Agricultural Conservation Practices and Related Issues: Reviews of the State of the Art and Research Needs

A Conservation Effects Assessment Bibliography

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Abstract

Agricultural Conservation Practices and Related Issues: Reviews of the State of the Art and Research Needs, Special Reference Brief 2004-04. U.S. Department of Agriculture, National Agricultural Library.

This bibliography is one in a multi-volume set developed by the Water Quality Information Center at the National Agricultural Library in support of the U.S. Department of Agriculture's Conservation Effects Assessment Project (CEAP). This bibliography is a guide to recent literature covering agricultural conservation practices and associated issues. This bibliography provides people working in the area of agriculture and the environment with information resources to help them design and implement productive agricultural systems that foster environmental protection and improvement.

Keywords: conservation practices, agricultural research, objectives, new methods, conservation programs, Farm Bill

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TABLE OF CONTENTS

Preface

This is one in a series of bibliographies developed by the Water Quality Information Center at the National Agricultural Library in support of the U.S. Department of Agriculture's Conservation Effects Assessment Project (CEAP).

The purpose of CEAP is to study the environmental effects of conservation practices implemented through various U.S. Department of Agriculture conservation programs. CEAP will evaluate conservation practices and management systems related to nutrient, manure, and pest management; buffer systems; tillage; irrigation and drainage practices; wetland protection and restoration; and wildlife habitat establishment. More information about CEAP is available at www.nrcs.usda.gov/technical/nri/ceap/.

The current titles in this series are

- Environmental Effects of U.S. Department of Agriculture Conservation Programs
  Special Reference Brief 2004-01
- Implementing Agricultural Conservation Practices: Barriers and Incentives
  Special Reference Brief 2004-02
- Data and Modeling for Environmental Credit Trading
  Special Reference Brief 2004-03
- Agricultural Conservation Practices and Related Issues: Reviews of the State of the Art and Research Needs
  Special Reference Brief 2004-04

Each of the documents, as well as bibliographies on similar topics, is accessible online from the Water Quality Information Center at www.nal.usda.gov/wqic/.

The center gratefully acknowledges the following organizations who granted permission to use their citations and/or abstracts in these bibliographies.

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  www.nisc.com
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  www.isinet.com
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  www.biosis.com

In addition, support from the Natural Resources Conservation Service for the development of these bibliographies is greatly appreciated.

Joseph R. Makuch, Ph.D.
Coordinator
Water Quality Information Center

About This Bibliography

This bibliography is a guide to recent literature covering agricultural conservation practices and associated issues. It is intended to provide people working in the area of agriculture and the environment with information resources they can use to help design and implement productive agricultural systems that foster environmental protection and improvement. A range of conservation practices and environmental issues associated with agricultural landscapes is covered.

Rather than being a listing of the many individual studies done on conservation practices, this bibliography focuses on literature reviews, summary articles, white papers and books—documents where information has already been combined and synthesized from many sources. Taken as a whole, the bibliography is an overview of the current understanding of conservation practices, including the research needed to improve practices.

There are 1,815 citations with abstracts (when available) in this bibliography. Citations were found through literature searches of the AGRICOLA database, produced by the National Agricultural Library, and several commercial bibliographic databases. In addition, Water Quality Information Center staff created citations for documents that were located by other means. Documents cited were published from 1993 through 2003 (with a few included from early 2004). URLs are provided for online documents that are freely available. The inclusion or omission of a particular citation does not imply endorsement or disapproval.

Citations are arranged alphabetically by title. To locate information on a specific topic, for example, conservation tillage, use the subject index beginning on page 325. To ensure that you see all the relevant citations for a particular topic, be sure to also look up related terms in the subject index, for example, no till, ridge till, etc., from the example above. An author index is also available beginning on page 375.

To obtain a specific document, please contact your local library. Information on how to obtain documents from the National Agricultural Library can be found at www.nal.usda.gov/ddsb/.

1. **1998 Literature Review.**
Water Environment Research 70 (4): 385-976. (1998)
NAL Call #: TD419.R47;
ISSN: 1047-7624
Descriptors: environmental monitoring/ waste treatment/ wastewater treatment/ agricultural wastes/ sediment transport/ groundwater/ nonpoint source pollution
Abstract: This issue is comprised of 46 different reviews on environmental topics in six categories: Measurement and Monitoring of Pollutants; Treatment Systems; Industrial Wastes; Hazardous Wastes; Fate and Effects of Pollutants; and Administration.

2. **Abatement of volatile organic sulfur compounds in odorous emissions from the bio-industry.**
Smet, E and Van Langenhove, H
Biodegradation 9 (3-4): 273-284. (1998); *ISSN:* 0923-9820
Descriptors: volatile organic sulfur compounds: abatement, pollutants/ biodegradation/ biotechnology/ odorous emissions: treatment/ wastewater treatment
Abstract: Compounds of interest in this work are methanethiol (MeSH), dimethyl sulfide (Me2S), dimethyl polysulfides (Me2Sx) and carbon disulfide (CS2) since these volatiles have been identified as predominant odorants in the emission of a wide range of activities in the bio-industry (e.g. aerobic waste water treatment plants, composting plants, rendering plants). In these processes, the occurrence of volatile organic sulfur compounds is mainly related to the presence of anaerobic microsites with consecutive fermentation of sulfur containing organic material and/or to the breakdown of the latter due to thermal heating. Due to the chemical complexity of these low-concentrated waste gas streams and the high flow rates to be handled, mainly biotechnological techniques and scrubbers can be used to control the odour emission. When using biofilters or trickling filters, inoculation with specific microorganisms and pH-control strategies should be implemented to optimise the removal of volatile organic sulfur compounds. In scrubbers, chemical oxidation of the volatile organic sulfur compounds can be obtained by dosing hypochlorite, ozone or hydrogen peroxide to the scrubbing liquid. However, optimal operational conditions for each of these abatement techniques requires a further research in order to guarantee a long-term and efficient overall odour abatement.
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3. **Abiotic Behaviour of Organic Micropollutants in Soils and the Aquatic Environment: A Review, Partitioning (Part I).**
Stangroom, S. J.; Lester, J. N.; and Collins, C. D.
Environmental Technology 21 (8): 845-863. (2000)
NAL Call #: TD1.E59;
ISSN: 0959-3330
Descriptors: Path of Pollutants/ Organic Matter/ Organic Carbon/ Humic Acids/ Sorption/ Colloids/ Clays/ Soil Contamination/ Water Pollution/ Herbicides/ Humic matter/ Sorption/ Pollution (Soil)/ Pollution (Water)/ Clay/ Aquatic environment/ Sediments/ Pesticides/ triazine/ isoproturon/ Sources and fate of pollution/ Water Quality/ Environmental action
Abstract: Recent research has confirmed the significance of organic carbon (OC) as the key sorbent for hydrophobic organic chemicals (HOC), as well as for many polar compounds. However, the triazine herbicides exhibit a variable affinity for soil organic matter (SOM) which is attributed to the extent of humification of the organic fraction. Charge transfer mechanisms are important for triazine sorption to OC and either proton or electron transfer may account for the reaction mechanism with humic acids. For many uron herbicides (e.g. chlorotoluron, metabromuron, chloroxuron, defenoxuron), sorption correlates with SOM. However, specific interactions between uron herbicides and a limited quantity of active constituents within SOM have also been proposed to explain deviations from sorption linearity at low herbicide relative concentration. Other studies indicate that isoproturon sorbs to organic colloids in solution and that a sorption threshold to SOM may be operative. Below the threshold, isoproturon appears to sorb predominantly to clays, indicating the presence of a limited number of 'active' sorptive sites within clay minerals. Research suggests that pesticide interactions with clay minerals may be influenced by near-surface clay geometry; the accessibility of the sorbing region of the sorbate to the active site of the clay; the identity of exchangeable cations on the clay and solution electrolytes. These recent studies indicate that interactions between micropollutants and soils and sediments often need to be evaluated on a compound-specific basis. This is especially the case for polar compounds which may partition to these environmental phases by diverse mechanisms.
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4. **Abiotic Behaviour of Organic Micropollutants in Soils and the Aquatic Environment: A Review, Transformations (Part II).**
Stangroom, S. J.; Collins, C. D.; and Lester, J. N.
Environmental Technology 21 (8): 865-882. (2000)
NAL Call #: TD1.E59;
ISSN: 0959-3330
Descriptors: Fate of Pollutants/ Organophosphorus Pesticides/ Photochemistry/ Degradation/ Water Pollution/ Soil Contamination/ Organic Matter/ Carbamate Pesticides/ Pesticides (Organophosphorus) / Decomposition/ Pollution (Water)/ Pollution (Soil)/ Pesticides (Organonitrogen)/ Pesticides/ Herbicides/ Chemical reactions/ Photodegradation/ Pyrethroids/ Carbamate compounds/ Organophosphorus compounds/ Hydrolysis/ Aquatic environment/ triazine/ urea/ Sources and fate of pollution/ Water Quality/ Environmental action
Abstract: The abiotic processes contributing to the transformation of pesticides in soils and natural waters are reviewed for pyrethroid, carbamate and organophosphorus (OP) insecticides; and the urea, chlorophenoxy and s-triazine herbicides. The review aims to highlight the known abiotic thermochemical and photochemical

reactions that may contribute to tfhe overall degradation of pesticides, and to identify the environmental factors influencing degradation pathways and rates of transformation. Studies indicate that transformation by hydrolysis is restricted to alkaline pH for pyrethroids, OPs, carbamates and benzoylphenylureas, and limited to acid pH for sulphonylureas. OPs are also susceptible to catalysed hydrolysis by certain cations and mineral-bound +III and +IV metal ions. Little or no hydrolysis of triazines occurs in the water column or groundwaters, although triazines may be subject to hydrolysis in certain soils at acid pH. Tests indicate that alkaline hydrolysis is the most significant abiotic process for mono-substituted carbamates, and that photosensitised degradation is the most important abiotic pathway many OPs. Certain pyrethroids, triazines and urea pesticides are susceptible to photodegradation. However, the potential for photosensitised transformation for the majority of pesticide classes is uncertain (e.g. ureas, carbamates, triazines and CPHs). Tests for sensitised photodegradation need to be extended and undertaken in mixtures of natural sensitisers because of the variable effects of dissolved organic matter (DOM). There appears to be insufficient information regarding the significance of hydrolysis, photochemical degradation, and metal/mineral-catalysed transformation in the environment for the majority of these extensively used pesticide classes.

5. **Accounting for seasonal nitrogen mineralization: An overview.**
Vigil, M. F.; Eghball, B.; Cabrera, M. L.; Jakubowski, B. R.; and Davis, J. G.
Journal of Soil and Water Conservation 57 (6): 464-469. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: organic nitrogen compounds/ mineralization/ soil organic matter/ seasonal variation/ soil flora/ decomposition/ biological activity in soil/ soil biology/ literature reviews
This citation is from AGRICOLA.

6. **Achievements in management and utilization of southern grasslands.**
Hoveland, C. S.
Journal of Range Management 53 (1): 17-22. (2000)
NAL Call #: 60.18 J82;
ISSN: 0022-409X
This citation is provided courtesy of CAB International/CABI Publishing.

7. **Achieving soil carbon sequestration in the United States: A challenge to the policy makers.**
Lal, R.; Follett, R. F.; and Kimble, J. M.
Soil Science 168 (12): 827-845. (2003)
NAL Call #: 56.8 So3;
ISSN: 0038-075X.
Notes: Number of References: 143; Publisher: Lippincott Williams & Wilkins
Descriptors: Environment/ Ecology/ climate change/ humus/ secondary carbonates/ soil carbon/ dynamics/ conservation tillage/ land use/ soil restoration/ soil degradation/ organic carbon/ wheat fallow/ chemical properties/ grassland soils/ climate change/ CO2 emissions/ crop rotation/ global change/ central Ohio/ urban trees
Abstract: Carbon (C) sequestration in soil implies enhancing the concentrations/pools of soil organic matter and secondary carbonates. It is achieved through adoption of recommended management practices (RMPs) on soils of agricultural, grazing, and forestry ecosystems, and conversion of degraded soils and drastically disturbed lands to restorative land use. Of the 916 million hectares (Mha) comprising the total land area in the continental United States and Alaska, 157 Mha (17.1%) are under cropland, 336 Mha (36.7%) under grazing land, 236 Mha (25.8%) under forest, 14 Mha (1.5%) under Conservation Reserve Programs (CRP), and 20 Mha (2.2%) are under urban land use. Land areas affected by different soil degradative processes include 52 Mha affected by water erosion, 48 Mha by wind erosion, 0.2 Mha by secondary salinization, and more than 4 Mha affected by mining. Adoption of RMPs can lead to sequestration of soil organic carbon (SOC) at an annual rate of 45 to 98 Tg (teragram = 1 X 10(12) g = 1 million metric tons or MMT) in cropland, 13 to 70 Tg in grazing land, and 25 to 102 Tg in forestlands. In addition, there is an annual soil C sequestration potential of 21 to 77 Tg by land conversion, 25 to 60 Tg by land restoration, and 15 to 25 Tg by management of other land uses. Thus, the total potential of C sequestration in soils of the United States is 144 to 432 Tg/y or an average of 288 Tg C/y. With the implementation of suitable policy initiatives, this potential is realizable for up to 30 years or when the soil C sink capacity is filled. In comparison, emission by agricultural activities is estimated at: 43 Tg C/y, and the current rate of SOC sequestration is reported as 17 Tg C/y. The challenge the policy makers face is to be able to develop and implement policies that are conducive to realization of this potential.

8. **Additives to reduce ammonia and odor emissions from livestock wastes: A review.**
McCrory, D. F. and Hobbs, P. J.
Journal of Environmental Quality 30 (2): 345-355. (Mar. 2001-Apr. 2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Descriptors: animal wastes/ feed additives/ adsorbents/ pollution control/ ammonia/ odors/ emission/ literature reviews/ microbial based feed additives/ digestive additives/ acidifying additives
Abstract: This paper reviews the use of additives to reduce odor and ammonia (NH3) emissions from livestock wastes. Reduction of NH3 volatilization has been shown to be possible, particularly with acidifying and adsorbent additives, and potential exists to develop further practical and cost-effective additives in this area. Masking, disinfecting, and oxidizing agents can provide short-term control of malodor, but as the capacity of these additives is finite, they require frequent reapplication. Microbial-based digestive additives may offer a solution to this problem as they are regenerative, but they appear to have been developed without a thorough understanding of microbiological processes occurring in livestock

wastes. Currently, their use to reduce odor or NH3 emissions cannot be recommend. If the potential of these types of additives is to be realized, research needs to shift from simply evaluating these unknown products to investigating known strains of bacteria or enzymes with known modes of action. To protect the farmers' interest, standard independent test procedures are required to evaluate efficacy. Such tests should be simple and quantify the capacity of the additive to perform as claimed. The principle use of additives needs to be identified and addressed during their development. Producers may not use effective additives in one area if they further compound other problems that they perceived to be more important. There is the potential to use additives to treat other problems associated with livestock wastes, particularly to improve handling properties, reduce pollution potential to watercourses, and reduce pathogenic bacteria. Further work is required in these areas.
This citation is from AGRICOLA.

9. **Adsorption and degradation: From the laboratory to the real world.**
Walker, A.
In: Pesticide in air, plant, soil & water system: Proceedings of the XII Symposium Pesticide Chemistry. (Held 4 Jun 2003-6 Jun 2003 at Piacenza, Italy.) Del Re, A. A. M.; Capri, E.; Padovani, L.; and Trevisan, M. (eds.); pp. 1-6; 2003.
ISBN: 88-7830-359-3
This citation is provided courtesy of CAB International/CABI Publishing.

10. **Advances in Actinorhizal Symbiosis: Host Plant-Frankia Interactions, Biology, and Applications in Arid Land Reclamation, A Review.**
Schwencke, J. and Caru, M.
Arid Land Research and Management 15 (4): 285-327. (2001)
NAL Call #: S592.17.A73 A74;
ISSN: 1532-4982
Descriptors: Nitrogen fixation/ Reclaimed land/ Trees/ Plants/ Reviews/ Symbiosis/ Frankia/ Nitrogen cycle
Abstract: Symbiotic association of the N sub(2)-fixing actinomycete Frankia with the roots of more than 200 tree species from 24 genera of 8 families of angiosperms has been studied since 1829. The first successful isolation of the microsymbiont and reinfection in the host plant was achieved in 1978. Marked advances in research and understanding of Frankia biology, its actinorhizal hosts and their interactions have made since then, although the studies on Frankia have been hampered by difficulties of isolation and their slow growth rate in vitro. Exponential growth with high biomass yields within three to four days has been obtained for a number of strains isolated from Casuarina spp. Use of BAP medium, supplemented with avian phospholipid mixtures and certain fatty acids at controled O sub(2) access, optimizes growth. Monosporal cultures are scarce; recently a few became available for biochemical and genetic studies. Research using exponentially growing cultures has yielded information on a complex proteolytic system, including proteasomes, endo- and extracellular proteinases and aminopeptidases, and also on esterases, dehydrogenases, and extracellular DNAses. Molecular tools have revealed a marked genetic diversity of Frankia soil populations and have enabled the definition of four clades in the Frankia phylogenetic tree. Studies on Frankia-host plant interactions have detected molecular signal exchange preceeding the establishment of symbiosis. Similarly, there is progress in research on transgenic actinorhizal plants and on actinorhizal-specific genes and proteins (actinorhizins) involved in symbiotic interactions, infectivity, and host specificity. Actinorhizal plants are rapidly growing species, able to develop in N-poor soils, and for certain species, in harsh environmental stress conditions. They increase the fertility of agroforestry ecosystems, and have an economic potential for timber, fuelwood production, land reclamation, and amenity planting. The Casuarina spp. are of especial value in arid environments.
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11. **Advances in grassland science.**
Mannetje, L. 'T.
Netherlands Journal of Agricultural Science 50 (2): 195-221. (2002)
NAL Call #: 12 N3892;
ISSN: 0028-2928
This citation is provided courtesy of CAB International/CABI Publishing.

12. **Advances in plant health management in the twentieth century.**
Cook, R. J.
Annual Review of Phytopathology 38: 95-116. (2000)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]
Descriptors: plant diseases/ plant protection/ integrated pest management/ planting stock/ roots/ soil fumigation/ rotations/ tillage/ intensive production/ air microbiology/ plant pests/ pest control/ epidemiology/ population ecology / decision making/ prediction/ defense mechanisms/ biological control/ biotechnology/ maximum yield/ crop yield/ literature reviews/ plant disease control
This citation is from AGRICOLA.

13. **Advances in poultry litter disposal technology: A review.**
Kelleher BP; Leahy JJ; Henihan AM; O'Dwyer TF; Sutton D; and Leahy MJ
Bioresource Technology 83 (1): 27-36. (2002)
NAL Call #: TD930.A32
This citation is provided courtesy of CAB International/CABI Publishing.

14. **Advances in weed management strategies.**
Ghersa, C. M.; Benech Arnold, R. L.; Satorre, E. H.; and Martinez Ghersa, M. A.
Field Crops Research 67 (2): 95-104. (2000)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Plant phenology and the management of crop-weed interactions / edited by C.M. Ghersa. Paper presented at a workshop held October 13-15, 1997, Buenos Aires, Argentina. Includes references.
Descriptors: weeds/ weed control/ integrated pest management/ annuals/ perennials/ long term experiments/ population dynamics/ population growth/ developmental stages/ demography/ literature reviews
This citation is from AGRICOLA.

15. **The advantages of implementation of water conservation practices in arid, semiarid regions.**
Agassi, M.
Journal of Sustainable Agriculture 18 (2/3): 63-69. (2001)
NAL Call #: S494.5.S86S8;
ISSN: 1044-0046 [JSAGEB]

Descriptors: arid zones/ semiarid zones/ water conservation/ water erosion/ water availability/ rain/ runoff/ mulching/ evaporation/ water use efficiency/ aquifers/ soil conservation/ literature reviews/ erosion control
Abstract: In arid, semiarid regions (ASAR), water is the limiting factor for economical yields, and the main source of water for crops is the annual rainfall. Taking into consideration that there is no considerable soil erosion by rain water without runoff initiation, it suggested to focus on the control of rainfall water loss (runoff) instead of on the control of soil loss by rain water, e.g., to replace terracing practices with mulching and increasing of the soil surface storage practices. Mulching also reduces direct evaporation of rain water, therefore increasing rain water use efficiency by crops and the recharge of aquifers.
This citation is from AGRICOLA.

16. **Aeration of livestock manure slurry and lagoon liquid for odor control: A review.**
Westerman PW and Zhang RH
Applied Engineering in Agriculture 13 (2): 245-249. (1997)
NAL Call #: S671.A66
This citation is provided courtesy of CAB International/CABI Publishing.

17. **Aerial pollutants and the health of poultry farmers.**
Whyte, R. T.
World's Poultry Science Journal 49 (2): 131-156. (1993)
NAL Call #: 47.8-W89;
ISSN: 0043-9339
This citation is provided courtesy of CAB International/CABI Publishing.

18. **Aggregate stability and assessment of soil crustability and erodibility: Theory and methodology.**
Le, Bissonnais Y
European Journal of Soil Science 47 (4): 425-437. (1996);
ISSN: 1351-0754.
Notes: Subtitle: [Part] I.
Descriptors: aggregation stability/ crusting/ erosion/ soil crustability/ soil erodibility/ soil science
Abstract: Crusting and erosion of cultivated soils result from aggregate breakdown and the detachment of soil fragments by rain, and the susceptibility of soil to these processes is often inferred from measurements of aggregate stability. Here, theories of aggregate breakdown are reviewed and four main mechanisms (i.e. slaking, breakdown by differential swelling, mechanical breakdown by raindrop impact and physico-chemical dispersion) are defined. Their relative importance depends on the nature of the rain, as well as on the soil's physical and chemical properties. The relations between aggregate breakdown, crusting and water erosion are analysed, and existing methods for the assessment of aggregate stability are reviewed. A unified framework for the measurement of aggregate stability is proposed to assess a soil's susceptibility to crusting and erosion. It combines three treatments having various wetting conditions and energies (fast wetting, slow wetting, and stirring after pre-wetting) and measures the resulting fragment size distribution after each treatment. It is designed to compare different soils, or different climatic conditions for a given soil, not to compare time-dependent changes in that soil.
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19. **Agricultural chemical discharge in surface water runoff.**
Smith, S. J.; Sharpley, A. N.; and Ahuja, L. R.
Journal of Environmental Quality 22 (3): 474-480. (July 1993-Sept. 1993)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the USDA-ARS Beltsville Agricultural Research Center Symposium XVII, "Agricultural Water Quality Priorities, A Team Approach to Conserving Natural Resources," May 4-8, 1992, Beltsville, MD. Includes references.
Descriptors: agricultural chemicals/ discharge/ surface water/ runoff/ watersheds/ grasslands/ farmland/ watershed management/ crop management/ research/ equations/ literature reviews
Abstract: The discharge of agricultural chemicals (i.e., soil-fertilizer nutrients and pesticides) in runoff waters is important from both agronomic and environmental standpoints. Presented here is an overview of our current concepts and approaches employed for describing this discharge, based on studies we have conducted over the past decade. Most of our field testing and validation of concepts regarding chemical discharge has focused on approximately 24 grassland and cropland watersheds across the Southern Plains. Chemicals considered include N, P, K, S, atrazine [2-chloro-4(ethylamino)-6-(isopropylamino)-s-triazine], alachlor [2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide], and cyanazine [2-[[4-chloro-6-(ethylamino)-s-triazine-2-yl]amino]-2-methy lpropionitrile]. Soluble chemical discharge has been described by kinetic desorption and uniform or nonuniform mixing approaches, incorporating parameters reflecting watershed management and the nature of the surface soil X precipitation interaction. Particulate chemical discharge has been described by the relationship between the discharge enrichment ratio (chemical content of eroded sediment/source soil) and soil loss. Special situations considered include type of tillage, computed water and sediment runoff, severe storms, bioavailability of P, cover crops, and manure applications. For the most part, predicted chemical discharge values compared favorably with their measured counterparts, r2 values often being > 0.9. Further research needs include refinement and development of the prediction equations, data bases, runoff indices, and multidisciplinary systems.
This citation is from AGRICOLA.

20. **Agricultural Contaminants in Quaternary Aquitards: A Review of Occurrence and Fate in North America.**
Rodvang, S. and Simpkins, W.
Hydrogeology Journal 9 (1): 44-59. (2001);
ISSN: 1431-2174.
Notes: Publisher: Springer-Verlag
Descriptors: North America/ Fate of Pollutants/ Agricultural Chemicals/ Groundwater Pollution/ Groundwater/ Chemical Composition/ Organic Carbon/ Sulfur/ Geologic Time/ Biogeochemistry/ Agriculture/ Aquifers/ Permeability/ Contaminants/ Pesticides/ Hydrology/ North America/ Sources and fate of pollution/ Freshwater pollution
Abstract: The intensity of agriculture has increased significantly during the past 30 years, resulting in increased detection of agricultural contaminants (nutrients, pesticides, salts, trace elements, and pathogens) in groundwater. Till, glaciolacustrine, and loess deposits of Quaternary age

compose the most common surficial deposits underlying agricultural areas in North America. Quaternary aquitards generally contain higher concentrations of solid organic carbon (SOC, as much as 1.4%), dissolved organic carbon (DOC, as much as 205 mg/L), and reduced sulfur (as much as 0.9%) than do aquifers. Their potential to sorb pesticides increases with the percent of older SOC, because diagenesis increases Koc. Denitrification consistently reduces nitrate to non-detectable levels in unweathered Quaternary aquitards. Organic carbon of Quaternary age is a more labile electron donor than carbon from shale clasts. Pyrite is a more labile electron donor than carbon in many instances. Unweathered Quaternary aquitards provide a high degree of protection for underlying aquifers, due to their large reserves of SOC and reduced sulfur for sorption and denitrification, combined with their typically low hydraulic conductivity. In contrast, agricultural contaminants are common in weathered Quaternary aquitards. Lower reserves of reduced sulfur and sorptive/labile organic carbon, and a higher bulk K due to fractures, limit their ability to attenuate nitrate and pesticides. Subsurface drainage, which is common in Quaternary aquitards because of high water tables, bypasses the attenuation capacity of Quaternary aquitards and facilitates the transport of agricultural contaminants to surface water.

21. **Agricultural drainage.**
Skaggs, R. W.; Van Schilfgaarde, J.; and American Society of Agronomy.
Madison, Wis., USA: American Society of Agronomy. (1999)
NAL Call #: 4-Am392-no.38;
ISBN: 0891181415
Descriptors: Drainage
This citation is from AGRICOLA.

22. **Agricultural drainage water management in arid and semi-arid areas.**
Tanji, Kenneth K.; Kielen, Neeltje C.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; xiv, 188 p.: ill. 1 CD-ROM (4 3/4 in).; Series: FAO irrigation and drainage paper 0254-5284 (61). (2002)
NAL Call #: S612-.I754-no.-61;
ISBN: 9251048398
Descriptors: Drainage---Management/ Irrigation---Management/ Water quality/ Arid regions agriculture
Abstract: "This publication provides planners, decision-makers and engineers with guidelines to sustain irrigated agriculture and at the same time to protect water resources from the negative impacts of agricultural drainage water disposal. On the basis of case studies from Central Asia, Egypt, India, Pakistan and the United States of America, it distinguishes four broad groups of drainage water management options: water conservation, drainage water reuse, drainage water disposal and drainage water treatment."--P. [4] of cover.
This citation is from AGRICOLA.

23. **Agricultural drainage: Water quality impacts and subsurface drainage studies in the Midwest.**
Zucker, Leslie A.; Brown, Larry C.; and Ohio State University. Extension.
Columbus, OH: Ohio State University Extension; Series: Bulletin 871. (1998)
Notes: Title from web page. Description based on content viewed May 5, 2003.
NAL Call #: 275.29-.Oh32-no.-871
http://ohioline.osu.edu/b871/index.html
Descriptors: Drainage---Middle West/ Water quality---Middle West
This citation is from AGRICOLA.

24. **Agricultural influence on landscape sensitivity in the Upper Mississippi River Valley.**
Knox, James C
Catena 42 (2-4): 193-224. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: agricultural land use/ alluvial sediments/ climate change/ climate variability/ environmental conditions/ erosion/ floodplain stratigraphy/ floods/ landscape sensitivity/ sedimentation/ surface runoff/ tillage/ water infiltration
Abstract: Agricultural landscapes are more sensitive to climatic variability than natural landscapes because tillage and grazing typically reduce water infiltration and increase rates and magnitudes of surface runoff. This paper evaluates how agricultural land use influenced the relative responsiveness of floods, erosion, and sedimentation to extreme and nonextreme hydrologic activity occurring in watersheds of the Upper Mississippi Valley. Temporally overlapping stratigraphic and historical instrumental records from southwestern Wisconsin and northwestern Illinois show how agricultural modification of a natural prairie and forest land cover affected the behavior of floods and sedimentation during the last two centuries. For comparison, pre-agriculture Holocene alluvial sediments document the sensitivity of floods and alluvial activity to climate change prior to significant human influences on the natural land cover. High-resolution floodplain stratigraphy of the last two centuries shows that accelerated runoff associated with agricultural land use has increased the magnitudes of floods across a wide range of recurrence frequencies. The stratigraphic record also shows that large floods have been particularly important to the movement and storage of sediment in the floodplains of the Upper Mississippi Valley. Comparison of floodplain alluvial sequences in watersheds ranging in scale from headwater tributaries to the main valley Mississippi River demonstrates that land use changes triggered hydrologic responses that were transmitted nearly simultaneously to all watershed scales. In turn, flood-driven hydraulic adjustments in channel and floodplain morphologies contributed to feedback effects that caused scale-dependent long-term lag responses. There has been a general reduction in magnitudes of flooding, erosion, and sedimentation since the mid-20th century, largely in response to better land conservation practices. The reduction trend is most apparent on tributary watersheds of a few hundred square kilometers and smaller sizes. However, the main-channel Upper Mississippi River, with associated drainage areas between about 100,000-200,000 km2, has experienced increased occurrences of large floods during the second half of the 20th century. Most of these large floods have been associated with snowmelt runoff which is occurring more rapidly and earlier in the season in response to a trend toward warmer winters and springs in the late 20th century. Modification of the natural drainage network through establishment of drainage tiles and channelization has also continued during the late 20th century. Tiling and channelization have increased

drainage efficiency and probably have contributed in part to the occurrence of large floods on the Mississippi River, but the magnitudes of their effects are unknown at present. In spite of reduced sediment loads since about 1950 on all watershed scales, the anomalous high frequency of large floods on the Upper Mississippi River continues the accelerated delivery of agriculturally-related sediment to floodplain and backwater environments. The results of this study indicate that agricultural land use has escalated landscape sensitivity to such a degree that modern process rates provide a very distorted representation of process rates that occurred in the geologic past prior to human disturbance.

25. **Agricultural land fragmentation: The spatial effects of three land protection strategies in the eastern United States.**
Brabec, E. and Smith, C.
Landscape and Urban Planning 28 (2-4): 255-268. (Feb. 2002)
NAL Call #: QH75.A1L32;
ISSN: 0169-2046
Descriptors: Agricultural land/ Sustainable development/ Land use/ Landscape/ United States/ Planning/ development
Abstract: Fragmentation of agricultural land by urban sprawl affects both the agricultural production capacity of the land and its rural scenic quality. In order to assess the resulting fragmentation of the three most common types of agricultural land conservation tools in the United States, this study analyzes the spatial form of three land protection strategies: a purchase of development rights (PDR) program, a clustering program and a transfer of development rights program. By assessing a series of measures of success such as total acreage protected, size of parcels, contiguity and farming status, the study compares the effectiveness of programs that have been in place for approximately 20 years, analyzing the extent to which each program prevents or enhances fragmentation. The analysis shows that although the number of acres protected is an important factor in program success, the amount of protected land remaining in active farming is additionally influenced by any development rights that may remain with the land, the use of a variety of tools to reduce the likelihood of parcel isolation, and the adjacency and contiguity of protected parcels.

26. **Agricultural NH3 and NOx emissions in Canada.**
Kurvits, T. and Marta, T.
Environmental Pollution 102 (Supp 1): 187-194. (1998)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491.
Notes: From: Proceedings of the First International Nitrogen Conference, Noordwijkerhout, Netherlands, 23-27 March 1998.
This citation is provided courtesy of CAB International/CABI Publishing.

27. **Agricultural pesticide emissions associated with common crops in the United States.**
Benjey, William G.
Research Triangle Park, NC: Office of Research and Development, U.S. Environmental Protection Agency; 16 p.: ill., maps. (1993)
Notes: "EPA/600/A-93/065." "PB93-173136." Includes bibliographical references (p. 13-14).
NAL Call #: QH545.P4B49-1993
Descriptors: Pesticides---Environmental aspects---Measurement
This citation is from AGRICOLA.

28. **Agricultural pesticides: Management improvements needed to further promote integrated pest management: Report to the Chairman, Subcommittee on Research, Nutrition, and General Legislation, Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.**
United States. General Accounting Office and United States. Congress. Senate. Committee on Agriculture, Nutrition and Forestry. Subcommittee on Research Nutrition and General Legislation.
Washington, D.C.: GAO. (2001)
Notes: Title from web page. "August 2001." "GAO-01-815." Description based on content viewed July 26, 2002. Includes bibliographical references.
NAL Call #: SB950.2.A1-A57-2001
http://www.gao.gov/new.items/d01815.pdf
Descriptors: Pesticides---United States/ Agricultural pests---Integrated control---United States/ Pests---Integrated control---United States
This citation is from AGRICOLA.

29. **Agricultural Phosphorus and Eutrophication: A Symposium Overview.**
Daniel, T. C.; Sharpley, A. N.; and Lemunyon, J. L.
Journal of Environmental Quality 27 (2): 251-257. (1998)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: USA/ Phosphorus/ Eutrophication/ Agricultural Runoff/ Water Pollution/ Cultivated Lands/ Nonpoint Pollution Sources/ Soil Management/ Sources and fate of pollution
Abstract: Phosphorus in runoff from agricultural land is an important component of nonpoint-source pollution and can accelerate eutrophication of lakes and streams. Long-term land application of P as fertilizer and animal wastes has resulted in elevated levels of soil P in many locations in the USA. Problems with soils high in P are often aggravated by the proximity of many of these areas to P-sensitive water bodies, such as the Great Lakes, Chesapeake and Delaware Bays, Lake Okeechobee, and the Everglades. This paper provides a brief overview of the issues and options related to management of agricultural P that were discussed at a special symposium titled, "Agricultural Phosphorus and Eutrophication," held at the November 1996 American Society of Agronomy annual meetings. Topics discussed at the symposium and reviewed here included the role of P in eutrophication; identification of P-sensitive water bodies; P transport mechanisms; chemical forms and fate of P; identification of P source areas; modeling of P transport; water quality criteria; and management of soil and manure P, off-farm P inputs, and P transport processes.

30. **Agricultural phosphorus, water quality, and poultry production: Are they compatible.**
Sharpley, A.
Poultry Science 78 (5): 660-673. (May 1999)
NAL Call #: 47.8-Am33P;
ISSN: 0032-5791 [POSCAL]

Descriptors: poultry industry/ battery husbandry/ poultry manure/ application to land/ application rates/ phosphorus/ farming systems/ fertilizer requirement determination/ runoff water/ water pollution/ eutrophication/ use efficiency/ tillage/ soil testing/ losses from soil/ literature reviews
Abstract: With the concentration of poultry production and increase in operation size in several regions of the U.S., more manure is applied to agricultural land. This application of manure has resulted in more P being added than crops require, an accumulation in soil P, and increased potential for P loss in surface runoff. This situation has been exacerbated by manure management being N-based. Increased outputs of P to fresh waters can accelerate eutrophication, which impairs water use and can lead to fish kills and toxic algal blooms. As a result, information is needed on the effect of poultry production on the fate of P in agricultural systems so that compatible production and water quality goals can be met. Overall, these goals will be met by focusing on ways to increase P use-efficiency by attempting to balance inputs of P in feed and fertilizer into a watershed with output in crop and livestock. This will involve refining feed rations, using feed additives to increase P absorption by the animal, moving manure from surplus to deficit areas, finding alternative uses for manure, and targeting conservation practices, such as reduced tillage, buffer strips, and cover crops, to critical areas of P export from a watershed. These critical areas are where high P soils coincide with parts of the landscape where surface runoff and erosion potential is high. Development of management systems that address both production and environmental concerns must consider the socioeconomic and political impacts of any management changes on both rural and urban communities, and of the mechanisms by which change can be achieved in a diverse and dispersed community of land users.
This citation is from AGRICOLA.

31. **Agricultural sustainability and nematode integrated pest management.**
Duncan, Larry W. and Noling, Joseph W.
In: Plant and nematode interactions/ Barker, K. R.; Pederson, G. A.; and Windham, G. L.;
Series: Agronomy 36.
Madison, WI: Soil Science Society of America, 1998; pp. 251-287.
ISBN: 0891181369;
ISSN: 0065-4663
Descriptors: nematicides: pesticide/ agricultural sustainability/ plant nematode interactions/ Agronomy (Agriculture)/ Pest Assessment Control and Management/ integrated pest management: crop rotation/ integrated pest management: pest control method/ sanitation/ tillage/ physical chemical methods
© Thomson

32. **Agricultural waste.**
Marr, J. B. and Facey, R. M.
Water Environment Research 67 (4): 503-507. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Characterization/ Reviews/ Agricultural wastes/ Recycling/ Nitrification/ Denitrification/ Anaerobic digestion/ Industrial management/ Composting/ Waste utilization/ Drainage rates/ Land application/ Industrial Wastes Treatment/ Industrial Wastes/ Agricultural Wastes/ Chemical Reactions/ Biology
Abstract: This paper presents a review of literature published in 1994 on the subject of agricultural wastes. The review is divided into several sections, which cover: Management and characterization; Treatment; Reuse and recycle; Composting; and; Anaerobic treatment.
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33. **Agricultural wastes.**
Poggi Varaldo, H. M. and Estrada Vazquez, C.
Water Environment Research 69 (4): 575-603. (June 1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: agricultural wastes/ waste treatment/ composting/ pesticides/ soil pollution/ water pollution/ literature reviews
This citation is from AGRICOLA.

34. **Agricultural Wastes.**
Poggi-Varaldo, H. M.; Estrada-Vazquez, C.; and Rinderknecht-Seijas, N.
Water Environment Research 70 (4): 601-620. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Farm Wastes/ Manure/ Slurries/ Phosphorus/ Nitrogen/ Sampling/ Agricultural wastes/ Animal wastes/ Sampling methods/ Agricultural runoff/ Pollution monitoring/ Eutrophication/ Ultimate disposal of wastes/ Waste management/ Behavior and fate characteristics/ Waste Management
Abstract: Both currently available and recently developed new sampling methods for slurry and solid manure were tested for bias and reproducibility in the determination of total phosphorous and nitrogen content of the samples. Sampling methods were based on techniques in which samples were taken either during loading from the hose or from the transporting vehicle after loading. It was demonstrated that most methods were unbiased.
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35. **Agricultural wastes.**
Poggi Varaldo, H. M.
Water Environment Research 71 (5): 737-785. (Aug. 1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: agricultural wastes/ animal wastes/ waste treatment/ waste disposal/ soil pollution/ water pollution/ pesticide residues/ groundwater pollution/ literature reviews
This citation is from AGRICOLA.

36. **Agricultural water conservation: A global perspective.**
Unger, P. W. and Howell, T. A.
Journal of Crop Production 2 (2): 1-36. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Water use in crop production / edited by M.B. Kirkham. Includes references.
Descriptors: agriculture/ water conservation/ semiarid climate/ crop production/ irrigation/ temporal variation/ spatial variation/ market competition/ dry farming/ evaporation/ weed control/ irrigation systems/ water management/ irrigation water/ infiltration/ tillage/ mulches/ no-tillage/

soil water retention/ fallow/ water use efficiency/ crop yield/ harvesting date/ literature reviews
This citation is from AGRICOLA.

37. **Agricultural Wetlands and Waterbirds: A Review.**
Czech, H. A. and Parsons, K. C.
Waterbirds 25 (2 [supplement]): 56-65. (2002);
ISSN: 1524-4695.
Notes: Managing Wetlands for Waterbirds: Integrated Approaches
Descriptors: Agricultural ecosystems/ Wetlands/ Habitat changes/ Habitat utilization/ Reviews/ Aquatic birds/ Habitat/ Literature reviews/ Agriculture/ Breeding sites/ Foraging behaviour/ Rice fields/ Aves/ Birds/ Management/ Ecology/ Community Studies/ Conservation, wildlife management and recreation
Abstract: Waterbird use of agricultural wetlands has increased as natural wetlands continue to decline worldwide. Little information exists on waterbird use of wetland crops such as taro, hasu, and wild rice. Several reports exist on waterbird use of cranberry bog systems. Information exists on waterbird use of rice fields, especially by herons and egrets. Rice fields encompass over 1.5 million km super(2) of land and are found on all continents except Antarctica. Rice fields are seasonally flooded for cultivation and to decoy waterfowl, and drawn down for sowing and harvest. A wide variety of waterbirds including wading birds, shorebirds, waterfowl, marshbirds, and seabirds utilize rice fields for foraging and to a lesser extent as breeding sites. In some areas, especially Asia, waterbirds have come to rely upon rice fields as foraging sites. However, few reports exist on waterbird use of rice ecosystems outside of the Mediterranean Region. Species that are commonly found utilizing agricultural wetlands during the breeding season, migration, and as wintering grounds are listed. General trends and threats to waterbirds utilizing agricultural wetlands, including habitat destruction and degradation, contaminant exposure, and prey fluctuations are presented.
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38. **Agriculture and Environment: A Review, 1972-1992.**
Biswas, M. R.
Ambio 23 (3): 192-197. (1994)
NAL Call #: QH540.A52;
ISSN: 0044-7447
Descriptors: reviews/ agricultural practices/ environmental degradation/ resource evaluation/ land use/ pesticide residues/ nutrition/ agriculture/ public health/ environmental quality/ Management/ Land pollution/ Ecological impact of water development
Abstract: The resources necessary for food production have shown a disquieting deterioration during the last two decades. Modern intensive agriculture has had an adverse effect not only on the physical environment but also on human health. Land has been degraded, water resources have been depleted, and genetic resources have been lost. In addition, there have been negative impacts on human health because of agricultural inputs. Extensive data have been used to indicate the evolution of the problems and the present status.
© Cambridge Scientific Abstracts (CSA)

39. **Agriculture and phosphorus management: The Chesapeake Bay.**
Sharpley, Andrew N.
Boca Raton, Fla.: Lewis Publishers; 229 p.: ill., maps. (2000)
NAL Call #: TD427.P56-A35-2000;
ISBN: 1566704944
Descriptors: Phosphorus---Environmental aspects---Chesapeake Bay Watershed---Md and Va/ Water quality---Chesapeake Bay Watershed---Md and Va/ Phosphorus in agriculture---Chesapeake Bay Watershed---Md and Va
This citation is from AGRICOLA.

40. **Agriculture and the environment.**
Shortle, J. S. and Abler, D. G.
Handbook of Environmental and Resource Economics: 159-176. (2002); *ISBN:* 1-84376-236-6
This citation is provided courtesy of CAB International/CABI Publishing.

41. **Agriculture and the environment: The problem of soil erosion.**
Uri, N. D.
Journal of Sustainable Agriculture 16 (4): 71-94. (2000)
NAL Call #: S494.5.S86S8;
ISSN: 1044-0046 [JSAGEB]
Descriptors: erosion control/ agriculture/ environmental impact/ soil depth/ sediment/ streams/ lakes/ estuaries/ soil conservation/ farm income/ agricultural policy/ nature conservation/ wind erosion/ sheet erosion/ rill erosion/ social costs/ government policy/ agricultural education/ technology transfer/ research/ taxes/ literature reviews/ United States
This citation is from AGRICOLA.

42. **Agriculture and water contamination: Methods of study and research.**
Borin, M.
Genio Rurale 61 (12): 39-48. (1998);
ISSN: 0016-6863
This citation is provided courtesy of CAB International/CABI Publishing.

43. **Agriculture and Water Quality.**
Barrios, A.; American Farmland Trust, Center for Agriculture in the Environment.
American Farmland Trust [Also available as: CAE/WP 00-2], 2000 (application/pdf)
http://www.aftresearch.org/researchresource/wp/wp00-2.pdf
Descriptors: agricultural land/ cropland/ rangelands/ water quality/ nonpoint source pollution/ best management practices/ conservation practices/ environmental protection/ agricultural policy/ environmental policy/ citizen participation/ public economics/ United States/ land stewardship/ BMPs

44. **Agriculture and wildlife: Ecological implications of subsurface irrigation drainage.**
Lemly, A. D.
Journal of Arid Environments 28 (2): 85-94. (1994)
NAL Call #: QH541.5.D4J6;
ISSN: 0140-1963 [JAENDR]
Descriptors: irrigated farming/ irrigation/ subsurface drainage/ drainage water/ contaminants/ selenium/ trace elements/ salinization/ toxicity/ wetlands/ wildlife/ wild birds/ literature reviews/ arid regions/ western states of USA/ California/ migratory birds
This citation is from AGRICOLA.

45. **Agriculture, methyl bromide, and the ozone hole: Can we fill the gaps?**
Ristaino, Jean Beagle and Thomas, William
Plant Disease 81 (9): 965-977. (1997)
NAL Call #: 1.9-P69P;
ISSN: 0191-2917
Descriptors: methyl bromide/ ozone/

agriculture/ biobusiness/ climatology/ fumigant/ methyl bromide/ ozone depletor/ ozone hole/ pesticide/ pesticides/ phytopathology/ pollutant/ pollution

46. **Agrochemical and nutrient impacts on estuaries and other aquatic systems.**
Hapeman, C. J.; Dionigi, C. P.; Zimba, P. V.; and McConnell, L. L.
Journal of agricultural and food chemistry 50 (15): 4382-4384. (July 2002)
NAL Call #: 381 J8223;
ISSN: 0021-8561 [JAFCAU]
Descriptors: water pollution/ runoff/ agricultural land/ nutrients/ pesticide residues/ environmental impact/ estuaries/ environmental protection/ water quality
Abstract: This paper summarizes the "Agrochemical and Nutrient Impacts on Estuaries" symposium held at the 220th National Meeting of the American Chemical Society. The focus of the symposium was to highlight ongoing research efforts to understand estuarine function and pollutant fate in these important ecosystems. Expanding urbanization and agricultural activity can result in increased particulate and chemical loads, resulting in decreased light penetration and degraded aquatic habitats. Legislative and regulatory protections, such as the Clean Water Act and Total Maximum Daily Loads (TMDLs), are considered here. Measurement of nutrient and pesticide loads and their ecotoxicological impacts are explored, as well as potential mitigation practices. The complexity and high visibility of estuarine ecosystem health will require continued examination to develop more effective agricultural and land management strategies and sound science-based regulations.
This citation is from AGRICOLA.

47. **Agrochemical leaching and water contamination.**
Rose, S. C. and Carter, A. D.
In: Conservation agriculture: Environment, farmers experiences, innovations, socio-economy, policy/ García-Torres, L.; Benites, J.; Martínez-Vilela, A.; and Holgado-Cabrera, A.
Dordrecht, The Netherlands: Kluwer Academic, 2003; pp. 417-424.
ISBN: 1-4020-1106-7
NAL Call #: S604.5 .C64 2003
This citation is provided courtesy of CAB International/CABI Publishing.

48. **Agrochemicals and water management.**
Kanwar, R. S.
In: Sustainability of irrigated agriculture: Proceedings of the NATO Advanced Research Workshop. (Held 21 Mar 1994-26 Mar 1994 at Vimeiro, Portugal.) Pereira, L. S.; Feddes, R. A.; Gilley, J. R.; and Lesaffre, B. (eds.)
Dordrecht: Kluwer; pp. 373-393; 1996.
ISBN: 0-7923-3936-3
This citation is provided courtesy of CAB International/CABI Publishing.

49. **Agroecosystem responses to combinations of elevated CO2, ozone, and global climate change.**
Fuhrer, J.
Agriculture, Ecosystems and Environment 97 (1/3): 1-20. (2003)
NAL Call #: S601 .A34;
ISSN: 0167-8809
This citation is provided courtesy of CAB International/CABI Publishing.

50. **Agroforestry and wildlife: Opportunities and alternatives.**
Allen, A. W.
In: Agroforestry and sustainable systems symposium proceedings. Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 67-73; 1995.
Notes: Meeting held August 7-10, 1994, Fort Collins, Colorado. Includes references.
NAL Call #: aSD11.A42-no.261
Descriptors: wildlife / agroforestry/ ecosystems/ farm management/ land use/ land use planning/ habitats/ fragmentation/ fauna/ literature reviews
This citation is from AGRICOLA.

51. **Agroforestry in North America and its role in farming systems.**
Williams, P. A.; Gordon, A. M.; Garrett, H. E.; and Buck, L.
In: Temperate agroforestry systems/ Gordon, A. M. and Newman, S. M. Wallingford, UK: CAB International, 1997; pp. 9-84.
ISBN: 0-85199-147-5
This citation is provided courtesy of CAB International/CABI Publishing.

52. **Agroforestry opportunities for the United States of America.**
Schultz, R. C.; Colletti, J. P.; and Faltonson, R. R.
Agroforestry Systems 31 (2): 117-132. (1995)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
This citation is provided courtesy of CAB International/CABI Publishing.

53. **Agroforestry policy issues and research directions in the US and less developed countries: Insights and challenges from recent experience.**
Buck, L E
Agroforestry Systems 30 (1-2): 57-73. (1995)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
Descriptors: Spermatophyta (Spermatophyta)/ plants/ spermatophytes/ vascular plants/ agriculture integrative approach/ natural resource management/ policy assessment/ sustainable development
Abstract: Efforts to improve the performance of agroforestry systems, and to expand the land area and number of people able to benefit from this integrative approach to agriculture and natural resource management, are constrained throughout the world by non-supportive land use policies. A growing sense of urgency that policy change is needed to enable agroforestry to flourish has contributed during the past two years to an unprecedented level of agroforestry policy assessment and planning activity. In the US, agroforestry has emerged from academia, where it has incubated since the mid-1980s, into the professional resource management arena. A multi-organizational agroforestry evaluation process has driven national policy and program formation to the forefront of the agenda of the agroforestry community, as it seeks to influence the 1995 Farm Bill. Internationally, the Consultative Group on International Agricultural Research and collaborators fostered a sequence of policy issue identification activities as a basis for setting strategic research priorities for forestry and agroforestry. Following a brief review of forces driving agroforestry development in industrialized and less developed countries, the paper highlights recent policy assessment initiatives in each sphere. Observations on the issues

driving and the priorities emerging from these processes are offered, to lend perspective to the critical challenges facing the agroforestry policy research community. An explanation for pervasive constraints and inconsistencies in policy effectiveness is then explored, from which a promising approach to research intervention is forwarded. It is argued that social scientists might influence agroforestry policy most favorably at this critical juncture, as perceptions of inter-dependence increase among different stakeholders in the policy system, by employing interventionist, actor-oriented perspectives and participatory methods to facilitate policy innovation and evaluation. The approach is consistent with participatory technology design processes that earlier helped to establish agroforestry as a prototype for sustainable development.
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54. **Agroforestry practice and policy in the United States of America.**
Garrett, H. E. G. and Buck, L.
Forest Ecology and Management 91 (1): 5-15. (1997)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

55. **Agronomic measures for better utilization of soil and fertilizer phosphates.**
Mengel, Konrad
European Journal of Agronomy 7 (1-3): 221-233. (1997)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: lime: soil amendment/ phosphate: fertilizer, fixation, nutrient/ higher plants (Tracheophyta)/ livestock (Mammalia)/ mycorrhizal fungi (Fungi): symbiont/ Animals/ Chordates/ Fungi/ Mammals/ Microorganisms/ Nonhuman Mammals/ Nonhuman Vertebrates/ Nonvascular Plants/ Plants/ Vascular Plants/ Vertebrates/ cropping systems/ farmyard manure/ soil pH/ Oxisol
Abstract: Global known phosphate deposits are a finite resource which will run out in about four centuries at the present consumption rate. Since about 90% of the phosphate mined is used for fertilizer, soil and fertilizer phosphate should be efficiently used. Various agronomic measures are discussed relevant for saving phosphate and avoiding losses. Phosphate fertilizer rates should be adjusted to measured requirements for phosphate using soil tests. Particularly in areas with high livestock intensities soils frequently are much enriched in available phosphate and do not need further phosphate application whether in organic or in inorganic form. Excessively high levels of available soil phosphate, much higher than required for optimum crop production increase the hazard of phosphate loss by wind and water erosion and even leaching. Loss of plant available phosphate in soils occurs by phosphate fixation which is especially strong in acid mineral soils. Such losses can be dramatically reduced by liming soils to a pH of 6-7. In tropical areas where lime frequently is not available row placement of phosphate fertilizer is recommended. Oxisols with a very low pH liming, however, may promote phosphate fixation due to the formation of phosphate adsorbing Al complexes. Biological assimilation of phosphate may prevent inorganic phosphate from fixation by soil particles. Organic anions produced during the decomposition of organic matter in soils as well as the excretion of anions by plant roots depress phosphate adsorption by competing with phosphate for binding sites at the adsorbing surface. Hence farming systems and rotations which bring much organic matter into soils contribute to a better use of soil and fertilizer phosphate. Mycorrhization of plant roots with appropriate fungi ecotypes may essentially improve the exploitation of soil phosphates. The choice of the appropriate phosphate fertilizer type is crucial for its efficient use. This applies particularly for apatitic fertilizers of which the availability is poor in weakly acid to neutral and calcareous soils.
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56. **Air emissions from animal feeding operations: Current knowledge, future needs.**
Committee on Air Emissions from Animal Feeding Operations; Committee on Animal Nutrition; and National Research Council
Washington DC: National Academies Press; 286 p. (2003)
NAL Call #: TD886-.N38-2002;
ISBN: 0-309-08705-8
http://www.nap.edu/books/0309087058/html/
Descriptors: animal feeding/ emissions/ pollution control/ ammonia/ nitrous oxide/ methane/ odors

57. **Air quality and emissions from livestock and poultry production/ waste management systems.**
Bicudo, J. R.; Schmidt, D. R.; Gay, S. W.; Gates, R. S.; Jacobson, L. D.; and Hoff, S. J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

58. **Air quality research: Perspective from climate change modelling research.**
Semazzi, F.
Environment International 29 (2/3): 253-261. (2003)
NAL Call #: TD169.E54;
ISSN: 0160-4120
This citation is provided courtesy of CAB International/CABI Publishing.

59. **Algae and element cycling in wetlands.**
Vymazal, Jan.
Boca Raton: Lewis Publishers; xiv, 689 p.: ill. (1994)
Notes: Includes bibliographical references (p. 477-666) and index.
NAL Call #: QK565.V86--1994;
ISBN: 0873718992
Descriptors: Algae Ecophysiology/ Algae/ Wetland plants/ Wetlands/ Biogeochemical cycles
This citation is from AGRICOLA.

60. **Allelopathy in agroecosystems: An overview.**
Singh, H. P.; Batish, D. R.; and Kohli, R. K.
Journal of Crop Production 4 (2): 1-41. (2001)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Allelopathy in Agroecosystems / edited by R.K. Kohli, H.P. Singh, and D.R. Batish. Includes references.
Descriptors: agriculture/ ecosystems/ allelopathy/ crops/ interactions/

weeds/ trees/ soil biology/ microbial flora/ soil sickness/ crop residues/ weed control/ pest control/ allelochemicals/ pest management/ sustainability/ literature reviews
This citation is from AGRICOLA.

61. **Alley cropping: Ecological pie in the sky?**
Ong, C.
Agroforestry Today 6 (3): 8-10. (1994);
ISSN: 1013-9591
This citation is provided courtesy of CAB International/CABI Publishing.

62. **Alterations of riparian ecosystems caused by river regulation.**
Nilsson, C. and Berggren, K.
Bioscience 50 (9): 783-792. (2000)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Publisher: American Institute of Biological Sciences
Descriptors: Riparian environments/ Dams/ Freshwater environments/ Reviews/ Environmental changes/ River basin management/ Environmental impact/ Man induced effects/ Ecosystem disturbance/ Rivers/ Literature reviews/ Management/ Habitat community studies/ Conservation/ Mechanical and natural changes
Abstract: An estimated two-thirds of the fresh water flowing to the oceans is obstructed by approximately 40,000 large dams (defined as more than 15 m in height) and more than 800,000 smaller ones (Petts 1984, McCulluy 1996). Many additional rivers are constrained by artificial levees or dikes. These hydrological alterations--to ensure water for agricultural, industrial, and domestic purposes; for hydroelectricity; or for flood protection--have changed ecosystem structures and processes in running waters and associated environments the world over. In this article, we discuss the global-scale ecological changes in riparian ecosystems resulting from dam operations.
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63. **Amelioration strategies for saline soils: A review.**
Qadir, M.; Ghafoor, A.; and Murtaza, G.
Land Degradation and Development 11 (6): 501-521. (2000)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

64. **Amelioration strategies for sodic soils: A review.**
Qadir, M.; Schubert, S.; Ghafoor, A.; and Murtaza, G.
Land Degradation and Development 12 (4): 357-386. (2001)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

65. **America's Private Land: A Geography of Hope.**
U. S. Department of Agriculture, Natural Resources Conservation Service.
U. S. Department of Agriculture, 1997 (text/html)
NAL Call #: 1 Ag84Pro no.1548
http://www.nrcs.usda.gov/news/pub/GHopeHit.html
Descriptors: private lands/ conservation practices/ environmental protection/ natural resource management/ rural areas/ land tenure/ landowners/ land stewardship
Abstract: This book tells the story of America's private, nonurban land. Private land is America's working land. It produces food and fiber, and much, much more: It also produces clean water, clean air, wildlife habitat, healthy and productive soil, and scenic landscapes. But this story is more than a national report card on the state of our Nation's natural resources; it will help the reader learn to think about land (soil, water, air, plants, and animals) in a different way. A Geography of Hope is a call to action, a call to renew our national commitment to America's private land and private landowners. The Nation will never achieve its goals for conservation and environmental quality if farmers and ranchers and all other private landowners are not engaged in a cooperative effort to use the land according to its capabilities. You'll get the facts and figures on natural resources from A Geography of Hope, all woven into a framework of land stewardship and a vision for natural resource management in the 21st century.
This citation is from AGRICOLA.

66. **Ammonia emission from field applied manure and its reduction.**
Sommer, S. G. and Hutchings, N. J.
European Journal of Agronomy 15 (1): 1-15. (Sept. 2001)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: manures/ ammonia/ emission/ livestock farming/ slurries/ soil/ climatic factors/ simulation models/ geographical variation/ cultivation/ viscosity/ application rates/ soil injection/ application date/ literature reviews
Abstract: Emissions of ammonia to the atmosphere are considered a threat to the environment and both United Nation treaty and European Union legislation increasingly limit emissions. Livestock farming is the major source of atmospheric NH3 in Europe and field applied manure contributes significantly to the emission of NH3 from agriculture. This paper presents a review of studies of NH3 emission from field-applied animal manure and of the methods available for its reduction. It is shown that there is a complex relationship between the NH3 emission rate from slurry and the slurry composition, soil conditions and climate. It is concluded that simple empirical models cannot be used to predict ammonia emission from the wide range of circumstances found in European agriculture and that a more mechanistic approach is required. NH3 emission from applied solid manure and poultry manure has been studied less intensively than slurry but appear to be controlled by similar mechanisms. The use of trail hoses, pre- or post-application cultivation, reduction in slurry viscosity, choice of application rate and timing and slurry injection were considered as reduction techniques. The most effective methods of reducing ammonia emissions were concluded to be incorporation of the animal slurry and farmyard manure or slurry injection. Incorporation should be as close to the application as possible, especially after slurry application, as loss rates are high in the 1st hours

after application. Injection is a very efficient reduction technique, provided the slurry is applied at rates that can be contained in the furrows made by the injector tine.
This citation is from AGRICOLA.

67. **Ammonia emissions from animal feeding operations.**
Westerman, P. W.; Arogo, J.; Heber, A. J.; Robarge, W. P.; and Classen, J. J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

68. **Ammonia emissions from pig houses in The Netherlands, Denmark and France: A review.**
Peet Schwering CMC van der; Aarnink AJA; Rom HB; and Dourmad JY
Livestock Production Science 58 (3): 265-269. (1999)
NAL Call #: SF1.L5
Notes: Nitrogen and phosphorus nutrition of the pig (EAAP Publication No. 1-99); Number of References: 22
This citation is provided courtesy of CAB International/CABI Publishing.

69. **Ammonia in Animal Production: A Review.**
Arogo, J.; Westerman, P. W.; Heber, A. J; Robarge, W. P.; and Classen, J. J.
In: Proceedings of the 2001 ASAE Annual Meeting. (Held 30 Jul 2001-1 Aug 2001 at Sacramento, California.): American Society of Agricultural Engineers; 2001.
Notes: Paper number 014089; Written for presentation at the 2001 ASAE Annual International Meeting; Available through fee-based ASAE Technical Library
Descriptors: Ammonia emissions/ Emission factors/ Livestock buildings/ Animal waste storage and treatment facilities/ land application of animal manure

70. **Ammonia sources in agriculture and their measurement.**
McGinn, S M and Janzen, H H
Canadian Journal of Soil Science 78 (1): 139-148. (1998)
NAL Call #: 56.8 C162;
ISSN: 0008-4271
Descriptors: ammonia/ manure/ micrometeorology
Abstract: There are several reasons why the measurement of ammonia emissions is important in agriculture. The emission of ammonia from stored and land-applied manure to the atmosphere can result in a significant loss of nitrogen for crop production. It is necessary to quantify this loss to evaluate manure handling practices for maintaining the nutritive value of the manure. Minimizing the emissions of ammonia from manure also reduces agriculture's impact on the environment. A high atmospheric concentration of ammonia can result in acidification of land and water surfaces, cause plant damage and reduce plant biodiversity in natural systems. Ammonia emissions from manure coincide with odors, which are a nuisance in areas of intensive livestock operations. Reducing ammonia emissions by altering manure management will also reduce odor problems. The purpose of this paper is to review agricultural sources of ammonia and describe techniques used in determining the loss of ammonia from manure-amended soils. Micrometeorological techniques are used to estimate field scale emissions whereas, for small plots where treatment (effects) is used, chambers and mass balance techniques are more suitable methods. A simple method is described, which, when combined with a denuder sampler mounted on a wind vane, permits flexibility in experimental design and requires fewer ammonia samples than the traditional mass balance approach. A chamber method making use of diffusion samplers that can measure the ammonia concentration in the air at the soil surface is also described.
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71. **Ammonia volatilization from cow and pig manure: Results of laboratory studies with a new climate chamber technique.**
Andersson, Mats.
Lund, Sweden: Sveriges lantbruksuniversitet, Institutionen for jordbrukets biosystem och teknologi (JBT); 66 p.: ill.; Series: Rapport (Sveriges lantbruksuniversitet. Institutionen for lantbrukets byggnadsteknik) 98. (1995)
Notes: "ISRN SLU-JBT-R--98--SE." Includes bibliographical references (p. 59-62).
NAL Call #: TH4911.A1S9--no.98
This citation is from AGRICOLA.

72. **Ammonia volatilization from dairy farming systems in temperate areas: A review.**
Bussink DW and Oenema O
Nutrient Cycling in Agroecosystems 51 (1): 19-33. (1998)
NAL Call #: S631 .F422.
Notes: From: Ammonia emissions from agriculture: Proceedings of a seminar / Uppsala, Sweden, 23-24 May 1996
This citation is provided courtesy of CAB International/CABI Publishing.

73. **Anaerobic processes of treatment of manures and dung in ecology and resource economy.**
Puzankov AG; Borodin VI; Grevtsov Yu I; Krivonosov AA; Emelin GV; and Leonova EV
Khimiya v Sel'skom Khozyaistve 7: 27-28 (1993)
This citation is provided courtesy of CAB International/CABI Publishing.

74. **Anaerobic processing of piggery wastes: A review.**
Chynoweth DP; Wilkie AC; and Owens JM.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers; 38 p.; 1998.
Notes: ASAE Paper no. 984101
NAL Call #: S671.3 .A54
This citation is provided courtesy of CAB International/CABI Publishing.

75. **Analysis of Carbamate Pesticides and Their Metabolites in Water by Solid Phase Extraction and Liquid Chromatography: A Review.**
Soriano, J. M.; Jimenez, B.; Font, G.; and Molto, J. C.
Critical Reviews in Analytical Chemistry 31 (1): 19-52. (2001);
ISSN: 1040-8347
Descriptors: Pesticides (Organonitrogen)/ Water analysis/ Pesticides/ Chromatography (Liquid)/ Chemical analysis/ Pesticides/ Chemical Analysis/ Liquid Chromatography/ Agricultural Chemicals/ Analytical techniques/ Pollution detection/ Agricultural pollution/ Chromatographic techniques/ Chemical extraction/ Separation processes/ Degradation/ solid phase extraction/ Monitoring and Analysis of Water and Wastes/ Identification of pollutants/ Methods and instruments/ Freshwater pollution
Abstract: Carbamates are an important, broad class of pesticides that are used extensively as insecticides, fungicides, and herbicides. Sensitive, economical, fast, and environmental friendly procedures are constantly developed to investigate their residues in water samples. The state of the art in methods based on solid phase extraction (SPE) and liquid chromatographic determination are examined here. SPE is presently the most extended method for preconcentration of carbamate pesticide residues and their transformation products from water samples. Advantages and limitations of alkyl bonded-silica, and polymeric sorbents, carbon, and mixed-phases in off-line and on-line procedures are discussed. Because some carbamates and transformation products are thermolabile, multiresidue determination is usually carried out by liquid chromatographic techniques. The most interesting reported analytical conditions are presented in a tabular form. Finally, an overview to the levels found in different environmental waters is done; concentrations were usually detected in the sub mu g l super(-1) order.
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76. **Analysis of livestock use of riparian areas: Literature review and research needs assessment for British Columbia.**
Powell GW; Cameron KJ; and Newman RF
British Columbia, Canada: Ministry of Forests, Forest Science Program; Working Paper 52, 2000. 37 p.
NAL Call #: QH541.5.R52-P69-2000
This citation is provided courtesy of CAB International/CABI Publishing.

77. **Analysis of pesticides in food and environmental samples by enzyme-linked immunosorbent assays.**
Nunes, Gilvanda Silva; Toscano, Ilda Antonieta; and Barcelo, D
Trends in Analytical Chemistry 17 (2): 79-87. (1998)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: pesticide residues/ environmental samples/ food crops
Abstract: Enzyme-linked immunosorbent assays (ELISAs) are the most extensively studied types of immunoassay and their application in pesticide residue monitoring is an area with enormous potential for growth. In comparison with classical analytical methods, ELISA methods offer the possibility of highly sensitive, relatively rapid, and cost-effective measurements. This review introduces the general ELISA formats used, focusing on their use in pesticide analysis. Identifying and studying the effects of interferences in immunoassays is an active area of research and we discuss the matrix effects observed in several studies involving e.g. food, crop and environmental samples. The procedures to eliminate the matrix interferences are briefly discussed.
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78. **Analytical chemistry of chlorpyrifos and diuron in aquatic ecosystems.**
Simon, David; Helliwell, Stuart; and Robards, Kevin
Analytica Chimica Acta 360 (1-3): 1-16. (1998)
NAL Call #: 381 An1;
ISSN: 0003-2670
Descriptors: chlorpyrifos: insecticide, quantitative analysis/ diuron: insecticide, quantitative analysis/ analytical chemistry/ aquatic ecosystems / bioaccumulation/ sample recovery
Abstract: The chemistry and toxicology of chlorpyrifos and diuron are presented. These compounds represent the extremes of pesticide use both in terms of toxicity and chemistry. Methods used for their determination are reviewed with an emphasis on recent developments in sample preparation and quantification.
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79. **Analyzing correlations between stream and watershed attributes.**
Sickle, J. van
Journal of the American Water Resources Association 39 (3): 717-726. (2003)
NAL Call #: GB651.W315;
ISSN: 1093-474X
This citation is provided courtesy of CAB International/CABI Publishing.

80. **Animal Agriculture: Information on Waste Management and Water Quality Issues: Briefing Report to the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.**
Atkins, L. L.; Jones, James R.; Van Sickle, L. D.; Vermillion, S. B.; Brown, G. T.; Klaudt, S. A.; and Goldfarb, L. L.; U. S. General Accounting Office.
U. S. General Accounting Office [Also available as: GAO/RCED-95-200BR], 1995.
Notes: Series: Briefing Report to the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate (text/html)
NAL Call #: TD930 A75 1995
http://www.gao.gov/archive/1995/rc95200b.pdf
Descriptors: program evaluation/ governmental programs and projects/ conservation programs/ USDA/ animal manure management/ animal production/ concentrated animal feeding operations/ waste management/ water pollution/ nonpoint source pollution/ agricultural runoff/ water quality/ geographical distribution/ industry trends/ best management practices/ public finance/ decision support systems/ United States/ CAFOs/ BMPs
This citation is from AGRICOLA.

81. **Animal Agriculture: Waste Management Practices: Report to the Honorable Tom Harkin, Ranking Minority Member, Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.**
U. S. General Accounting Office.
U. S. General Accounting Office [Also available as: GAO/RCED-99-205], 1999 (text/html)
NAL Call #: TD930.2 U55 1999
http://www.gao.gov/archive/1999/rc99205.pdf
Descriptors: program evaluation/ governmental programs and projects/ USDA/ Agricultural Research Service/ Cooperative State Research, Education, and Extension Service/ Environmental Protection Agency/ animal manure management/ waste management/ best management practices/ nonpoint source pollution/ agricultural runoff/ water quality/ bioenergy/ public finance/ research support/ agricultural policy / decision support systems/ United States/ CSREES/ BMPs/ EPA
This citation is from AGRICOLA.

82. **Animal diet modification to decrease the potential for nitrogen and phosphorus pollution.**
Klopfenstein, T.
Ames, Iowa: Council for Agricultural Science and Technology (CAST); Issue Paper No. 21, 2002. 16 p.
Descriptors: livestock feeding/ animal nutrition/ animal manures/ nutrients/ nitrogen/ phosphorus/ water pollution

83. **Animal production, manure management and pathogens: A review.**
Bicudo JR; Goyal SM; Zhu J; and Moore JA.
In: Animal, agricultural and food processing wastes: Proceedings of the Eighth International Symposium. (Held 9 Oct 2000-11 Oct 2000 at Des Moines, Iowa.); pp. 507-521; 2000.
This citation is provided courtesy of CAB International/CABI Publishing.

84. **Animal waste and the land-water interface.**
Steele, Kenneth F.
Boca Raton: Lewis Publishers; 589 p.: ill., maps. (1995)
Notes: Based on a conference held in Fayetteville, Arkansas,July 16-19, 1995. Includes bibliographical references and index.
NAL Call #: TD930.A55--1995;
ISBN: 1566701899 (alk. paper)
Descriptors: Animal waste---Management/ Animal waste---Environmental aspects/ Watershed management
This citation is from AGRICOLA.

85. **Animal waste management and microorganisms.**
Nakai Y
Animal Science Journal 72 (1): 1-13; 48 ref. (2001)
This citation is provided courtesy of CAB International/CABI Publishing.

86. **Animal Waste Management and the Environment: Background for Current Issues.**
Copeland, C. and Zinn, J.
Congressional Research Service (CRS) [Also available as: CRS Report for Congress 98-451], 1999 (text/html)
NAL Call #: TD930.2.C66 1998
http://cnie.org/NLE/CRSreports/Agriculture/ag-48.cfm
Descriptors: animal manures/ agricultural wastes/ animal manure management/ waste management/ environmental quality/ water pollution/ livestock production/ concentrated animal feeding operations/ public health/ cost benefit analysis/ environmental policy/ agricultural policy/ laws and regulations/ United States/ CAFOs
Abstract: Waste from animal agriculture is an increasingly prominent environmental quality issue. This background report describes the livestock production industry' today along with public health and environmental concerns related to the industry. It summarizes policies and programs of the Department of Agriculture and the Environmental Protection Agency and recent Clinton Administration initiatives; state laws and programs concerning animal waste management; and dialogues on problems and solutions initiated by some segments of this industry. The report reviews congressional responses to the issues (including two bills 5. 1323 and H.R. 3232) and outlines policy questions likely to shape congressional action. It will be updated if there is major congressional action.
This citation is from AGRICOLA.

87. **Animal waste utilization: Effective use of manure as a soil resource.**
Hatfield, Jerry L. and Stewart, B. A.
Chelsea, MI: Ann Arbor Press; 320 p.: ill. (1998)
NAL Call #: S655.A57--1998;
ISBN: 1575040689
Descriptors: Farm manure---Congresses
This citation is from AGRICOLA.

88. **Anthropogenic effects on the biodiversity of riparian wetlands of a northern temperate landscape.**
Mensing, D. M.; Galatowitsch, S. M.; and Tester, J. R.
Journal of environmental management 53 (4): 349-377. (1998)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797
This citation is provided courtesy of CAB International/CABI Publishing.

89. **Anti-quality effects of insects feeding on rangeland plants: A review.**
Campbell, J. B.
Journal of Range Management 54 (4): 462-465. (July 2001)
NAL Call #: 60.18-J82;
ISSN: 0022-409X [JRMGAQ]
Descriptors: rangelands/ pasture plants/ insect pests/ defoliation/ quality/ nutritive value/ geographical distribution/ ecology/ biology/ pest management/ pest control/ pogonomyrmex/ orthoptera/ lepidoptera/ miridae/ literature reviews/ grasshoppers/ hemilenca oliviae
Abstract: The anti-quality effects of the major groups of insects that utilize rangeland plants for food is discussed. The biology, ecology, geographical distribution and economic thresholds of grasshoppers, crickets, Western harvester ants, ranch caterpillars, big-eyed or black grass bugs, and white grubs are reviewed. Also discussed are practical pest management strategies if they exist. Most of these rely on the integration of good range management practices and the control strategy.
This citation is from AGRICOLA.

90. **Antibiotic use in plant agriculture.**
McManus, Patricia S; Stockwell, Virginia O; Sundin, George W; and Jones, Alan L
Annual Review of Phytopathology 40: 443-465. (2002)

NAL Call #: 464.8 An72;
ISSN: 0066-4286
Descriptors: Pest Assessment Control and Management/ Tn5393: antibacterial drug/ Tn5393: antiinfective drug/ streptomycin: antibacterial drug/ streptomycin: antiinfective drug/ tetracycline: antibacterial drug/ tetracycline: antiinfective drug/ Erwinia amylovora (Enterobacteriaceae)/ Pseudomonas spp. (Pseudomonadaceae)/ Xanthomonas campestris (Pseudomonadaceae)/ pathogens/ antibiotic resistance: plant pathogens/ Enterobacteriaceae/ Facultatively Anaerobic Gram Negative Rods/ Eubacteria/ Bacteria/ Microorganisms/ Pseudomonadaceae/ Gram Negative Aerobic Rods and Cocci/ antibiotic use/ applied and field techniques/ therapeutic and prophylactic techniques
© Thomson

91. **APEX: A new tool for predicting the effects of climate and CO2 changes on erosion and water quality.**
Williams, J. R.; Arnold, J. G.; Srinivasan, R.; and Ramanarayanan, T. S.
In: Modelling soil erosion by water/ Boardman, J. and Favis-Mortlock, D.; Series: NATO ASI / Global Environmental Change (Series I) 55. Berlin: Springer, 1998; pp. 441-449.
ISBN: 3-540-64034-7
This citation is provided courtesy of CAB International/CABI Publishing.

92. **The application of climatic data for planning and management of sustainable rainfed and irrigated crop production.**
Smith, M.
Agricultural and Forest Meteorology 103 (1/2): 99-108. (June 2000)
NAL Call #: 340.8-AG8;
ISSN: 0168-1923.
Notes: Special issue: Agrometeorology in the 21st century: Needs and perspectives / edited by M.V.K. Sivakumar, C.J. Stigter, and D. Rijks. Paper presented at an international workshop held February 15-17, 1999, Accra, Ghana. Includes references.
Descriptors: agriculture/ dry farming/ rain/ irrigation/ climatic factors/ weather data/ planning/ irrigation systems/ sustainability/ water resources/ water use/ water use efficiency/ evapotranspiration/ relative humidity/ solar radiation/ wind speed/ estimation/ mathematical models/ estimates/ literature reviews
This citation is from AGRICOLA.

93. **The application of gas chromatography to environmental analysis.**
Santos, F J and Galceran, M T
Trends in Analytical Chemistry 21 (9-10): 672-685. (2002)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: alkane: pollutant/ brominated flame retardant: pollutant/ dibenzofuran: pollutant/ halogenated compound: pollutant/ naphthalene: pollutant/ organochlorine pesticide: pollutant/ pesticide: pollutant/ polybrominated biphenyl: pollutant/ polybrominated diphenylether: pollutant/ polychlorinated biphenyls: pollutant/ polychlorinated dibenzo p dioxin: pollutant/ polycyclic aromatic hydrocarbons: pollutant/ terphenyl: pollutant/ volatile organic compound: pollutant/ air pollution/ environment/ sediment pollution/ soil pollution/ water pollution
Abstract: Nowadays, gas chromatography (GC) continues to play an important role in the identification and quantification of ubiquitous pollutants in the environment. The present article describes current state-of-the-art capillary GC in the analysis of various classes of persistent organic contaminants in air, water, soils, sediments and biota. Special attention is given to sample-preparation techniques. The organic pollutant groups covered in this review are: volatile organic compounds (VOCs); polycyclic aromatic hydrocarbons (PAHs); pesticides; and, halogenated compounds. These last include polychlorinated dibenzo-p-dioxins and dibenzofurans, polychlorinated biphenyl, terphenyls, naphthalenes and alkanes, organochlorine pesticides, and the brominated flame retardants, polybrominated biphenyls and polybrominated diphenylethers. The use of capillary-GC columns, the type of column, the need for multi-dimensional GC techniques, and the advantages and limitations of the available detection systems for the analysis of these compounds are discussed. Trends and future perspectives of capillary GC in the field of environmental analysis are also commented on and discussed.
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94. **Application of soil quality to monitoring and management: Paradigms from rangeland ecology.**
Herrick, J. E.; Brown, J. R.; Tugel, A. J.; Shaver, P. L.; and Havstad, K. M.
Agronomy Journal 94 (1): 3-11. (Jan. 2002-Feb. 2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT].
Notes: Paper presented at the symposium, "Soil quality as an indicator of sustainable land management: Demonstrated successes and continued needs," held November 3, 1999, Salt Lake City, Utah. Includes references.
Descriptors: rangelands/ ecology/ soil/ quality/ monitoring/ land management/ nature conservation/ agricultural land/ indicators/ soil physical properties/ stability/ infiltration/ soil water content/ site factors/ weeds/ invasion/ erosion/ spatial variation/ literature reviews
Abstract: Recent interest in soil quality and rangeland health, and the large areas set aside under the USDA Conservation Reserve Program, have contributed to a gradual convergence of assessment, monitoring, and management approaches in croplands and rangelands. The objective of this paper is to describe a basis for integrating soils and soil quality into rangeland monitoring, and through monitoring, into management. Previous attempts to integrate soil indicators into rangeland monitoring programs have often failed due to a lack of understanding of how to apply those indicators to ecosystem function and management. We discuss four guidelines that we have used to select and interpret soil and soil quality indicators in rangelands and illustrate them using a recently developed rangeland monitoring system. The guidelines include (i) identifying a suite of indicators that are consistently correlated with the functional status of one or more critical ecosystem processes, including those related to soil stability, soil water infiltration, and the capacity of the ecosystem to recover following disturbance; (ii) basing indicator selection on inherent soil and site characteristics and on site- or project-specific resource concerns, such as erosion or species invasion; (iii) using spatial variability in developing and interpreting indicators to make them more representative of ecological processes; and (iv) interpreting indicators in the context of an understanding of dynamic,

nonlinear ecological processes defined by thresholds. The approach defined by these guidelines may serve as a paradigm for applying the soil quality concept in other ecosystems, including forests and ecosystems managed. for annual and perennial crop production.
This citation is from AGRICOLA.

95. **Applications of fractals in soil and tillage research: A review.**
Perfect, E. and Kay, B. D.
Soil and Tillage Research 36 (1-2): 1-20. (1995)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

96. **Applied disequilibriums: Riparian habitat management for wildlife.**
Boyce, M. S. and Payne, N. F.
In: Ecosystem management: Applications for sustainable forest and wildlife resources/ Boyce, M. S. and Haney, A.
New Haven, Conn.: Yale University Press, 1997; pp. 133-146.
ISBN: 0-300-06902-2; Conference: Based on a symposium on ecosystem management held at the University of Wisconsin-Stevens Point, 3-5 March, 1994
This citation is provided courtesy of CAB International/CABI Publishing.

97. **Applied wetlands science and technology.**
Kent, Donald M.
Boca Raton, FL: Lewis Publishers; 454 p.: ill. (2001)
Notes: 2nd ed.; Includes bibliographical references and index.
NAL Call #: QH75-.A44-2000;
ISBN: 156670359X (alk. paper)
Descriptors: Wetland conservation/ Ecosystem management/ Wetlands/ Water quality management
This citation is from AGRICOLA.

98. **Applying landscape ecology in biological conservation.**
Gutzwiller, K. J.
New York: Springer; xxvii, 518 p., [2] p. of plates: ill., maps (some col.); 24 cm. (2002)
NAL Call #: QH541.15.L35 A66 2002;
ISBN: 0387986537
Descriptors: Landscape ecology/ Nature conservation
This citation is from AGRICOLA.

99. **An appraisal of biological diversity 'standards' for forest plantation.**
Spellerberg, I. F. and Sawyer, J. W. D.
In: Assessment of biodiversity for improved forest planning: Proceedings of the Conference on Assessment of Biodiversity for Improved Planning. (Held 7 Oct 1996-11 Oct 1996 at Monte Verita, Switzerland.) Bachmann, P.; Kohl, M.; and Paivinen, R. (eds.)
Dordrecht: Kluwer Academic Publishers; pp. 361-365; 1998.
NAL Call #: SD1.F627-v.51;
ISBN: 0792348729
Descriptors: forest plantations/ biodiversity/ evaluation/ literature reviews/ forest management/ standards/ nature conservation/ land use/ wildlife/ forest ecology/ objectives
This citation is from AGRICOLA.

100. **An appraisal of methods for measurement of pesticide transformation in the groundwater zone.**
Leistra, Minze and Smelt, Johan H
Pest Management Science 57 (4): 333-340. (2001)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: pesticides: pollutant, toxin/ biogeochemical conditions/ catalysis/ drinking water/ ecotoxicology/ groundwater zones/ hydrolysis/ measurement methods/ microbial transformation: aerobic, anaerobic/ pH/ pesticide registration/ redox potential/ subsoils
Abstract: Laboratory and field studies show that pesticides may be transformed in the groundwater zone. Possible reaction mechanisms are chemical hydrolysis, catalytic reduction and aerobic or anaerobic microbial transformation. Transformation in the groundwater zone can be an important element in the advanced evaluation of the potential risk arising from a pesticide in the public drinking water supply. However, rate and pathway of transformation can show large differences, depending on the bio-geochemical conditions in the groundwater zone. Knowledge of the reaction mechanisms and the effect of aquifer conditions would allow vulnerable and low-vulnerable application areas for a pesticide to be delimited. An outline is given of possible approaches to quantifying these transformation processes and using the results in registration procedures, especially in the EU and its member states. Furthermore, areas where there is need for continued research and better understanding are highlighted.
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101. **An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices.**
Smith, R. Daniel. and United States. Army. Corps of Engineers. U.S. Army Engineer Waterways Experiment Station. Wetlands Research Program (U.S.).
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; Series: Wetlands Research Program technical report WRP-DE-9. (1995)
Notes: Title from title page. "Final report." "October 1995." Includes bibliographical references.
NAL Call #: GB624-.A76-1995
http://www.wes.army.mil/el/wetlands/pdfs/wrpde9.pdf
Descriptors: Wetlands---United States/ Ecosystem management---United States/ wetlands
This citation is from AGRICOLA.

102. **An approach to describing ecosystem performance "through the eyes of salmon".**
Mobrand, Lars E; Lichatowich, James A; Lestelle, Lawrence C; and Vogel, Thomas S
Canadian Journal of Fisheries and Aquatic Sciences 54 (12): 2964-2973. (1997);
ISSN: 0706-652X
Descriptors: Oncorhynchus spp. (Osteichthyes)/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ capacity/ ecosystem performance/ habitats/ productivity/ watershed health
Abstract: The intent of this paper is to show that discussion of watershed health and salmon (Oncorhynchus sp.) performance can incorporate a much greater degree of complexity without loss of clarity. We can and should include more temporal-spatial detail, more life history complexity, and more watershed-specific information. The framework and performance measures used in watershed management generally, and salmon management specifically, are inadequate. The bottleneck metaphor is cited all too frequently as a basis for discussion. The bottleneck

analogy is useful in understanding capacity, but capacity alone cannot explain observed responses of salmon populations to environmental change. An argument can be made that where protection and enhancement of weak stocks is the priority, productivity is a more critical variable. However, a framework built only around productivity and capacity is also not sufficient. It neglects the need for connectivity of habitats that salmon must pass through to complete their life histories. Adding life history diversity as the third component of performance provides the time and spare structure needed to deal with connectivity while also allowing for integration of populations where they mingle.
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103. **An Approach to improving decision making in wetland restoration and creation.**
Kentula, Mary E. and Hairston, Ann J.
Boca Raton: C.K. Smoley; xxix, 151 p.: ill. (1993)
Notes: Includes bibliographical references (p. 135-146) and index.
NAL Call #: QH76.A67-1993;
ISBN: 0873719379
Descriptors: Wetland conservation---United States Decision making/ Restoration ecology---United States Evaluation/ Wetlands---United States---Management
This citation is from AGRICOLA.

104. **An approach to nutrient management on dairy farms.**
Kuipers, Abele; Mandersloot, Frits; and Zom, Ronald LG
Journal of Animal Science 77 (2 [supplement]): 84-89. (1999)
NAL Call #: 49 J82;
ISSN: 0021-8812
Descriptors: ammonia/ nitrate/ nitrogen/ phosphorus/ urea/ cattle (Bovidae): dairy animal, female/ Animals / Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ farm model/ grazing/ management practices/ manure/ milk production/ nutrient management
Abstract: In the European Union, groundwater should contain less than 50 mg of nitrate/L. Individual countries have developed alternative strategies for phosphorus (P). In The Netherlands, regulations based on P limited the amount of manure applied per hectare. A more balanced P supply to the land has been achieved by transport of manure from surplus to deficit regions. Costs of processing of manure to pellets appeared to be (too) high. In animal production experiments, lowering the P content of concentrates and mineral supplements reduced P losses without an adverse effect on production. In addition to the European guideline for nitrate, ammonia volatilization should be reduced by 50 to 70%. Management practices for reducing nitrogen (N) losses were studied with a farm model, developed at PR. A combination of a more efficient use of fertilizer N, restricted grazing, and a more balanced diet, and, to a lesser extent, higher milk production per cow resulted in considerable reductions in nitrate leaching. The application of slurry by injection diminishes the ammonia volatilization at farm level by almost 50%. This technique has become obligatory, and is only allowed during the growing season. Other techniques, like low emission housing and covering of slurry storage have relatively high costs. Starting in 1998, farmers have to keep a record of nutrients on a balance sheet. A tax will be imposed on surpluses on N and P. This new instrument replaces the regulations based on P. To further improve efficiency of use of N and P, farmers have the nutrient balance sheet available as an integrated management tool. Urea content in bulk milk has been introduced as a new indicator for the utilization of N in the diet. Also, fertilizer applications are improved. Furthermore, an experimental farm was set up to integrate all available expertise and analyze the resulting nutrient flows and farm performance.
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105. **Approaches to assess the environmental impact of organic farming with particular regard to Denmark.**
Hansen, B.; Alroe, H. F.; and Kristensen, E. S.
Agriculture, Ecosystems and Environment 83 (1/2): 11-26. (Jan. 2001)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: A tribute to Hamish Sturrock. Includes references.
Descriptors: organic farming/ environmental impact/ intensive farming/ sustainability/ indicators/ nitrate/ phosphorus/ leaching/ soil organic matter/ soil structure/ soil biology/ ecosystems/ arable land/ landscape/ biotopes/ nitrogen/ soil bacteria/ soil fungi/ soil arthropods/ earthworms/ rotations/ fertilizers/ pesticides/ crop management/ feeds/ literature reviews/ Denmark
This citation is from AGRICOLA.

106. **Approaches to the economic analysis of erosion and soil conservation: A review.**
Calatrava-Leyva, J. and Gonzalez-Roa, M. C.
In: Soil erosion research for the 21st century: Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough II, J. C. and Flanagan, D. C. (eds.)
St Joseph, Mo.: American Society of Agricultural Engineers; pp. 203-206; 2001.
This citation is provided courtesy of CAB International/CABI Publishing.

107. **Aquatic ecosystems in agricultural landscapes: A review of ecological indicators and achievable ecological outcomes.**
Watzin, M. C. and McIntosh, A. W.
Journal of Soil and Water Conservation 54 (4): 636-644. (1999)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3]
Descriptors: agricultural land/ landscape ecology/ biological indicators/ aquatic communities/ environmental impact/ land use/ pollution/ point sources/ streams/ watersheds/ nonpoint source pollution
This citation is from AGRICOLA.

108. **Aquatic Sediments.**
Garton, L. S.; Sylvester, B. A.; Autenrieth, R. L.; and Bonner, J. S.
Water Environment Research 65 (6): 534-547. (1993)
NAL Call #: TD419.R47
Descriptors: Aquatic soils/ Bottom sediments/ Literature review/ Path of pollutants/ Reviews/ Sediment analysis/ Sediment chemistry/ Sediment contamination/ Dredging/ Environmental impact/ Fate of pollutants/ Metals/ Model studies/ Nutrients/ Organic carbon/ Organic compounds/ Oxygen demand/ Paleolimnology/ Radioisotopes/ Sediment transport/ Suspended sediments/ Toxicity/ Sources and fate of pollution/ Identification of pollutants/ Preparation of reviews
Abstract: Many conference proceedings, texts, and summary

documents address the topic of aquatic sediments. The development of new methods and improvement or modification of existing methods have been reported for the broad categories of screening methods for organisms, sampling techniques and devices, characterization, biological techniques and analyses, and inorganic and organic compounds. Articles on biological activity are broken into several broad categories: species distribution, indicator organisms, metabolic effects, toxicity, productivity, organic and inorganic compounds, and physical and chemical processes. Several studies have investigated nutrient distribution and transformation in streams and sediments. Other topics include extraction procedures used to determine phosphorus and organic phosphorus concentrations in suspended sediments, anthropogenic activities that influence heavy metals concentrations and trace metals in marine and freshwater sediments, and factors affecting metal transport. Many organic compounds including pesticides, polycyclic aromatic hydrocarbons, surfactants, phenols and polychlorinated biphenyls, have been studied in sediments. A comprehensive handbook of dredging has been published with chapters addressing sediment, transport of solids, and environmental effects of dredging activities, including such specific topics as sediment properties and classification, resuspension of sediment, and environmental impacts of dredging. Radionuclides in sediments have been studied in relation to mobility, complexation, and removal. Sediment organic carbon accumulation, cycling, and relation to aquatic organisms have also been examined. It has been shown that oxygen concentrations have great effects on sediment systems and processes. Most of the sediment modeling papers focus on particle transport processes (water column transport and bedload movement). Other research has addressed sediment mobility, sediment suspensions, sediment transport models, and use of sediments in paleolimnology. (Geiger-PTT) 35 004736037

109. **Aquatic Sediments.**
Sylvester, B. A.; Garton, L. S.; and Autenrieth, R. L.
Water Environment Research 66 (4): 496-516. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ aquatic environment/ sedimentation/ pollutants/ sediment load/ sediment concentration/ sediment sampler/ sedimentary basins/ sediments/ sampling/ sediment pollution/ lacustrine sedimentation/ sediment analysis/ literature reviews/ Sources and fate of pollution/ Behavior and fate characteristics

110. **Aquatic Sediments.**
Fuller, C. B.; Quinney, M. J.; Malupillai, N.; Sundaresan, A.; Swaroop, S.; and Ernest, A. N.
Water Environment Research 67 (4): 614-629. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ aquatic soils/ sediments/ sediment concentration/ substrates/ toxicity/ benthic fauna/ benthic flora/ sediment pollution/ pollution effects/ benthos/ pollutant persistence/ sediment transport/ detritus/ Erosion and sedimentation/ Effects on organisms

111. **Aquatic Sediments.**
Cheng, Chen-Yu; Sumner, P. L.; Fuller, C. B.; and Ernest, A. N.
Water Environment Research 70 (4): 780-807. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Sediments/ Erosion/ Deposition/ Literature Review/ Sedimentation/ Spillways/ Sedimentary Basins/ Erosion and sedimentation

112. **Aquatic Sediments.**
Hernandez, E. A. and Ernest, A. N.
Water Environment Research 5: 948-973. (1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Sediments/ Water Depth/ Stratification/ Lakes/ Reviews/ Pollutants/ Polychlorinated Biphenyls / Organic Compounds/ Sampling/ PCB/ Sediment pollution/ Industrial wastes/ Sediment sampling/ Sediment analysis/ Literature reviews/ PCB compounds/ Sources and fate of pollution/ Behavior and fate characteristics/ Freshwater pollution

113. **Aquatic toxicology: Past, present, and prospects.**
Pritchard, John B
Environmental Health Perspectives 100 (0): 249-257. (1993)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
Descriptors: Xenobiotics/ Pollution/ Pesticides/ Metals/ Carcinogens/ fish (Pisces Unspecified)/ mollusks (Mollusca Unspecified)/ Mollusca (Mollusca Unspecified)/ Osteichthyes (Osteichthyes)/ animals/ chordates/ invertebrates/ mollusks/ nonhuman vertebrates/ vertebrates

114. **Arbuscular mycorrhiza in soil quality assessment.**
Kling, Monica and Jakobsen, Iver
Ambio 27 (1): 29-34. (1998)
NAL Call #: QH540.A52;
ISSN: 0044-7447
Descriptors: nutrient: uptake/ arbuscular mycorrhiza (Phycomycetes)/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants/ drought/ root pathogens/ soil aggregates/ soil quality
Abstract: Arbuscular mycorrhizal (AM) fungi constitute a living bridge for the transport of nutrients from soil to plant roots, and are considered as the group of soil microorganisms that is of most direct importance to nutrient uptake by herbaceous plants. AM fungi also contribute to the formation of soil aggregates and to the protection of plants against drought and root pathogens. Assessment of soil quality, defined as the capacity of a soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant health, should therefore include both quantitative and qualitative measurements of this important biological resource. Various methods for the assessment of the potential for mycorrhiza formation and function are presented. Examples are given of the application of these methods to assess the impact of pesticides on the mycorrhiza.

115. **Arbuscular mycorrhizae and the phosphorus nutrition of maize: A review of Guelph studies.**
Miller, Murray H
Canadian Journal of Plant Science 80 (1): 47-52. (2000)
NAL Call #: 450-C16;
ISSN: 0008-4220
Descriptors: phosphorus: nutrient/ Brassica napus [canola] (Cruciferae): oil crop/ Zea mays [maize] (Gramineae): grain crop, host/ arbuscular mycorrhizae (Phycomycetes): symbiont/ Angiosperms/ Dicots/ Fungi/ Microorganisms/ Monocots/ Nonvascular Plants/ Plants/ Spermatophytes/ Vascular Plants/ fertilizer efficiency
Abstract: The role of mycorrhizae in phosphorus nutrition of maize (Zea mays L.) is related to the fact that the P concentration in maize shoots at the four- to five-leaf stage affects final grain yield. In the early 1980s we observed greater early-season shoot-P concentration (mg g-1) and P absorption (mg plant-1) from a notill compared to a conventional tillage system. Further studies established that the greater P absorption is due to a more effective arbuscular mycorrhizal (AM) symbiosis when the soil is not disturbed. The greater P absorption is largely a result of the undisrupted mycelium present in an undisturbed soil, rather than to increased colonization. This mycelium retains viability through extended periods in frozen soil. In the spring this mycelia network is able to acquire P from the soil and deliver it to the plant immediately upon becoming connected to a newly developing root system. Increased P absorption has not resulted in increased grain yield in field trials. Some additional factor limits yield with no-till maize preventing the advantage of early P absorption from being realized as yield. When maize follows a non-mycorrhizal crop such as canola (Brassica napus L.), mycorrhizal colonization is delayed, reducing early-season P absorption. Yield reductions may occur. In summary, AM mycorrhizae are involved in P nutrition of maize and an understanding of their functioning will assist us in modifying management practices to maximize economic returns through increased fertilizer efficiency.

116. **Arbuscular mycorrhizal fungi as components of sustainable soil-plant systems.**
Hooker, John E and Black, Kyrsten E
Critical Reviews in Biotechnology 15 (3-4): 201-212. (1995)
NAL Call #: TP248.13.C74;
ISSN: 0738-8551
Descriptors: Angiospermae (Angiospermae)/ Phycomycetes (Phycomycetes)/ angiosperms/ fungi/ microorganisms/ nonvascular plants/ plants/ spermatophytes/ vascular plants/ agriculture/ crop rotation/ fertilizer use/ pesticide use/ selection/ tillage

117. **Arbuscular-mycorrhizal fungi: Potential roles in weed management.**
Jordan, N. R.; Zhang, J.; and Huerd, S.
Weed Research 40 (5): 397-410. (Oct. 2000)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: weeds/ vesicular arbuscular mycorrhizas/ mycorrhizal fungi/ weed control/ plant ecology/ plant communities/ host plants/ botanical composition/ crop yield/ yield losses/ interactions/ soil biology/ beneficial organisms/ conservation tillage/ ground cover/ cover crops/ green manures/ literature reviews
This citation is from AGRICOLA.

118. **Architectural features of agricultural habitats and their impact on the spider inhabitants.**
Rypstra, A. L.; Carter, P. E.; Balfour, R. A.; and Marshall, S. D.
Journal of Arachnology 27 (1): 371-377. (1999)
NAL Call #: QL451.J6;
ISSN: 0161-8202
This citation is provided courtesy of CAB International/CABI Publishing.

119. **Assessing and mitigating N2O emissions from agricultural soils.**
Mosier, A R; Duxbury, J M; Freney, J R; Heinemeyer, O; and Minami, K
Climatic Change 40 (1): 7-38. (1998)
NAL Call #: QC980 .C55;
ISSN: 0165-0009
Descriptors: nitrogen: fertilizer/ nitrous oxide: pollutant/ agricultural cropping/ emissions mitigation/ fertilization/ pollution control
Abstract: Agricultural cropping and animal production systems are important sources of atmospheric nitrous oxide (N2O). The assessment of the importance of N fertilization from synthetic fertilizer, animal wastes used as fertilizers and from N incorporated into the soil through biological N fixation, to global N2O emissions presented in this paper suggests that this source has been underestimated. We estimate that agricultural systems produce about one fourth of global N2O emissions. Methods of mitigating these emissions are presented which, if adopted globally could decrease annual N2O emissions from cropped soils by about 20%.

120. **Assessing and monitoring forest biodiversity: A suggested framework and indicators.**
Noss, R. F.
Forest Ecology and Management 115 (2/3): 135-146. (1999)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

121. **Assessing effects of timber harvest on riparian zone features and functions for aquatic and wildlife habitat.**
Taratoot, Mark.
Research Triangle Park, N.C.: National Council of the Paper Industry for Air and Stream Improvement; 1 v. (various pagings): ill.; Series: Technical bulletin (National Council for Air and Stream Improvement) no. 775. (1999)
Notes: "January 1999." Includes bibliographical references (p. 36-37).
NAL Call #: TD899.P3N34-no.775
Descriptors: Logging/ Riparian forests, Effect of water pollution on
This citation is from AGRICOLA.

122. **Assessing sediment contamination in estuaries.**
Chapman, Peter M and Wang, Feiyue
Environmental Toxicology and Chemistry 20 (1): 3-22. (2001)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: benthic infauna (Organisms)/ estuarine biota (Organisms)/ chemical assessment techniques: background enrichment, bioavailability, grain size effects, interstitial water chemistry, sediment quality values/ estuaries: dissolved oxygen gradients, pH gradients, productive marine ecosystems, redox potential gradients, temperature gradients, variable salinity/ estuarine

processes/ estuarine sediment: chemical assessment techniques, community level assessment techniques, toxicological assessment techniques/ large scale seasonal species shifts/ paradox of brackish water/ particle composition/ salinity: contaminant partitioning controlling factor, interstitial, lateral variation, overlying, temporal variation, vertical variation/ salt wedge estuaries/ seasonal estuarine variability/ sediment contamination: estuarine, historic, ongoing/ sediments/ spatial estuarine variability
Abstract: Historic and ongoing sediment contamination adversely affects estuaries, among the most productive marine ecosystems in the world. However, all estuaries are not the same, and estuarine sediments cannot be treated as either fresh or marine sediments or properly assessed without understanding both seasonal and spatial estuarine variability and processes, which are reviewed. Estuaries are physicochemically unique, primarily because of their variable salinity but also because of their strong gradients in other parameters, such as temperature, pH, dissolved oxygen, redox potential, and amount and composition of particles. Salinity (overlying and interstitial) varies spatially (laterally, vertically) and temporally and is the controlling factor for partitioning of contaminants between sediments and overlying or interstitial water. Salinity also controls the distribution and types of estuarine biota. Benthic infauna are affected by interstitial salinities that can be very different than overlying salinities, resulting in large-scale seasonal species shifts in salt wedge estuaries. There are fewer estuarine species than fresh or marine species (the paradox of brackish water). Chemical, toxicological, and community-level assessment techniques for estuarine sediment are reviewed and assessed, including chemistry (grain size effects, background enrichment, bioavailability, sediment quality values, interstitial water chemistry), biological surveys, and whole sediment toxicity testing (single-species tests, potential confounding factors, community level tests, laboratory-to-field comparisons). Based on this review, there is a clear need to tailor such assessment techniques specifically for estuarine environments. For instance, bioavailability models including equilibrium partitioning may have little applicability to estuarine sediments, appropriate reference comparisons are difficult in biological surveys, and there are too few full-gradient estuarine sediment toxicity tests available. Specific recommendations are made to address these and other issues.
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123. **Assessing the impact of pesticides on the environment.**
Werf, H. M. G. van der
Agriculture, Ecosystems and Environment 60 (2/3): 81-96. (Dec. 1996)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agricultural land/ pesticides/ utilization/ environmental impact/ assessment/ methodology/ movement in soil/ dispersion/ sorption/ binding/ biodegradation/ volatilization/ uptake/ dilution/ leaching/ runoff/ toxicity/ simulation models/ health hazards/ exposure/ literature reviews/ human toxicity/ ecotoxicity
This citation is from AGRICOLA.

124. **Assessing the relative environmental impacts of agricultural pesticides: The quest for a holistic method.**
Levitan, L.; Merwin, I.; and Kovach, J.
Agriculture, Ecosystems and Environment 55 (3): 153-168. (Oct. 1995)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: pest management/ pesticides/ utilization/ environmental impact/ assessment/ systems/ simulation models/ indexes/ literature reviews
This citation is from AGRICOLA.

125. **Assessing upland and riparian areas.**
British Columbia Ministry of Forests
British Columbia, Canada: Ministry of Forests
Rangeland Health Brochure 1 (68), 2002. 12 p.
http://www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro68.pdf
This citation is provided courtesy of CAB International/CABI Publishing.

126. **Assessing wetland functional condition in agricultural landscapes.**
Eckles, S. Diane. and United States. Natural Resources Conservation Service.
Vicksburg, MS: U.S. Dept. of Agriculture, Natural Resources Conservation Service; Series: Wetland technical note 1. (2002)
Notes: Title from web page. "March 2002." Description based on content viewed May 13, 2003. Includes bibliographical references.
NAL Call #: aQH87.3-.A77-2002
http://www.nrcs.usda.gov/technical/land/pubs/directiv%5F%20files/TN%5FECS%5F190%5F2%5Fa.pdf
Descriptors: Wetlands---United States/ Environmental impact analysis---United States/ Wetland restoration---United States/ Wetland ecology---Environmental aspects---United States/ Wetland agriculture---United States/ Ecological assessment---Biology---United States/ Agricultural landscape management---United States
This citation is from AGRICOLA.

127. **An assessment of agroforestry systems in the southern USA.**
Zinkhan, F. C. and Mercer, D. E.
Agroforestry Systems 35 (3): 303-321. (1997)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
This citation is provided courtesy of CAB International/CABI Publishing.

128. **Assessment of aquatic and terrestrial reed (Phragmites australis) stands.**
Gusewell, Sabine and Klotzli, Frank
Wetlands Ecology and Management 8 (6): 367-373. (2000)
NAL Call #: QH541.5.M3 W472;
ISSN: 0923-4861
Descriptors: Phragmites australis (Gramineae)/ Angiosperms/ Monocots/ Plants/ Spermatophytes/ Vascular Plants/ agriculture/ conference proceedings/ die back/ ecological significance/ economic significance/ environmental protection/ food production/ international collaboration/ lakeshore restoration/ literature databases/ nature conservation/ reed progression/ reed stands: aquatic, terrestrial/ water treatment/ weed control/ wetlands management
Abstract: A survey of recent publications shows that research on Phragmites australis has often applied

character because of the considerable ecological and economic significance of the species. The main applications are water treatment, agriculture (food production or weed control) and nature conservation. In Europe, most research on natural reed stands has been motivated by reed die-back and efforts towards protection or restoration. Reed progression and reed control have been the main concerns in other parts of the world, and reed progression has also received increasing attention in Europe. While reed die-back generally affects aquatic stands, progression can occur at both terrestrial and aquatic sites, and it can be desired (e.g. lake shore restoration) or unwanted (e.g. in species-rich fens or marshes). Therefore, reed stands need to be assessed individually to decide on management aims and appropriate methods. The varying status of Phragmites australis formed the background of the 'European Reed Conference' held in Zurich/Switzerland in October 1998. The seven contributions published in this special issue are introduced with particular reference to differences between aquatic and terrestrial reed stands and to approaches used in their assessment.

129. **Assessment of methods to estimate pesticide concentrations in drinking water sources.**
ILSI Risk Science Institute and United States. Environmental Protection Agency. Office of Pesticide Programs.
Washington, D.C. ILSI Risk Science Institute; x, 29 p.: ill. (1998)
Notes: "April 2, 1998." "Under a cooperative agreement with the U.S. Environmental Protection Agency Office of Pesticide Programs"--Cover. Includes bibliographical references (p. 23).
NAL Call #: TD427.P35A87-1998
Descriptors: Water---Pollution---United States/ Pesticides---Environmental aspects---United States
This citation is from AGRICOLA.

130. **Assimilation Efficiencies of Chemical Contaminants in Aquatic Invertebrates: A Synthesis.**
Wang, Wen-Xiong and Fisher, N. S.
Environmental Toxicology and Chemistry 9: 2034-2045. (1999)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: Chemical pollutants/ Bioaccumulation/ Water pollution/ Sediment pollution/ Food chains/ Aquatic animals/ Aquatic organisms/ Trophic levels/ Chemical pollution/ Metals/ Sediments/ Pollution/ Reviews/ Invertebrata/ Contaminants/ Chemicals/ Diets/ Ingestion/ Toxicology/ Toxicity/ Invertebrates/ Aquatic Environment/ Foods/ Sediment Contamination/ bioavailability/ Physiology, biochemistry, biophysics/ Pollution Organisms/ Ecology/ Toxicology/ Effects on organisms/ Reviews/ Toxicology and health/ Effects of pollution
Abstract: Assimilation efficiencies of contaminants from ingested food are critical for understanding chemical accumulation and trophic transfer in aquatic invertebrates. Assimilation efficiency is a first-order physiological parameter that can be used to systematically compare the bioavailability of different contaminants from different foods. The various techniques used to measure contaminant assimilation efficiencies are reviewed. Pulse-chase feeding techniques and the application of gamma-emitting radiotracers have been invaluable in measuring metal assimilation efficiencies in aquatic animals. Uniform radiolabeling of food is required to measure assimilation, but this can be difficult when sediments are the food source. Biological factors that influence contaminant assimilation include food quantity and quality, partitioning of contaminants in the food particles, and digestive physiology of the animals. Other factors influencing assimilation include the behavior of the chemical within the animal's gut and its associations with different geochemical fractions in food particles. Assimilation efficiency is a critical parameter to determine (and to make predictions of) bioaccumulation of chemicals from dietary exposure. Robust estimates of assimilation efficiency coupled with estimates of aqueous uptake can be used to determine the relative importance of aqueous and dietary exposures. For bioaccumulation of metals from sediments, additional studies are required to test whether metals bound to the acid-volatile sulfide fraction of sediments can be available to benthic deposit-feeding invertebrates. Most assimilation efficiency studies have focused on chemical transfer in organisms at the bottom of the food chain; additional studies are required to examine chemical transfer at higher trophic levels.

131. **Atmospheric ammonia and ammonium transport in Europe and critical loads: A review.**
Ferm, Martin
Nutrient Cycling in Agroecosystems 51 (1): 5-17. (1998)
NAL Call #: S631 .F422;
ISSN: 1385-1314
Descriptors: ammonia: pollutant/ ammonia deposition/ ammonia emissions/ atmospheric transport/ critical loads
Abstract: The atmosphere in Europe is polluted by easily available nitrogen (ammonium and nitrate) mainly from livestock (NH3), traffic (NOx) and stationary combustion sources (NOx). The nitrogen emission from various European sources decreases in the order: agriculture, road traffic, stationary sources and other mobile sources (including vehicular emissions from agriculture), with annual emissions of approximately 4.9, 2.7, 2.7 and 0.8 Mt N respectively. The emissions have increased dramatically during the latest decades. In the atmosphere the pollutants are oxidised to more water soluble compounds that are washed out by clouds and eventually brought back to the earth's surface again. Since ammonia is emitted in a highly water soluble form it will also to a substantial degree be dry deposited near the source. Ammonia is, however, the dominant basic compound in the atmosphere and will form salts with acidic gases. These salt particles can be transported long distances especially in the absence of clouds. The deposition close to the source is substantial, but hard to estimate due to interaction with other pollutants. Far from the source the deposition of ammonium is on an annual average halved approximately every 400 km. This short transport distance and the substantial deposition near the source makes it possible for countries to control their ammonium deposition by decreasing their emissions, provided that there is no country with much higher emission in the direction of the prevailing wind trajectory. When the easily available nitrogen is deposited on natural ecosystems (lakes, forests), negative

effect can occur. The effect is determined by the magnitude of the deposition and the type of ecosystems (its critical load for nitrogen). In order to reduce the negative effects by controlling the emissions in a cost-efficient way it is necessary to use atmospheric transport models and critical loads.

132. **The atmospheric budget of oxidized nitrogen and its role in ozone formation and deposition.**
Fowler, David; Flechard, Chris; Skiba, Ute; Coyle, Mhairi; and Cape, J Neil
New Phytologist 139 (1): 11-23. (1998);
ISSN: 0028-646X
Descriptors: nitric oxide/ nitrogen dioxide/ oxidized nitrogen: atmospheric budget/ ozone: deposition, formation/ plants (Plantae)/ Plants/ soil emissions/ stomatal uptake
Abstract: Emissions of reactive oxidized nitrogen (NO and NO2), collectively known as NOx, from human activities are c. 21 Tg N annually, or 70% of global total emissions. They occur predominantly in industrialized regions, largely from fossil fuel combustion, but also from increased use of N fertilizers. Soil emissions of NO not only make an important contribution to global totals, but also play a part in regulating the dry deposition of NO and NO2 (NOx) to plant canopies. Soil microbial production of NO leads to a soil 'compensation point' for NO deposition or emission, which depends on soil temperature, N and water status. In warm conditions, the net emission of NOx from plant canopies contributes to the photochemical formation of ozone. Moreover, the effect of NOx emissions from soil is to reduce net rates of NOx deposition to terrestrial surfaces over large areas. Increasing anthropogenic emissions of NOx have led to an approximate doubling in surface O3 concentrations since the last century. NOx acts as a catalyst for the production of O3 from volatile organic compounds (VOCs). Paradoxically, emission controls on motor vehicles might lead to increases in O3 concentrations in urban areas. Removal of NO and NO2 by dry deposition is regulated to some extent by soil production of NO; the major sink for NO2 is stomatal uptake. Long-term flux measurements over moorland in Scotland show very small deposition rates for NO2 at night and before mid-day of 1-4 ng NO2-N m-2 s-1, and similar emission rates during afternoon. The bidirectional flux gives 24-h average deposition velocities of only 1-2 mm s-1, and implies a long life-time for NOx due to removal by dry deposition. Rates of removal of O3 at the ground are also influenced by stomatal uptake, but significant non-stomatal uptake occurs at night and in winter. Measurements above moorland showed 40% of total annual flux was stomatal, with 60% non-stomatal, giving nocturnal and winter deposition velocities of 2-3 mm s-1 and daytime summer values of 10 mm s-1. The stomatal uptake is responsible for adverse effects on vegetation. The critical level for O3 exposure (AOT40) is used to derive a threshold O3 stomatal flux for wheat of 0-5 mug m-2 s-1. Use of modelled stomatal fluxes rather than exposure might give more reliable estimates of yield loss; preliminary calculations suggest that the relative grain yield reduction (%) can be estimated as 38 times the stomatal ozone flux (g m-2) above the threshold, summed over the growing season.

133. **Atmospheric dispersion of current-use pesticides: A review of the evidence from monitoring studies.**
Van Dijk, Harrie FG and Guicherit, Robert
Water, Air and Soil Pollution 115 (1-4): 21-70. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: atrazine: herbicide, pollutant, toxin/ current use pesticides: pesticide, pollutant, toxin, transformation products/ lindane: insecticide, pollutant, toxin/ organophosphate insecticides: insecticide, pollutant, toxin/ application season/ atmospheric dispersion/ coastal waters/ dry particle deposition/ ecotoxicology/ gas exchange/ mountainous areas/ pesticide contamination/ remote lakes/ riverine inputs/ seas
Abstract: Recently, evidence has accumulated that the extensive use of modern pesticides results in their presence in the atmosphere at many places throughout the world. In Europe over 80 current-use pesticides have been detected in rain and 30 in air. Similar observations have been made in North America. The compounds most often looked for and detected are the organochlorine insecticide lindane and triazine herbicides, especially atrazine. However, acetanilide and phenoxyacid herbicides, as well as organophosphorus insecticides have also frequently been found in rain and air. Concentrations in air normally range from a few pg/m3 to many ng/m3. Concentrations in rain generally range from a few ng/L to several mug/L. In fog even higher concentrations are observed. Deposition varies between a few mg/ha/y and more than 1 g/ha/y per compound. However, these estimates are usually based on the collection and analysis of (bulk) precipitation and do not include dry particle deposition and gas exchange. Nevertheless, model calculations, analysis of plant tissue, and first attempts to measure dry deposition in a more representative way, all indicate that total atmospheric deposition probably does not normally exceed a few g/ha/y. So far, little attention has been paid to the presence of transformation products of modern pesticides in the atmosphere, with the exception of those of triazine herbicides, which have been looked for and found frequently. Generally, current-use pesticides are only detected at elevated concentrations in air and rain during the application season. The less volatile and more persistent ones, such as lindane, but to some extent also triazines, are present in the atmosphere in low concentrations throughout the year. In agricultural areas, the presence of modern pesticides in the atmosphere can be explained by the crops grown and pesticides used on them. They are also found in the air and rain in areas where they are not used, sometimes even in remote places, just like their organochlorine predecessors. Concentrations and levels are generally much lower there. These data suggest that current-use pesticides can be transported through the atmosphere over distances of tens to hundreds, and sometimes even more than a thousand kilometres. The relative importance of these atmospheric inputs varies greatly. For mountainous areas and remote lakes and seas, the atmosphere may constitute the sole route of contamination by pesticides. In

coastal waters, on the other hand, riverine inputs may prevail. To date, little is known about the ecological significance of these aerial inputs.

134. **Atmospheric transport and air-surface exchange of pesticides.**
Bidleman, Terry F
Water, Air and Soil Pollution 115 (1-4): 115-166. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: alpha hexachlorochyclohexane: pollutant, toxin/ atrazine: herbicide, toxin, pollutant/ chiral OC pesticides: enantiomers, pesticide, toxin, volatilization, pollutant/ chlorothalonil: fungicide, pollutant, toxin/ chlorpyrifos: insecticide, pollutant, toxin/ endosulfan: insecticide, toxin, pollutant/ metolachlor: herbicide, toxin, pollutant/ persistent organic pollutants [POPs]: pollutant, toxin/ terbufos: insecticide, toxin, pollutant/ trifluralin: herbicide, toxin, pollutant/ PCBs [polychlorinated biphenyls]: pollutant, toxin/ aerosol sorption/ air surface exchange/ atmospheric transport/ chemical transport distance/ cold regions/ ecotoxicology/ environmental persistence/ environmental temperatures/ fog/ octanol air partition coefficient/ particle partitioning/ particle phase/ physiochemical properties/ regional scale/ sediment/ soil residue data/ soil air exchange/ surface seawater/ temperate climate/ temperature/ water/ air fugacity ratio
Abstract: Atmospheric transport and exchange of pesticides with soil, vegetation, water and atmospheric particles are discussed, with an emphasis on applying physicochemical properties of the compound to describe environmental partitioning. The octanol-air partition coefficient is promoted as a unifying property for describing volatilization of pesticides from soil and sorption to aerosols. Present-day sources of organochlorine (OC) pesticides to the atmosphere are continued usage in certain countries and volatilization from contaminated soils where they were used in the past. Models are available to predict volatilization from soil; however, their implementation is hampered by lack of soil residue data on a regional scale. The need to differentiate "new" and "old" sources is increasing, as countries negotiate international controls on persistent organic pollutants (POPs). A new technique, based on the analysis of individual pesticide enantiomers, is proposed to follow emission of chiral OC pesticides from soil and water. Air monitoring programs in the Arctic show the ubiquitous presence of OC pesticides, PCBs and other POPs, and recently a few "modern" pesticides have been identified in fog and surface seawater. Atmospheric loadings of POPs to oceans and large lakes take place mainly by air-water gas exchange. In the case of OC pesticides and PCBs, aquatic systems are often near air-water equilibrium or even oversaturated. Measurement of water/air fugacity ratios suggests revolatilization of PCBs and several OC pesticides in the Great Lakes and, for alpha-hexachlorocyclohexane (alpha-HCH), in the Arctic Ocean. Outgassing of alpha-HCH in large lakes and arctic waters has been confirmed by enantiomeric tracer studies. The potential for pesticides to be atmospherically transported depends on their ability to be mobilized into air and the removal processes that take place enroute: wet and dry deposition of gases and particles and chemical reactions in the atmosphere. Measurement of reaction rate constants for pesticides in the gas and particle phase at a range of environmental temperatures is a critical research need. The transport distance of a chemical is related to its overall environmental persistence, determined by the partitioning among different compartments (water, sediment, soil, air), degradation rates in each compartment and mode of emission (into water, soil, air). Several pesticides found in the arctic environment have predicted lifetimes in the gas phase of only a few days in temperate climates, pointing out the need for monitoring and evaluation of persistence in cold regions.

135. **Atmospheric transport and deposition of pesticides: An assessment of current knowledge.**
Van Pul, W Addo J; Bidleman, Terry F; Brorstrom, Lunden Eva; Builtjes, Peter JH; Dutchak, Sergey; Duyzer, Jan H; Gryning, Sven Erik; Jones, Kevin C; Van Dijk, Harrie FG; and Van Jaarsveld, JA
Water, Air and Soil Pollution 115 (1-4): 245-256. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: pesticides: atmospheric fate, deposition, toxin, pesticide, pollutant/ air soil interface/ air vegetation interface/ air water interface/ atmospheric transport/ ecotoxicology/ pesticide deposition/ physicochemical properties/ risk assessment implications/ surface exchange/ temperature dependency/ vapor pressure/ Henry's law constant
Abstract: The current knowledge on atmospheric transport and deposition of pesticides is reviewed and discussed by a working group of experts during the Workshop on Fate of pesticides in the atmosphere; implications for risk assessment, held in Driebergen, the Netherlands, 22-24 April, 1998. In general there is a shortage of measurement data to evaluate the deposition and reemission processes. It was concluded that the mechanisms of transport and dispersion of pesticides can be described similarly to those for other air pollution components and these mechanisms are rather well-known. Large uncertainties are present in the exchange processes at the interface between air and soil/water/vegetation. In all process descriptions the uncertainty in the physicochemical properties play an important role. Particularly those in the vapour pressure, Henry's law constant and its temperature dependency. More accurate data on physicochemical properties and particularly the temperature dependencies is needed.

136. **Automated storm water sampling on small watersheds.**
Harmel, R. D.; King, K. W.; and Slade, R. M.
Applied Engineering in Agriculture 19 (6): 667-674. (2003)
NAL Call #: S671.A66;
ISSN: 0883-8542.
Notes: Number of References: 18
Descriptors: Agriculture/ Agronomy/ storm water sampling/ automated sampling/ nonpoint source pollution/ water quality/ strategies/ accuracy
Abstract: Few guidelines are currently available to assist in designing appropriate automated storm water sampling strategies for small watersheds. Therefore, guidance is needed to develop strategies that achieve an appropriate balance between accurate characterization of storm water quality and loads and limitations of budget,

equipment, and personnel. In this article, we explore the important sampling strategy components (minimum flow threshold, sampling interval, and discrete versus composite sampling) and project-specific considerations (sampling goal, sampling and analysis resources, and watershed characteristics) based on personal experiences and pertinent field and analytical studies. These components and considerations are important in achieving the balance between sampling goals and limitations because they determine how and when samples are taken and the potential sampling error Several general recommendations are made, including: setting low minimum flow thresholds, using flow-interval or variable time-interval sampling, and using composite sampling to limit the number of samples collected. Guidelines are presented to aid in selection of an appropriate sampling strategy based on user's project-specific considerations. Our experiences suggest these recommendations should allow implementation of a successful sampling strategy for most small watershed sampling projects with common sampling goals.

137. **Background and Overview of Current Sediment Toxicity Identification Evaluation Procedures.**
Ankley, G. T. and Schubauer-Berigan, M. K.
Journal of Aquatic Ecosystem Health 4 (3): 133-149. (1995);
ISSN: 0925-1014
Descriptors: toxicity tests/ sediment pollution/ bioassays/ synergism/ pollutant identification/ bioassay/ sediments/ pollutants/ toxicity/ toxicity testing/ water pollution/ Methods and instruments/ Identification of pollutants/ Toxicity testing
Abstract: Laboratory bioassays can provide an integrated assessment of the potential toxicity of contaminated sediments to aquatic organisms; however, toxicity as a sole endpoint is not particularly useful in terms of identifying remedial options. To focus possible remediation (e.g., source control), it is essential to know which contaminants are responsible for toxicity. Unfortunately, contaminated sediments can contain literally thousands of potentially toxic compounds. Methods which rely solely on correlation to identify contaminants responsible for toxicity are limited in several aspects: (a) actual compounds causing toxicity might not be measured, (b) concentrations of potentially toxic compounds may covary, (c) it may be difficult to assess the bioavailability of contaminants measured in a sediment, and (d) interactions may not be accounted for among potential toxicants (e.g., additivity). Toxicity identification evaluation (TIE) procedures attempt to circumvent these problems by using toxicity-based fractionation procedures to implicate specific contaminants as causative toxicants. Phase I of a TIE characterizes the general physio-chemical nature of sample toxicants. Phase II employs methods to measure toxicants via different analytical methods, and Phase III consists of techniques to confirm that the suspect toxicants identified in Phases I and II of the TIE actually are responsible for toxicity. These TIE procedures have been used to investigate the toxicity of a variety of samples, including sediments. Herein we present a brief conceptual overview of the TIE process, and discuss specific considerations associated with sediment TIE research. Points addressed include: (a) selection and preparation of appropriate test fractions, (b) use of benthic organisms for sediment TIE work, and (c) methods for the identification of common sediment contaminants.

138. **Background of the MSEA-RZWQM modeling project.**
Watts, D. G.; Fausey, N. R.; and Bucks, D. A.
Agronomy Journal 91 (2): 169-170. (Mar. 1999-Apr. 1999)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT]
Descriptors: roots/ soil water/ water quality/ mathematical models/ water pollution/ fertilizers/ economic analysis/ simulation models/ calibration/ validity/ databases/ groundwater/ groundwater pollution/ pesticide residues/ Iowa/ Minnesota/ Missouri/ Nebraska/ Ohio/ Colorado
Abstract: The Management System Evaluation Areas (MSEA) project was established in 1990 as a part of the Midwest Water Quality Initiative to evaluate the effect of agricultural management practices and systems on the quality of water resources, to increase understanding of processes affecting water contamination, and to develop cost effective strategies to reduce water contamination from pesticides and plant nutrients. The midwest was chosen because it produces so much of the country's corn (>80%) and soybean (approximately equal to 70%) crops, and consumes >50% of the N fertilier and almost 60% of the herbicides applied. The MSEA project collected a large volume of data across a wide region. Properly calibrated and validated, simulation models could use this database to estimate water quality impact over much longer periods than the expected life of the MSEA field program and to simulate responses for other combinations of soil, management systems, and weather conditions. The Root Zone Water Quality Model (RZWQM) was chosen for model improvement, calibration, and validation, to be followed by multilocation simulation of several specific management systems used in Midwest corn and corn-soybean production. Model improvement was an iterative process across multiple location. The next seven papers in this issue provide an overview of RZWQM Version 3.2, an explanation of the calibration-validation process, and documentation of that process and the modeling at MSEA locations in Iowa, Minnesota, Missouri, Nebraska, Ohio, and Colorado.
This citation is from AGRICOLA.

139. **Bacteriophages as Indicators of Pollution.**
Armon, R. and Kott, Y.
Critical Reviews in Environmental Science and Technology 26 (4): 299-335. (1996)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: water pollution/ pathogens/ indicators/ viruses/ public health/ bacteriophage/ pollution control/ indicator species/ bacteriophages/ phages/ pollution indicators/ reviews/ bioindicators/ viruses/ Sources and fate of pollution/ Prevention and control/ Other water systems/ Freshwater pollution
Abstract: Water pollution is an undesired reality encountered in many countries. To prevent major outbreaks of infectious disease caused by

pathogenic microorganisms such as viruses, bacteria, and protozoa that contaminate the water, the scientific community has searched for various indicators that could be used to alert their presence. Among the possible indicators, bacteriophages are receiving increasing attention because of the concern with waterborne viral diseases. This review summarizes the advantages and disadvantages of utilizing bacteriophages as pollution indicators as seen from the somewhat confusing information accumulated from almost 50 years of research and proposes some new directions in the application of bacteriophages as indicators. Bacteriophages have been studied worldwide as pollution indicators because of the ease of their detection and their morphological similarity to human viruses. In addition, detection of human viruses is still a highly skilled and costly process. Generally speaking, bacteriophages have shown good potential application as indicators in certain situations, but some additional effort is needed in order to determine their real merit.
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140. **Barrens of the midwest: A review of the literature.**
Heikens, A. L. and Robertson, P. A.
Castanea 59 (3): 184-194. (Sept. 1994)
NAL Call #: 450-So82;
ISSN: 0008-7475 [CSTNAC].
Notes: Paper presented at "Barrens Symposium," April 15, 1993, Virginia. Includes references.
Descriptors: plant communities/ habitats/ climatic factors/ edaphic factors/ fire effects/ habitat destruction/ literature reviews/ north central states of USA
This citation is from AGRICOLA.

141. **Bayesian methods for analysing climate change and water resource uncertainties.**
Hobbs, Benjamin F
Journal of Environmental Management 49 (1): 53-72. (1997)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797
Descriptors: Bayesian Methods/ Climate Change/ Climatology/ Dempster Shafer Reasoning/ Fuzzy Sets/ Global Warming/ Models And Simulations/ Water Resource Uncertainties/ Wetlands Management
Abstract: The purpose of this paper is to outline the advantages of the Bayesian approach for analysing uncertainties involving climate change, emphasizing the study of the risks such changes pose to water resources systems. Bayesian analysis has the advantage of basing inference and decisions on a coherent and normatively appealing theoretical framework. Furthermore, it can incorporate diverse sources of information, including subjective opinions, historical observations and model outputs. The paper summarizes the basic assumptions and procedures of Bayesian analysis. Summaries of applications to detection of climate change, estimation of climate model parameters, and wetlands management under climatic uncertainty illustrate the potential of the Bayesian methodology. Criticisms of the approach are summarized. It is concluded that in comparison with alternative paradigms for analysing uncertainty, such as fuzzy sets and Dempster-Shafer reasoning, Bayesian analysis is practical, theoretically sound, and relatively easy to understand.
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142. **Beneficial use of effluents, wastes, and biosolids.**
Sumner, M. E.
Communications in Soil Science and Plant Analysis 31 (11/14): 1701-1715. (2000)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Paper presented at the 1999 International Symposium on Soil and Plant Analysis held March 22-29, 1999, Brisbane, Queensland, Australia. Includes references.
Descriptors: application to land/ sewage effluent/ sewage sludge/ animal manures/ composts/ gypsum/ food industry/ wastes/ paper mill sludge/ literature reviews/ nutrient content
Abstract: Anthropogenic wastes are accumulating at ever increasing rates. As an alternative to stockpiling and landfilling, land application of wastes is considered in terms of benefits to agriculture while protecting the environment. Beneficial reuse of wastes such as municipal wastewater, sewage sludge, animal manures, composts, byproduct gypsum, food processing and paper and pulp wastes are discussed both in terms of their benefits to agriculture and requirements from the standpoint of analyses required for monitoring. Clearly, many of these wastes are highly beneficial to crop production as fertilizer substitutes and soil ameliorants.
This citation is from AGRICOLA.

143. **Benefits and drawbacks to composting organic by-products.**
Sikora, Lawrence J.
In: Beneficial co-utilization of agricultural, municipal and industrial by-products/ Brown, S.; Angle, J. S.; and Jacobs, L.
Norwell, MA: Kluwer Academic, 1998; pp. 69-77.
ISBN: 0792351894; Proceedings of the Beltsville Symposium XXII, Beltsville, Maryland, USA, May 4-8, 1997; Conference Sponsors: Beltsville Agricultural Research Center, Agricultural Research Service, US Dept. of Agriculture with the cooperation of Friends of Agriculture Research - Beltsville (FAR-B)
NAL Call #: TD796.5.B45 1998
Descriptors: Waste Management (Sanitation)/ organic by product composting/ waste treatment methods/ benefit drawback analysis/ costs/ marketing/ pathogen reduction
© Thomson

144. **Benefits of reducing domestic well nitrate contamination from concentrated animal feeding operations: A national model of groundwater contamination.**
Lazo, J. K; Waldman, D. M.; Ottem, T. D.; and Wheeler, W. J., 2003 (application/pdf)
NAL Call #: HD1405 .A44
http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=8954
Abstract: This paper presents an analysis of benefits to private drinking water well users from regulatory changes for concentrated animal feeding operations (CAFOs). Combining a statistical model of groundwater quality with benefit estimates based on values available from the literature, we develop aggregate national benefit estimates for reduced well water contamination from changes in CAFO regulations. The statistical model is developed to explore truncation and selection issues. We conduct a sensitivity analysis of aggregate benefit estimates to model estimation and benefits transfer values.
This citation is from AGRICOLA.

145. **Benefits of Reducing Nitrate Contamination in Private Domestic Wells Under CAFO Regulatory Options.**
U.S. Environmental Protection Agency, Office of Science and Technology.
U.S. Environmental Protection Agency, 2002 (application/pdf)
NAL Call #: EPA821R03008
http://www.epa.gov/npdes/pubs/cafo_benefit_nitrate.pdf

146. **Benthic-pelagic interactions in shallow water columns: An experimentalist's perspective.**
Threlkeld, Stephen T
Hydrobiologia 275-276: 293-300. (1994)
NAL Call #: 410 H992;
ISSN: 0018-8158
Descriptors: Aquatic food web/ Nutrients/ Sedimentation/ algae (Algae Unspecified)/ fish (Pisces Unspecified)/ plankton (Organisms Unspecified)/ Animalia (Animalia Unspecified)/ Osteichthyes (Osteichthyes)/ chordates/ microorganisms/ nonhuman vertebrates/ nonvascular plants/ plants/ vertebrates
Abstract: Shallow water column benthic and pelagic communities are thought to be linked by trophic relationships, through life history or ontogenetic links, and by biologically or physically-mediated resuspension or sedimentation processes. It is often confusing and sometimes misleading to focus only on benthic or only on pelagic components of aquatic food webs, even though the literature on shallow water column experiments contains few experiments that give a balanced view of these components, or interactions between components in different habitats. The rarity of balanced experiments is especially troublesome because the most common types of manipulations in shallow water column experiments (fish and nutrients) often have rapid, direct effects on both kinds of habitats, or easily recognized indirect links between the two habitats that go unevaluated. Despite a large experimental literature on pelagic and benthic foodwebs (with less on both in the same systems), there appears to be continuing uncertainty about the importance to pelagic productivity of nutrients released from resuspended sediments, the role of macrobenthos in controlling plankton, and the efficacy and interaction of trophic cascades between pelagic and benthic communities.
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147. **Best management practices for poultry manure utilization that enhance agricultural productivity and reduce pollution.**
Moore, P. A.
In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A., 1998; pp. 89-123
NAL Call #: S655.A57 1998
This citation is provided courtesy of CAB International/CABI Publishing.

148. **Bioaccumulation of Heavy Metals by Aquatic Macro-Invertebrates of Different Feeding Guilds: A Review.**
Goodyear, K. L. and Mcneill, S.
Science of the Total Environment 1-2: 1-19. (1999)
NAL Call #: RA565.S365;
ISSN: 0048-9697.
Notes: DOI: 10.1016/S0048-9697(99)00051-0
Descriptors: Bioaccumulation/ Heavy metals/ Zinc/ Copper/ Cadmium/ Lead/ Reviews/ Aquatic organisms/ Macrofauna/ Freshwater environments/ Feeding/ Guilds/ Freshwater organisms/ Sediment pollution/ Water pollution/ Feeds/ Pollution monitoring/ Food webs/ Trophic relationships/ Water Pollution Effects/ Foods/ Predation/ Macroinvertebrates/ Diptera/ Ephemeroptera/ Mayflies/ Insecta/ Metabolism/ Aquatic entomology/ Freshwater pollution/ Effects on organisms/ Effects of pollution
Abstract: The available literature on heavy metal bioaccumulation by freshwater macro-invertebrates has been analysed. A very uneven data distribution was found. Ephemeroptera and Diptera are the most commonly investigated orders of insect larvae, whilst many orders are not represented at all. The collector-gatherer and predator feeding guilds are more frequently investigated than other guilds. Furthermore, Zn, Cu, Pb and Cd are the most intensively researched heavy metals, and only infrequent investigations of other metals are documented. Relationships between metal concentrations in the animals and levels in sediments and waters were determined from the pooled data for three feeding guilds. No one relationship represents how each metal interacts within the feeding guilds. Each of the four metals (Zn, Cu, Pb and Cd) displays a unique relationship between metal concentrations in sediments or waters with those in individual feeding guilds of macro-invertebrates, indicating the relative importance of different sources of metals to the different feeding types. Biomagnification of Zn, Cu, Pb and Cd has been demonstrated not to occur between these guilds.
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149. **Bioaerosols from municipal and animal wastes: Background and contemporary issues.**
Pillai, S. D. and Ricke, S. C.
Canadian Journal of Microbiology 48 (8): 681-696. (Aug. 2002)
NAL Call #: 448.8-C162;
ISSN: 0008-4166 [CJMIAZ]
Descriptors: animal wastes/ feedlot wastes/ feedlots/ sewage sludge/ pathogens/ air microbiology/ aerosols/ risk assessment/ infectious diseases/ literature reviews
This citation is from AGRICOLA.

150. **Bioassessment and management of North American freshwater wetlands.**
Rader, Russell Ben.; Batzer, Darold P.; and Wissinger, Scott A.
New York: Wiley; x, 469 p.: ill. (2001)
NAL Call #: QH77.N56-B56-2001;
ISBN: 0471352349 (cloth: alk. paper)
Descriptors: Wetland management---North America/ Environmental monitoring---North America
This citation is from AGRICOLA.

151. **Biochemical and molecular basis of pesticide degradation by microorganisms.**
Singh, B. K.; Kuhad, R. C.; Singh, A.; Lal, R.; and Tripathi, K. K.
Critical Reviews in Biotechnology 19 (3): 197-225. (1999)
NAL Call #: TP248.13.C74;
ISSN: 0738-8551 [CRBTE5]
Descriptors: pesticides/ microbial degradation/ literature reviews
This citation is from AGRICOLA.

152. **Biodegradation of the acetanilide herbicides alachlor, metolachlor, and propachlor.**
Stamper, David M and Tuovinen, Olli H
Critical Reviews in Microbiology 24 (1): 1-22. (1998)

NAL Call #: QR1.C7;
ISSN: 1040-841X
Descriptors: alachlor: biodegradation, herbicide/ chloroacetanilides/ glutathione/ metolachlor: biodegradation, herbicide/ propachlor: biodegradation, herbicide/ Chaetomium globosum (Ascomycetes)/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants
© Thomson

153. **The biodiversity benefits of organic farming.**
Bartram, H. and Perkins, A.
In: Organic agriculture: Sustainability, markets and policies: OECD workshop on organic agriculture. (Held 23 Sep 2002-26 Sep 2002 at Washington, D.C., USA.) OECD (eds.)
Wallingford, UK: CAB International; pp. 77-93; 2003.
ISBN: 0-85199-740-6
This citation is provided courtesy of CAB International/CABI Publishing.

154. **Biodiversity, conservation and inventory: Why insects matter.**
Kim, K. C.
Biodiversity and Conservation 2 (3): 191-214. (June 1993)
NAL Call #: QH75.A1B562;
ISSN: 0960-3115 [BONSEU].
Notes: Special Issue: Global Biodiversity and Conservation of Insects. Includes references.
Descriptors: arthropods/ species diversity/ nature conservation/ ecosystems/ inventories/ monitoring/ surveys/ literature reviews
This citation is from AGRICOLA.

155. **Biodiversity of agricultural land: Habitats, species and hotspots.**
Usher, M. B.
In: Biodiversity and conservation in agriculture proceedings of an international symposium. (Held 17 Nov 1997 at Stakis Brighton Metropole Hotel, UK.)
Farnham, UK: British Crop Protection Council; pp. 1-14; 1997.
NAL Call #: SB599.B73-no.69;
ISBN: 190139669X
Descriptors: agricultural land/ biodiversity/ species diversity/ genetic diversity/ community ecology/ landscape ecology/ habitats/ literature reviews
This citation is from AGRICOLA.

156. **Biofertilizers for enhancement of crop productivity: A review.**
Pathak DV; Khurana AL; and Satpal Singh
Agricultural Reviews Karnal 18 (3-4): 155-166; 52 ref. (1997)
This citation is provided courtesy of CAB International/CABI Publishing.

157. **Biofertilizers in agriculture.**
Gupta RP and Pandher MS
Journal of Research 33 (1-4): 209-224. (1996).
Notes: Publisher: Punjab, India: Punjab-Agricultural-University; 52 ref.
This citation is provided courtesy of CAB International/CABI Publishing.

158. **Biofiltration: The treatment of fluids by microorganisms immobilized into the filter bedding material, A review.**
Cohen, Y.
Bioresource Technology 77 (3): 257-274. (May 2001)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB].
Notes: Reviews issue. Includes references.
Descriptors: waste treatment/ biological treatment
This citation is from AGRICOLA.

159. **Biogenic trace gases: Measuring emissions from soil and water.**
Matson, P. A. and Harriss, Robert C.
Oxford England; Cambridge, Mass., USA: Blackwell Science; xi, 394 p.: ill.; Series: Methods in ecology. (1995)
NAL Call #: QC879.6.B566--1995;
ISBN: 0632036419
Descriptors: Atmospheric chemistry---Technique/ Bioclimatology---Technique/ Biogeochemistry---Technique/ Agricultural ecology---Technique
This citation is from AGRICOLA.

160. **Biogeochemical Models Relating Soil Nitrogen Losses to Plant-Available N.**
Tabachow, R. M.; Peirce, J. J.; and Richter, D. D.
Environmental Engineering Science 18 (2): 81-90. (2001);
ISSN: 1092-8758
Descriptors: Biogeochemistry/ Nitrogen cycle/ Plants/ Soil/ Fertilizers/ Simulation/ Agriculture/ Mathematical models/ Leaching/ Water Pollution Control/ Cycling Nutrients/ Nitrogen/ Soil water plant Relationships/ Model Studies/ Reviews/ DAISY model/ APS model/ RISK N model/ NLEAP model/ Land pollution/ Water quality control
Abstract: Four biogeochemical models that simulate N cycling in the plant-soil-water-atmosphere environment are evaluated. Each model considers N inputs and outputs to an agricultural system with emphasis on the relationships between mineral fertilizers and biofertilizers to plant-available N. Efficient use of N fertilizers by minimizing losses of N by NO super(-) sub(3) leaching, NO sub(x) off-gas, and erosion decreases any negative impact on the environment and reduces the drain of natural resources and economic loss. A review of four existing models is conducted to evaluate the effectiveness of these models in simulating major biogeochemical relationships of added N to agricultural systems. The APS simulation model focuses on the influence of N fertilization on CO sub(2) emissions with varying soil temperature. The deterministic DAISY model simulated nitrate leaching in an effort to develop sustainable crop rotations. The NLEAP model simulates nitrate leaching and allows users to evaluate various agricultural management strategies. The physically based analytical model RISK-N simulates N fluxes for major processes involving N in soil, and seems best suited for modeling the full complex of biogeochemical N cycles in fertilized systems.
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161. **Bioindicators for assessing ecological integrity of prairie wetlands.**
Adamus, Paul R.; Hairston, Ann J.; National Health and Environmental Effects Research Laboratory (U.S.), Western Ecology Division; and ManTech Environmental Research Services Corp.
Corvallis, OR: U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Western Ecology Division; ix, 209 p.: ill. 1 computer disk (3.5 in.). (1996)
Notes: "Prepared ... through Contract 68-C4-0019 to ManTech Environmental Research Services Corp. and Contract number 5B6075NATA to Ann Hairston"--T.p. verso. Shipping list no.: 97-0045-P. "July 1996." "EPA/600/R-96/082."

Includes bibliographical references (p. 131-171). SUDOCS: EP 1.2:B 52/21.
NAL Call #: Fiche-S-133-EP-1.2:B-52/21-
Descriptors: Prairie ecology---United States/ Wetland ecology---United States/ Indicators---Biology---United States/ Biological diversity conservation---United States
This citation is from AGRICOLA.

162. **Bioindicators for Water Quality Evaluation: A Review.**
Hao, O. J.
Journal of the Chinese Institute of Environmental Engineering 6 (1): 1-19. (1996);
ISSN: 1022-7636
Descriptors: water quality/ bioindicators/ industrial wastes/ runoff/ pesticides/ environmental effects/ monitoring/ reviews/ aquatic organisms/ physiology/ species composition/ indicator species/ pollution monitoring/ Identification of pollutants/ Freshwater pollution/ Effects on organisms
Abstract: In general, assessment of water quality has been traditionally relied on the conventional pollutant parameters of biological oxygen demand and suspended solids. Often, these parameters are unable to detect those pollutants associated with industrial activities (e.g., heavy metals, solvents, toxic organics, and waste oils) and runoff (e.g., pesticides). It is not possible to chemically monitor each and every one of the possible pollutants to assess the environmental impact on water quality. It, thus, would appear logical that biological methods be used to monitor contamination levels of aquatic environments, since water pollution is essentially a biological phenomenon. Water quality affects the abundance, species composition, productivity, and physiological conditions of indigenous populations of a variety of aquatic species. Thus, the nature and health of the aquatic communities represent the quality of the water. Consequently, qualitative and/or quantitative description of the status of bioindicators may provide a viable alternative to assess water quality. The primary purpose of this study is to provide a comprehensive review of the developments in the past 10 years in the area of bioindicators of water quality. Fish, macroinvertebrates, macrophytes, algae, bacteria and viruses as bioindicators are covered and discussed.
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163. **Biological control of weeds in European crops: Recent achievements and future work.**
Muller Scharer, H.; Scheepens, P. C.; and Greaves, M. P.
Weed Research 40 (1): 83-98. (Feb. 2000)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: weeds/ biological control/ weed control/ integrated pest management/ plant pathogens/ evaluation/ agricultural research/ field experimentation/ competitive ability/ epidemics/ provenance/ storage/ formulations/ efficacy/ literature reviews/ mycoherbicides/ plant pathogenic fungi/ Europe/ integrated weed management
This citation is from AGRICOLA.

164. **Biological effects of agriculturally derived surface water pollutants on aquatic systems: A review.**
Cooper, C. M.
Journal of Environmental Quality 22 (3): 402-408. (July 1993-Sept. 1993)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the USDA-ARS Beltsville Agricultural Research Center Symposium XVII, "Agricultural Water Quality Priorities, A Team Approach to Conserving Natural Resources," May 4-8, 1992, Beltsville, MD. Includes references.
Descriptors: aquatic environment/ surface water/ water quality/ sediment/ nutrients/ organic wastes/ pesticides/ heavy metals/ pollution/ agriculture
Abstract: Environmental manipulations and other human activities are major causes of stress on natural ecosystems. Of the many sources of surface water pollutants, agricultural activities have been identified as major contributors to environmental stress, which affects all ecosystem components. In water, agricultural contaminants are most noticeable when they produce immediate, dramatic toxic effects on aquatic life although more subtle, sublethal chronic effects may be just as damaging over long periods. Aquatic systems have the ability to recover from contaminant damage if not seriously overloaded with irreversible pollutants. Thus, contaminant loading level is as important as type of pollutant. Although suspended sediment represents the largest volume of aquatic contaminant, pesticides, nutrients, and organic enrichment are also major stressors of aquatic life. Stream corridor habitat traps and processes contaminants. Loss of buffering habitat, including riparian zones, accelerates effects of pollutants and should be considered when assessing damage to aquatic life. Protection of habitat is the single most effective means of conserving biological diversity. Current available management practices and promising new technology are providing solutions to many contaminant-related problems in aquatic systems.
This citation is from AGRICOLA.

165. **Biological effects of fine sediment in the lotic environment.**
Wood, Paul J and Armitage, Patrick D
Environmental Management 21 (2): 203-217. (1997)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: biological effects/ conservation/ deposition/ fine sediment/ habitat quality/ lotic environment/ river sedimentation/ soil science/ transport/ fish (Pisces Unspecified)/ invertebrate (Invertebrata Unspecified)/ Invertebrata (Invertebrata Unspecified)/ Pisces (Pisces Unspecified)/ animals/ chordates/ nonhuman vertebrates/ vertebrates
Abstract: Although sedimentation is a naturally occurring phenomenon in rivers, land-use changes have resulted in an increase in anthropogenically induced fine sediment deposition. Poorly managed agricultural practices, mineral extraction, and construction can result in an increase in suspended solids and sedimentation in rivers and streams, leading to a decline in habitat quality. The nature and origins of fine sediments in the lotic environment are reviewed in relation to channel and nonchannel sources and the impact of human activity. Fine sediment transport and deposition are outlined in relation to variations in streamflow and particle size characteristics. A holistic approach to the problems associated with fine sediment is outlined to aid in the identification of sediment sources,

transport, and deposition processes in the river catchment. The multiple causes and deleterious impacts associated with fine sediments on riverine habitats, primary producers, macroinvertebrates, and fisheries are identified and reviewed to provide river managers with a guide to source material. The restoration of rivers with fine sediment problems are discussed in relation to a holistic management framework to aid in the planning and undertaking of mitigation measures within both the river channel and surrounding catchment area.

166. **Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries.**
Wilber, Dara H and Clarke, Douglas G
North American Journal of Fisheries Management 21 (4): 855-875. (2001)
NAL Call #: SH219.N66;
ISSN: 0275-5947
Descriptors: fish (Pisces)/ salmonid (Osteichthyes): anadromous / shellfish (Invertebrata)/ Animals/ Chordates/ Fish/ Invertebrates/ Nonhuman Vertebrates/ Vertebrates/ aquatic biology/ behavioral responses/ bioassays/ biological effects/ ecotoxicology/ environmental impacts/ estuaries/ exposure durations/ human activities/ life history stages/ mortality/ navigation dredging/ resource management/ suspended sediments/ taxonomy/ tidal flushing
Abstract: Objective assessment of the effects of increased concentrations of suspended sediment caused by human activities, such as navigation dredging, on estuarine fish and shellfish requires an integration of findings from biological and engineering studies. Knowledge is needed of (1) the suspended sediment characteristics typical of both ambient and dredging-induced conditions, (2) the biological responses of aquatic organisms to these suspended sediment dosages, and (3) the likelihood that organisms of interest will encounter suspended sediment plumes. This paper synthesizes the results of studies that report biological responses to known suspended sediment concentrations and exposure durations and relates these findings to suspended sediment conditions associated with dredging projects. Biological responses of taxonomic groups and life history stages are graphed as a function of concentration and exposure duration. The quality and taxonomic breadth of studies on which resource managers must rely when evaluating potential impacts from activities that resuspend sediments, such as dredging projects, are addressed. Review of the pertinent literature indicates that few data exist concerning biological responses of fish and shellfish to suspended sediment dosages commonly associated with dredging projects. Much of the available data come from bioassays that measured acute responses and required high concentrations of suspended sediments to induce the measured response, usually mortality. Although anadromous salmonids have received much attention, little is known of behavioral responses of many estuarine fishes to suspended sediment plumes. Likewise, the effects of intermittent exposures at periodicities that simulate the effects of tidal flushing or the conduct of many dredge operations have not been addressed.

167. **Biological Implications of Sulfide in Sediment: A Review Focusing on Sediment Toxicity.**
Wang, F. and Chapman, P. M.
Environmental Toxicology and Chemistry 11: 2526-2532. (1999)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: Reviews/ Sediment pollution/ Sulfide/ Polluted environments/ Metals/ Sulfides/ Toxicology/ Biota/ Behavior/ Irrigation/ Toxicity/ Pollution effects / Pollutant identification/ Behaviour/ Pollution tolerance/ Chemical reactions/ Sulphides/ Analytical techniques/ Sediment chemistry/ Sediment Contamination/ Bioassay/ Ecological Effects/ Reviews/ Toxicology and health/ Effects on organisms/ Effects of pollution
Abstract: The biological implications of sulfide in sediment are poorly understood and all too often ignored despite the fact that sulfide can be extremely important in determining sediment toxicity to resident biota. Sulfide influences sediment toxicity in three major ways, which are reviewed in detail: as a toxicant in its own right; by reducing metal toxicity by forming insoluble metal sulfide solids and/or by forming metal sulfide complexes; and by affecting animal behavior, which in turn can alter the toxicity of not just the sulfide but also other sediment contaminants. Our present limited understanding of sulfide in sediments represents two major problems related to determining the toxicity of sediments, both in the laboratory and the field, and the causative agents of such toxicity. First, we do not know how important sulfide toxicity is to resident populations. Second, by not adequately considering sulfide toxicity, we risk underestimating toxicity and misidentifying the causative agents. Generic and specific recommendations related to resolving these problems are provided, including appropriate measurement and monitoring of sulfide in the laboratory and the field, determination of toxicity thresholds and tolerances for a wide range of sediment-dwelling organisms, further development of toxicity identification evaluation procedures, further research into sulfide effects on metal toxicity, and determination of the influence of sulfide on bioirrigation.

168. **Biological methods for determination of physiologically active substances in environmental samples.**
Tumanov, A. A.; Kitaeva, I. A.; and Barinova, O. V.
Journal of Analytical Chemistry 48 (1): 2-11. (1993);
ISSN: 1061-9348
This citation is provided courtesy of CAB International/CABI Publishing.

169. **Biological monitoring: Lichens as bioindicators of air pollution assessment: A review.**
Conti, M E and Cecchetti, G
Environmental Pollution 114 (3): 471-492. (2001)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: lichen (Lichenes): bioindicator/ Nonvascular Plants/ Plants/ air pollution/ air quality
Abstract: Often as part of environmental impact studies and, above all, to obtain authorisations in accordance with prescriptions from the Ministry for the Environment (Italy), surveys and controls that use biological indicators are required. This is because such indicators are valid instruments for evaluating the quality of the air ensuing from the subject

(often an industrial plant) of the Environmental Impact Assessment (EIA). In this context, this paper aims to analyse some of the theoretical aspects of biological monitoring and to provide a progress report on the use of lichens as bioindicators of air quality, with a particular eye to the situation in Italy. The object of this paper is that of pointing out the most important lines in the current state of knowledge in this field, evaluating the methodological applications and their advantages/disadvantages with respect to traditional surveying methods.

170. **Biological monitoring of eutrophication in rivers.**
Kelly, M. G. and Whitton, B. A.
Hydrobiologia 384: 55-67. (1998)
NAL Call #: 410 H992;
ISSN: 0018-8158
This citation is provided courtesy of CAB International/CABI Publishing.

171. **Biological monitoring: The dilemma of data analysis.**
Norris, R. H.
Journal of the North American Benthological Society 14 (3): 440-450. (1995)
NAL Call #: QL141.F7;
ISSN: 0887-3593
This citation is provided courtesy of CAB International/CABI Publishing.

172. **Biological substitutes for pesticides.**
Gerhardson, Berndt
Trends in Biotechnology 20 (8): 338-343. (2002)
NAL Call #: TP248.13.T72;
ISSN: 0167-7799
Descriptors: pesticides/ biological pest control methods/ crop plant resistance/ environmental concerns/ health concerns/ pesticide biological substitutes
Abstract: In the 20th century an increasing number of pesticides, based on biocidal molecules, were the means for a substantial increase in food and fibre production and quality. Because of health and environmental concerns continued extensive use of such molecules is intensively debated and substitutes are often urgently required. Beside crop plant resistance, various biological control methods based on natural pest suppressing organisms are regarded as main alternatives. Several approaches and concepts also have been tested and commercial organism-based preparations are steadily increasing. However, further biotechnological efforts are required to give them status of being practical substitutes to pesticides. At present they are not comparable to pesticides in meeting efficacy, market and other expectations, but they still have a promising future, especially where genetically modified organisms can be used.

173. **Biological weed control with pathogens: Search for candidates to applications.**
Khachatourians, G. G.; Arora, D. K.; Caesar, A. J.; and Charudattan, R.
In: Applied mycology and biotechnology: Agriculture and food production/ Khachatourians, G. G. and Arora, D. K.; Vol. 2, 2002; pp. 239-274.
ISBN: 0-444-51030-3
This citation is provided courtesy of CAB International/CABI Publishing.

174. **The biologically significant attributes of forest canopies to small birds.**
Sharpe, F.
Northwest Science 70 (special issue): 86-93. (1996)
NAL Call #: 470-N81;
ISSN: 0029-344X [NOSCAX]
Descriptors: wild birds/ coniferous forests/ deciduous forests/ canopy/ structure/ habitats/ forest ecology/ habitat selection/ riparian forests/ ecosystems/ literature reviews/ Pacific Northwest states of USA/ ecosystem management
This citation is from AGRICOLA.

175. **Biology and ecology of higher Diptera from freshwater wetlands.**
Keiper, J. B.; Walton, W. E.; and Foote, B. A.
Annual Review of Entomology 47: 207-232. (2002)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: diptera/ biology/ life cycle/ feeding habits/ habitats/ population ecology/ community ecology/ species diversity/ sampling/ aquatic insects/ freshwater ecology/ wetlands/ literature reviews/ cyclorrhapha/ schizophora/ niche partitioning
This citation is from AGRICOLA.

176. **Biology and establishment of mountain shrubs on mining disturbances in the Rocky Mountains, USA.**
Paschke, M. W.; Redente, E. F.; and Brown, S. L.
Land Degradation and Development 14 (5): 459-480. (2003)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

177. **The biology and integrated management of leafy spurge (Euphorbia esula) on North Dakota rangeland.**
Lym, Rodney G
Weed Technology 12 (2): 367-373. (1998)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: picloram / 2,4 D/ herbicides/ Aphthona czwalinae (Coleoptera): biological control agent, flea beetle/ Aphthona lacertosa (Coleoptera): biological control agent, flea beetle/ Aphthona nigriscutus (Coleoptera): biological control agent, flea beetle/ Euphorbia esula [leafy spurge] (Euphorbiaceae): weed/ Spurgia esulae [spurge gall midge] (Diptera): biological control agent/ Angiosperms/ Animals/ Arthropods/ Dicots/ Insects/ Invertebrates/ Plants/ Spermatophytes/ Vascular Plants/ rangelands
Abstract: Leafy spurge, a long-lived perennial, grows in many habitats, from floodplains to grasslands and mountain slopes. The plant emerges in early spring and produces showy, yellow bracts that appear in late May. The true flowers emerge in mid-June. The plant spreads by both seeds and roots and contains a white sticky latex that deters grazing by many animals. Dicamba, 2,4-D, glyphosate, and picloram have commonly been used to control leafy spurge. Picloram plus 2,4-D is frequently used for leafy spurge control in North Dakota. Ten insect species for leafy spurge biocontrol have been released in North Dakota; the most successful have been the flea beetles, Aphthona nigriscutis, A. czwalinae, and A. lacertosa. The leafy spurge gall midge (Spurgia esulae) has been most successful near wooded areas. Herbicides combined with either the leafy spurge flea beetles or gall midge have controlled leafy spurge better than either method used alone. Grazing with sheep or goats is a cost-

effective method for controlling leafy spurge top growth in large infestations. Grazing combined with fall-applied picloram plus 2,4-D reduced leafy spurge density more rapidly and maintained control longer than either method used alone. Several grass species are competitive with leafy spurge including 'Rebound' smooth brome, 'Rodan' western wheatgrass, 'Pryor' slender wheatgrass, and 'Manska' pubescent wheatgrass. Cultivating twice each fall after harvest for 3 yr in cropland completely controlled leafy spurge. A successful long-term management program should be designed for specific situations and should include combinations of herbicides, insects, grazing, and/or seeding competitive species.
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178. **Biology and management of noxious rangeland weeds.**
Sheley, Roger L. and Petroff, J. K.
Corvallis, OR: Oregon State University Press; 438 p., 16 p. of plates: ill. (some col.), maps. (1999)
Notes: 1st ed.; Includes bibliographical references and index.
NAL Call #: SB612.W47B564-1999;
ISBN: 0870714619 (alk. paper)
Descriptors: Rangelands---Weed control---West---United States/ Weeds---West---United States/ Range plants---Control---West---United States/ Range management---West---United States/ Invasive plants---West---United States
This citation is from AGRICOLA.

179. **The biology and management of purple loosestrife (Lythrum salicaria).**
Mullin, Barbra H
Weed Technology 12 (2): 397-401. (1998)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: Lythrum salicaria [purple loosestrife] (Lythraceae): biology, weed, management/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants/ wetland ecosystems
Abstract: Purple loosestrife is an invasive, introduced plant that is usually associated with wetland, marshy, or riparian sites. It is found across the northern tier states and provinces in North America. Purple loosestrife affects the diversity of native wetland ecosystems. Infestations lead to severe wildlife habitat degradation, loss of species diversity, and displacement of wildlife-supporting native vegetation, such as cattails and bulrushes. The plant spreads effectively along waterways, and the thick, matted root system can rapidly clog irrigation ditches, resulting in decreased water flow and increased maintenance. Effective management of purple loosestrife along waterways and in riparian areas requires integrating management strategies to prevent further introductions, detecting and eradicating new infestations, and containing and controlling large-scale infestations. Management practices that aid in the control of purple loosestrife include herbicide, physical, and biological practices. Each infestation site should be individually evaluated to determine the appropriate control measure. Factors to be considered include the proximity and type of vegetation on the site, whether the water is flowing or still, and the utilization of the site and the water (domestic, irrigation, recreation, or scenic value).
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180. **Biomethanation under psychrophilic conditions: A review.**
Kashyap, D. R.; Dadhich, K. S.; and Sharma, S. K.
Bioresource Technology 87 (2): 147-153. (Apr. 2003)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB]
Descriptors: biogas/ bioenergy/ anaerobic digestion/ methane production/ temperature/ animal manures/ agricultural wastes/ sewage/ biotechnology/ reviews/ psychrophilic temperature
Abstract: Anaerobic digestion of animal manure, sewage and other agricultural wastes at psychrophilic temperatures has not been explored as extensively as either mesophilic or thermophilic digestion, probably due to little anticipation of the development of economically attractive systems using this technology. This review article discusses psychrophilic anaerobic digestion studies reported by various researchers using different substrates. The effect of operational parameters such as type of substrate, size of inoculum, concentration of volatile fatty acids, hydraulic retention time and loading rate, on reduction of TS/VS, BOD/COD and biogas yield is discussed in detail.
This citation is from AGRICOLA.

181. **Biomonitoring.**
Isom, B. G.
Water Environment Research 65 (4): 596-599. (1993)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

182. **Biomonitoring.**
Lange, C. R. and Lange, S. R.
Water Environment Research 69 (4): 900-915. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

183. **Biopesticides: A review of their action, applications and efficacy.**
Copping, L. G. and Menn, J. J.
Pest Management Science
8: 651-676. (2000)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: Pesticides/ Chemical control/ Arthropoda/ Agricultural & general applied entomology
Abstract: A survey is given of the wide range of different materials and organisms that can be classified as biopesticides. Details are given of those currently of commercial importance, and future developments in this area are discussed. It is considered that, while in the immediate future biopesticides may continue to be limited mainly to niche and speciality markets, there is great potential for long-term development and growth, both in their own right and in providing leads in other areas of pest management science.
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184. **Biophysical Interactions and the Structure and Dynamics of Riverine Ecosystems: The Importance of Biotic Feedbacks.**
Naiman, R. J.; Elliott, S. R.; Helfield, J. M.; and O'Keefe, T. C.
Hydrobiologia 410: 79-86. (1999)
NAL Call #: 410 H992;
ISSN: 0018-8158.
Notes: Publisher: Kluwer Academic Publishers; DOI: 10.1023/A:1003768102188
Descriptors: Ecosystem management/ Rivers/ Physical properties/ Nature conservation/ Biotic factors/ Streams/ Climatic conditions/ Disturbance/ Forests/ Dynamics/ Ecosystems/ Structure/ Reviews/

Conservation/ Riparian Vegetation/ Biological Properties/ Habitat community studies/ Topography and morphology/ Freshwater/ Streamflow and runoff
Abstract: Characteristics of streams and rivers reflect variations in local geomorphology, climate, natural disturbance regimes and the dynamic features of the riparian forest. Hierarchical interactions between these components result in a rich variety of distinct stream communities which, when considered in combination with strong biotic feedbacks to the physical environment, present formidable challenges in discovering and understanding fundamental, system-level characteristics of natural rivers. The objectives of this article are to briefly review the traditional view of hierarchical physical controls on stream structure and dynamics and to show how this viewpoint is changing as recognition of strong biological influences on physical structure are emerging. In combination, identifying natural stream characteristics and the interactions among individual components, as well as recognizing the importance of biotic feedbacks on physical structure, form the basis for establishing effective conservation strategies.

185. **Bioremediation in the rhizosphere.**
Anderson, Todd A; Guthrie, Elizabeth A; and Walton, Barbara T
Environmental Science and Technology 27 (13): 2630-2636. (1993)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: microorganisms (Microorganisms Unspecified)/ microorganisms/ contaminated soil/ hazardous waste/ microbial degradation/ pesticides

186. **Bioremediation of DDT-Contaminated Soils: A Review.**
Foght, J.; April, T.; Biggar, K.; and Aislabie, J.
Bioremediation Journal 5 (3): 225-246. (2001);
ISSN: 1088-9868
Descriptors: Reviews/ Bioremediation/ DDT/ Soil/ Dechlorination/ Biodegradation/ Soil remediation/ Insecticides/ Aeration/ Bioreactors/ Pesticides/ Soils/ Environmental factors/ Microorganisms/ Literature reviews/ Water pollution treatment / Bacteria/ Fungi/ organic matter/ aeration/ pH effects/ temperature effects/ Bacteria/ Microbial degradation/ Land pollution/ Physiology, biochemistry, biophysics/ Protective measures and control/ Soil Pollution: Monitoring, Control & Remediation
Abstract: The insecticide 1,1,1-trichloro-2,2-bis-(4-chlorophenyl)ethane (DDT) has been used extensively since the 1940s for control of agricultural pests, and is still used in many tropical countries for mosquito control. Despite a ban on DDT use in most industrialized countries since 1972, DDT and its related residues (DDTr) persist in the environment and pose animal and human health risks. Abiotic processes such as volatilization, adsorption, and photolysis contribute to the dissipation of DDTr in soils, often without substantial alteration of the chemical structure. In contrast, biodegradation has the potential to degrade DDTr significantly and reduce soil concentrations in a cost-effective manner. Many bacteria and some fungi transform DDT, forming products with varying recalcitrance to further degradation. DDT biodegradation is typically co-metabolic and includes dechlorination and ring cleavage mechanisms. Factors that influence DDTr biodegradation in soil include the composition and enzymatic activity of the soil microflora, DDTr bioavailability, the presence of soil organic matter as a co-metabolic substrate and (or) inducer, and prevailing soil conditions, including aeration, pH, and temperature. Understanding how these factors affect DDTr biodegradation permits rational design of treatments and amendments to stimulate biodegradation in soils. The DDTr-degrading organisms, processes and approaches that may be useful for bioremediation of DDTr-contaminated soils are discussed, including in situ amendments, ex situ bioreactors and sequential anaerobic and aerobic treatments.

187. **Bioremediation of heavy metals and organictoxicants by composting.**
Barker, Allen V and Bryson, Gretchen M
The Scientific World 2: 407-420. (2002)
NAL Call #: 472 SCI25;
ISSN: 1537-744X.
Notes: Online version cited April 4, 2002
Descriptors: heavy metals: binding, degradation, pollutant, toxin/ organic toxicants: binding, degradation, pollutant, toxin/ pesticides: pollutant/ polychlorinated biphenyls [PCBs]: pollutant/ polycyclic aromatic hydrocarbons [PAHs]: pollutant/ microbe (Microorganisms): diversity/ Microorganisms/ noncontaminated organic matter/ soil pollution
Abstract: Hazardous organic and metallic residues or by-products can enter into plants, soils, and sediments from processes associated with domestic, municipal, agricultural, industrial, and military activities. Handling, ingestion, application to land or other distributions of the contaminated materials into the environment might render harm to humans, livestock, wildlife, crops, or native plants. Considerable remediation of the hazardous wastes or contaminated plants, soils, and sediments can be accomplished by composting. High microbial diversity and activity during composting, due to the abundance of substrates in feedstocks, promotes degradation of xenobiotic organic compounds, such as pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs).For composting of contaminated soils, noncontaminated organic matter should be cocomposted with the soils. Metallic pollutants are not degraded during composting but may be converted into organic combinations that have less bioavailability than mineral combinations of the metals. Degradation of organic contaminants in soils is facilitated by addition of composted or raw organic matter, thereby increasing the substrate levels for cometabolism of the contaminants. Similar to the composting of soils in vessels or piles, the on-site addition of organic matter to soils (sheet composting) accelerates degradation of organic pollutants and binds metallic pollutants. Recalcitrant materials, such as organochlorines, may not undergo degradation in composts or

in soils, and the effects of forming organic complexes with metallic pollutants may be nonpermanent or short lived. The general conclusion is, however, that composting degrades or binds pollutants to innocuous levels or into innocuous compounds in the finished product.
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188. **Bioremediation of selenium in soil and water. [Erratum: June 1998, v. 163 (6), p. 507.].**
Losi, M. E. and Frankenberger, W. T.
Soil Science 162 (10): 692-702. (Oct. 1997)
NAL Call #: 56.8-So3;
ISSN: 0038-075X [SOSCAK]
Descriptors: agricultural soils/ drainage water/ selenium/ contamination/ bioremediation/ technical progress/ soil pollution/ water pollution/ pollution control/ microbial activities/ transformation/ toxicity/ wildlife/ reviews/ California
This citation is from AGRICOLA.

189. **Biosensors for environmental monitoring.**
Dennison, M J and Turner, A P F
Biotechnology Advances 13 (1): 1-12. (1995)
NAL Call #: TP248.2.B562;
ISSN: 0734-9750
Descriptors: pesticide/ pollution
© Thomson

190. **Biosensors for the detection of pesticides.**
Marty, J L; Leca, B; and Noguer, T
Analusis 26 (6): M144-M149. (1998)
NAL Call #: QD71.A52;
ISSN: 0365-4877
Descriptors: carbamate insecticides (detection of pollutants) dithiocarbamate fungicides (detection of pollutants) imidazolinone herbicides (detection of pollutants) organophosphorus insecticides (detection of pollutants) pesticides (detection of pollutants) sulfonylurea herbicides (detection of pollutants) triazine herbicides: detection, pollutant
Abstract: This review presents the last advances in the field of biosensors for pesticide detection. The main categories of reported sensors are presented according to the immobilized biological sensing element: immunosensors, enzyme sensors and "whole cell" sensors. The potential of each type of sensor in environmental monitoring is discussed and the advantages and drawbacks of the described devices are highlighted.
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191. **Biosolids and Sludge Management.**
Krogmann, U.; Boyles, L. S.; Bamka, W. J.; Chaiprapat, S.; and Martel, C. J.
Water Environment Research 5: 692-714. (1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Waste Management/ Solids/ Sludge/ Land Disposal/ Landfills/ Composting/ Reviews/ Sludge disposal/ Ultimate disposal of wastes
© Cambridge Scientific Abstracts (CSA)

192. **Biosolids Applied to Land: Advancing Standards and Practices.**
Committee on Toxicants and Pathogens in Biosolids Applied to Land; National Research Council, Board on Environmental Studies and Toxicology (BEST).
National Academy Press, 2002.
ISBN: 0-309-08486-5; Table of Contents: Front Matter, pp. i-xx; Summary, pp. 1-16 1, Introduction, pp. 17-30; 2, Biosolids Management, pp. 31-105; 3, Epdiemiological Evidence of Health Effects Associated with Biosolids Production and Application, pp. 106-125; 4, Advances in Risk Assessment since the Establishment of the Part 503 Rule, pp. 126-163; 5, Evaluation of EPA's Approach to Setting Chemical Standards, pp. 164-256; 6, Evaluation of EPA's Approach to Setting Pathogen Standards, pp. 257-321; 7, Integration of Chemical and Pathogen Risk Assessment, pp. 322-334; Glossary, pp. 335-337; Appendix A, Biographical Information on the Committee on Toxicants and Pathogens in Biosolids Applied to Land, pp. 338-343; Appendix B, Partipants at Public Sessions, pp. 344-346. (image/tiff)
http://search.nap.edu/books/0309084865/html/
Descriptors: biosolids/ land application/ environmental management/ risk assessment/ physicochemical properties/ pathogens/ issues and policy/ Environmental Protection Agency
Abstract: This National Research Council report recommends changes in EPA's regulations for the land application of biosolids.

193. **Biotechnical engineering as an alternative to traditional engineering methods. A biotechnical streambank stabilization design approach.**
Li, Ming-Han and Eddleman, K. E.
Landscape and Urban Planning 60 (4): 225-242. (2002)
NAL Call #: QH75.A1L32;
ISSN: 0169-2046
Descriptors: Streams/ Environmental restoration/ Engineering/ Riparian environments/ Revegetation/ Conservation/ General Environmental Engineering
Abstract: Focus on ecologically fragile streams in the US has resulted in heightened recognition and popularity of biotechnical streambank stabilization methods. This ancient technique re-emerges in the US in response to the link between traditional protection measures and numerous occurrences of streambank failures. The purpose of this study was to investigate biotechnical engineering as a viable alternative to traditional channelization and hard-armoring methods. Primarily by literature review, this study analyzed and organized various streambank stabilization approaches in traditional engineering, fluvial geomorphological, ecological and biotechnical engineering perspectives. Strengths and weaknesses in these four perspectives are discussed, suitable biotechnical alternatives are presented, and a cost-strength matrix of biotechnical techniques is introduced.
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194. **Biotechnical erosion control.**
Snider, Joseph A. and United States. Natural Resources Conservation Service. Jamie L. Whitten Plant Materials Center.
Jackson, MS: Natural Resources Conservation Service; Series: Technical note (Jamie L. Whitten Plant Materials Center) v. 12, no. 2. (1996)
Notes: Title from title page of source document. "September 1996" Includes bibliographical references.

NAL Call #: aS627.P55-T43-v.-12,-no.-2
http://plant-materials.nrcs.usda.gov/pubs/mspmctn9602.pdf
Descriptors: Soil conservation/ Bioengineering/ Erosion/ Riparian ecology
Abstract: "This study was conducted [in Panola County, Mississippi] to evaluate the potential of selected plant species and Biotechnical Erosion Control (BEC) techniques for streambank stabilization in the Mid-South.".
This citation is from AGRICOLA.

195. **Biotechnology and environmental issues in dairying.**
Tamminga. S.
In: Milk composition, production and biotechnology/ Welch, R. A.; Burns, D. J.; Davis, S. R.; Popay, A. I.; and Prosser, C. G., 1997; pp. 513-532
This citation is provided courtesy of CAB International/CABI Publishing.

196. **Biotechnology and new integrated pest management approaches.**
DeVault, J. D.; Hughes, K. J.; Johnson, O. A.; and Narang, S. K.
Bio/technology (Nature Publishing) 14 (1): 46-49. (Jan. 1996)
NAL Call #: QH442.B5;
ISSN: 0733-222X [BTCHDA]
Descriptors: insect pests/ biological control/ biological control agents/ microbial pesticides/ genetic control/ genetic engineering/ integrated pest management/ environmental impact/ literature reviews/ microbial insecticides
This citation is from AGRICOLA.

197. **Biotechnology: Environmental impacts of introducing crops and biocontrol agents in North American agriculture.**
Pimentel, D.
In: Biological control: Benefits and risks/ Hokkanen, H. M. and Lynch, J. M.; Series: Plant and microbial biotechnology research series No. 4, 1995; pp. 13-29.
ISBN: 052154405X
NAL Call #: TP248.27.P55P54
Descriptors: plant introduction/ introduced species/ crops/ livestock/ game birds/ game animals/ environmental impact/ weeds/ pests/ biological control agents/ weed control/ insects/ insect pests/ genetic engineering/ recombinant DNA/ transgenic plants/ risk/ literature reviews/ North America/ animal pests/ pest potential/ weed eating insects
This citation is from AGRICOLA.

198. **Biotechnology in the treatment of animal manure.**
Woestyne, M. V. and Verstraete, W.
In: Biotechnology-in-animal-feeds-and-animal-feeding/ Wallace, R. J. and Chesson, A., 1995; pp. 311-327
This citation is provided courtesy of CAB International/CABI Publishing.

199. **Birds of lake, pond, and marsh: Water and wetland birds of eastern North America.**
Eastman, John
Mechanicsburg, PA: Stackpole Books; xv, 271 p.: ill. (1999)
Notes: Includes bibliographical references (p. 263-266) and index.
NAL Call #: QL683.E27-E375-1999;
ISBN: 0811726819 (alk. paper)
Descriptors: Water birds---East---United States
This citation is from AGRICOLA.

200. **Bound pesticide residues in soils: A review.**
Gevao, B.; Semple, K. T.; and Jones, K. C.
Environmental Pollution 108 (1): 3-14. (2000)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491 [ENPOEK].
Notes: Special Issue: Non-extractable residues in soils and sediments: Characterisation and Environmental Significance. Includes references.
Descriptors: pesticide residues/ technology/ soil properties/ land management/ microorganisms/ biological activity in soil/ aging/ soil pollution/ environmental impact/ literature reviews/ pesticide classes/ chemical bonding/ soil aging/ bound residues
This citation is from AGRICOLA.

201. **Breeding bird communities of Midwestern prairie fragments: The effects of prescribed burning and habitat area.**
Herkert, J. R.
Natural Areas Journal 14: 128-135. (1994)
NAL Call #: QH76.N37
Descriptors: Wildlife habitat/ breeding birds/ agricultural practices/ fire
Abstract: Compared the effects of habitat area and prescribed burning on breeding bird communities using Midwestern prairie fragments.

202. **A brief review of the potential benefits of buffer zones as field margins in UK agriculture.**
Davies, D. H. K.
Aspects of Applied Biology (54): 61-70. (1999);
ISSN: 0265-1491
This citation is provided courtesy of CAB International/CABI Publishing.

203. **Broiler litter as a fertilizer or livestock feed.**
Bagley, C. P.; Evans, R. R.; and Burdine, W. B. Jr.
Journal of Production Agriculture 9 (3): 342-346. (July 1996-Sept. 1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524 [JPRAEN]
Descriptors: poultry manure/ broilers/ waste utilization/ uses/ organic fertilizers/ forage/ crop production/ application to land/ nutrients/ management/ nutrient content/ beef cattle/ feeds/ nutritive value/ feed conversion/ performance/ farming systems/ integration/ reviews/ southeastern states of USA
Abstract: The growth in the broiler industry and the concomitant increase in the broiler litter generated out of these operations, coupled with increased environmental awareness, has resulted in increased interest by producers and scientists in uses for broiler litter. Long-term land applications of broiler litter have resulted in a buildup of some nutrients in certain soils. Research results indicate that annual application rates of up to 4 tons/acre of litter are acceptable, but should be accompanied by annual soil testing. Broiler litter of adequate quality is acceptable as a livestock feed, provided the litter is properly processed prior to feeding. When used as a livestock feed, the ash level in litter is of concern due to its negative effects on the nutritive value (total digestible nutrients, TDN) of litter diets containing relatively high ash levels. Based on expected levels of performance, broiler litter-based diets require varying levels of grain to meet the nutrient requirements of different classes of livestock. Broiler litter can be used as both fertilizer and livestock feed, and the combining of broiler production with a commercial beef operation represents an attractive integration of two enterprises.
This citation is from AGRICOLA.

204. **Broiler phosphorus intake versus broiler phosphorus output in the United States: Nutrition or soil science?**
Miles, D. M. and Sistani, K. R.
World's Poultry Science Journal 58 (4): 493-500. (2002)
NAL Call #: 47.8-W89;
ISSN: 0043-9339
This citation is provided courtesy of CAB International/CABI Publishing.

205. **Buffer Zones and Water Quality Protection: General Principles.**
Correll, D. L.
In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 2 Aug 1930-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 13-14; 1996.
Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: literature review/ water quality control/ protection/ riparian land/ zones/ groundwater movement/ overland flow/ riparian vegetation/ organic matter/ soil properties/ floods/ riparian environments/ groundwater/ nutrients/ streams/ soil/ buffer zones/ flooding/ Water quality control/ Freshwater pollution
Abstract: Riparian buffer zones (RBZ) improve water quality in different ways depending upon the pathway of delivery to the water to the RBZ. Groundwater passing through the RBZ may be cleansed of nitrate and acidity due to a combination of denitrification, biostorage, and changes in soil composition. Overland storm flows entering laterally from the uplands may be cleansed of suspended particulates, with adhering nutrients, inorganic toxins, and pesticides, as well as some dissolved nutrients and toxins. Sometimes these overland flows will also infiltrate within the RBZ and become a part of the groundwater, thus also obtaining the benefits associated with groundwaters in the RBZ. During stream flooding events, waters flooding out into the RBZ may also be cleansed of sediments, nutrients, and toxic materials as a result of particulate trapping and the binding of materials on the leaf litter and soils within the RBZ. The RBZ is also an important source to the stream of high quality dissolved and particulate organic matter which is delivered both vertically and laterally. Forested RBZs also provide shade and evaporative cooling to streams, maintaining lower summertime temperatures critical to some biota. Factors which limit the effectiveness of the functions can be divided into internal and external. Factors external to the RBZ include watershed area and gradient, stream channel morphology, soil mineralogy and texture, bedrock type and depth, and climate. Factors internal to the RBZ include width and type of vegetation, water logging and organic content of soils, hydraulic conductivity, soil nutrient content and geochemistry. These water quality functions of RBZs and the factors which limit their effectiveness in various settings will be reviewed from the world literature.
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206. **Buffer zones to improve water quality: A review of their potential use in UK agriculture.**
Muscutt, A. D.; Harris, G. L.; Bailey, S. W.; and Davies, D. B.
Agriculture, Ecosystems and Environment 45 (1-2): 59-77. (1993)
NAL Call #: S601 .A34;
ISSN: 0167-8809
This citation is provided courtesy of CAB International/CABI Publishing.

207. **Butterfly conservation management.**
New, T. R.; Pyle, R. M.; Thomas, J. A.; Thomas, C. D.; and Hammond, P. C.
Annual Review of Entomology 40: 57-83. (1995)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: lepidoptera/ wildlife conservation/ protected species/ wildlife management/ ecology/ habitats/ environmental legislation/ reviews
This citation is from AGRICOLA.

208. **Cadmium contamination of vegetable crops, farmlands, and irrigation waters.**
Cabrera, C.; Ortega, E.; Lorenzo, M. L.; and Lopez, M. C.
Reviews of Environmental Contamination and Toxicology 154: 55-81. (1998)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: pollutants/ food contamination/ toxicology/ literature reviews
This citation is from AGRICOLA.

209. **Calibration of pesticide leaching models: Critical review and guidance for reporting.**
Dubus, Igor G; Beulke, Sabine; and Brown, Colin D
Pest Management Science 58 (8): 745-758. (2002)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: critical review/ environmental implications/ reporting guidance
Abstract: Calibration of pesticide leaching models may be undertaken to evaluate the ability of models to simulate experimental data, to assist in their parameterisation where values for input parameters are difficult to determine experimentally, to determine values for specific model inputs (eg sorption and degradation parameters) and to allow extrapolations to be carried out. Although calibration of leaching models is a critical phase in the assessment of pesticide exposure, lack of guidance means that calibration procedures default to the modeller. This may result in different calibration and extrapolation results for different individuals depending on the procedures used, and thus may influence decisions regarding the placement of crop-protection products on the market. A number of issues are discussed in this paper including data requirements and assessment of data quality, the selection of a model and parameters for performing calibration, the use of automated calibration techniques as opposed to more traditional trial-and-error approaches, difficulties in the comparison of simulated and measured data, differences in calibration procedures, and the assessment of parameter values derived by calibration. Guidelines for the reporting of calibration activities within the scope of pesticide registration are proposed.
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210. **Can cows and fish co-exist.**
Fitch, L. and Adams, B. W.
Canadian Journal of Plant Science 78 (2): 191-198. (Apr. 1998)
NAL Call #: 450-C16;
ISSN: 0008-4220 [CPLSAY].
Notes: Paper presented at the Symposium on the Effects of

Agriculture on the Riparian Ecosystem held 1996, Lethbridge, Alberta, Canada. Includes references.
Descriptors: cattle/ freshwater fishes/ rivers/ riparian grasslands/ water quality/ grazing/ habitats/ environmental management/ grassland management/ grazing systems/ watersheds/ productivity/ populations/ wildlife/ degradation/ literature reviews/ water pollution/ Alberta
This citation is from AGRICOLA.

211. **Capillary electrophoresis and electrochromatography of pesticides and metabolites.**
Tegeler, Tony and El, Rassi Ziad
Electrophoresis 22 (19): 4281-4293. (2001);
ISSN: 0173-0835
Descriptors: pesticide metabolites: analysis, detection/ pesticides: analysis, detection, uses
Abstract: Synthetic pesticides are important chemicals since they are widely used to control many types of weeds, insects, and other pests in a wide variety of agricultural and nonagricultural settings. This review article is aimed at describing the recent progress made in capillary electrophoresis (CE) and capillary electrochromatography (CEC) of pesticides and metabolites. The various electrophoretic systems and detection schemes that were introduced during the period extending from the second half of 1999 to the first half of 2001 for the CE and CEC of pesticides are discussed. Also included in this review article are the various approaches for trace enrichment that are involved in the analysis of dilute pesticide samples.

212. **Carabid beetles in sustainable agriculture: A review on pest control efficacy, cultivation impacts and enhancement.**
Kromp, B.
Agriculture, Ecosystems and Environment 74 (1/3): 187-228. (June 1999)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Invertebrate biodiversity as bioindicators of sustainable landscapes / edited by M.G. Paoletti. Includes references.
Descriptors: carabidae/ sustainability/ agriculture/ insect control/ efficacy/ farming systems/ fields/ agricultural land/ ecosystems/ biological control agents/ landscape/ species diversity/ arable land/ trapping/ field experimentation/ colonization/ beneficial insects/ foraging/ insect pests/ habitats/ biological indicators/ plowing/ conservation/ tillage/ weed control/ burning/ green manures/ manures/ nitrogen fertilizers/ plant density/ microclimate/ seasonal variation/ phenology/ intercropping/ literature reviews/ predators of insect pests
Abstract: This review article on carabids in sustainable agro-ecosystems of the temperate Northern hemisphere presents a compilation of the available knowledge on the significance of carabids for natural pest control and the effects of cultivation methods (except pesticides) and landscape structural elements. Field carabids are species rich and abundant in arable sites, but are affected by intensive agricultural cultivation. For sampling, fenced pitfall trapping or pitfall trapping is recommended according to the type of study. Many of the assumed beneficial pest control activities of carabids are still based on laboratory feeding records. In the field, carabids have been demonstrated to reduce cereal and sugar beet aphid populations in their early colonization phase, mainly by foraging on aphids that have fallen from the vegetation. Egg predation on Dipteran eggs, e.g. the cabbage root fly, has been overestimated in earlier literature. Scattered data indicate carabidforaging on certain coleopteran pest larvae. In North America, some evidence has been found for control of pest lepidopterans. Larger carabids, e.g. Abax parallelepipedus, can effectively control slugs in greenhouses. Because of their spermophagous feeding habits, certain species of Harpalus and Amara could have some potential for biological weed control. As a result of their sensitive reaction to anthropogenic changes in habitat quality, carabids are considered of bioindicative value for cultivation impacts. Carabids seem to be negatively affected by deep ploughing and enhanced by reduced tillage systems. No negative effects have been found for mechanical weed control and flaming. Carabid recruitment is enhanced by proper organic fertilization and green manuring. Intensive nitrogen amendment might indirectly affect carabids by altering crop density and microclimate. Field carabid assemblages are not bound to a certain crop type, but shift in dominance according to the crop-specific rhythmicity of cultivation measures and changes in crop phenology and microclimate. Crop rotation effects could also be influenced by field-size dependent recolonization capability of carabids. They are enhanced by crop diversification in terms of monocrop heterogeneity and weediness as well as by intercropping and the presence of field boundaries, although corresponding increases in their pest reduction efficacy have not yet been evidenced.
This citation is from AGRICOLA.

213. **Carbon and nutrient cycles.**
Delgado, J. A. and Follett, R. F.
Journal of Soil and Water Conservation 57 (6): 455-464. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: carbon cycle/ cycling/ nutrients/ nitrogen cycle/ phosphorus/ sulfur/ soil flora/ soil biology/ soil fertility/ soil organic matter/ carbon/ crops/ nutrient uptake/ crop residues/ decomposition/ plant residues/ soil chemistry/ soil organic carbon
This citation is from AGRICOLA.

214. **Carbon distribution and losses: Erosion and deposition effects.**
Gregorich, E. G.; Greer, K. J.; Anderson, D. W.; and Liang, B. C.
Soil and Tillage Research 47 (3/4): 291-302. (1998)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

215. **Carbon sequestration in soils: Some cautions amidst optimism.**
Schlesinger, W. H.
Agriculture, Ecosystems and Environment 82 (1/3): 121-127. (Dec. 2000)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].

Notes: Special issue: Food and forestry: Global change and global challenges / edited by P.J. Gregory and J.S.I. Ingram. Paper presented at a conference held September 1999, Reading, UK. Includes references.
Descriptors: soil/ carbon dioxide/ conservation tillage/ vegetation/ abandoned land/ soil organic matter/ emission/ fertilizers/ irrigation/ biomass/ calcium carbonate/ chemical precipitation/ manures/ literature reviews/ carbon cycle/ revegetation
Abstract: A sink for atmospheric carbon (i.e., CO2) in soils may derive from the application of conservation tillage and the regrowth of native vegetation on abandoned agricultural land. Accumulations of soil organic matter on these lands could offset emissions of CO2 from fossil fuel combustion, in the context of the Kyoto protocol. The rate of accumulation of soil organic matter is often higher on fertilized fields, but this carries a carbon "cost" that is seldom assessed in the form of CO2 emissions during the production and application of inorganic fertilizer. Irrigation of semiarid lands may also produce a sink for carbon in plant biomass, but its contribution to a sink for carbon in soils must be discounted by CO2 that is emitted when energy is used to pump irrigation water and when CaCO3 precipitates in the soil profile. No net sink for carbon is likely to accompany the use of manure on agricultural lands.
This citation is from AGRICOLA.

216. **A case for using plethodontid salamanders for monitoring biodiversity and ecosystem integrity of North American forests.**
Welsh, H. H. Jr. and Droege, S.
Conservation Biology 15 (3): 558-569. (2001)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
This citation is provided courtesy of CAB International/CABI Publishing.

217. **A case for wetland restoration.**
Hey, Donald L. and Philippi, Nancy S.
New York: Wiley; x, 215 p.: ill. (some col.), maps. (1999)
Notes: "A Wiley-Interscience publication." Includes bibliographical references and index.
NAL Call #: QH75-.H49-1999;
ISBN: 0471176427 (alk. paper)
Descriptors: Wetland conservation/ Wetlands/ Restoration ecology/ Wetland conservation---United States---Case studies
This citation is from AGRICOLA.

218. **Catch crops and green manures as biological tools in nitrogen management in temperate zones.**
Thorup Kristensen, K.; Magid, J.; and Jensen, L. S.
Advances in Agronomy 79: 227-302. (2003)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: nutrient management/ soil fertility/ nutrient availability/ nitrogen/ soil nutrient dynamics
This citation is from AGRICOLA.

219. **Cattle phosphorus requirements may be lowered.**
Paterson, J.
Feedstuffs 75 (16): 11-14. (2003);
ISSN: 0014-9624
This citation is provided courtesy of CAB International/CABI Publishing.

220. **Caveat emptor: Safety considerations for natural products used in arthropod control.**
Trumble, John T
American Entomologist 48 (1): 7-13. (2002)
NAL Call #: QL461.A52;
ISSN: 1046-2821
Descriptors: arthropod (Arthropoda): pest/ insect (Insecta): pest/ Animals/ Arthropods/ Insects/ Invertebrates/ arthropod control/ natural products/ safety considerations
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221. **Challenges and opportunities for integrated weed management.**
Buhler, D. D.
Weed Science 50 (3): 273-280. (May 2002-June 2002)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: weed control/ integrated pest management/ trends/ cropping systems/ herbicide resistant weeds/ population dynamics/ plant communities/ weed associations/ survival/ literature reviews
Abstract: Despite several decades of modern weed control practices, weeds continue to be a constant threat to agricultural productivity. Herbicide-resistant weeds and weed population shifts continue to generate new challenges for agriculture. Because of weed community complexity, integrated approaches to weed management may help reduce economic effects and improve weed control practices. Integrated weed management emphasizes the combination of management techniques and scientific knowledge in a manner that considers the causes of weed problems rather than reacts to existing weed populations. The goal of weed management is the integration of the best options and tools to make cropping systems unfavorable for weeds and to minimize the effect of weeds that survive. No single practice should be considered as more than a portion of an integrated weed management strategy. The best approach may be to integrate cropping system design and weed control strategies into a comprehensive system that is environmentally and economically viable. Management decisions must also be made on a site- and time-specific basis. Considering weeds in a broader ecological and management context may lead to the use of a wider range of cultural and management practices to regulate weed communities and prevent the buildup of adapted species. This will help producers manage herbicides and other inputs in a manner that preserves their effectiveness and move weed scientists toward the development of more diverse and integrated approaches to weed management.
This citation is from AGRICOLA.

222. **Challenges and Opportunities for Science in Reducing Nutrient Over-enrichment of Coastal Ecosystems.**
Boesch, D. F.
Estuaries 25 (4b): 886-900. (2002)
NAL Call #: GC96.E79;
ISSN: 0160-8347.
Notes: Special issue: Nutrient Over-enrichment in Coastal Waters: Global Patterns of Cause and Effect
Descriptors: Nutrients (mineral)/ Anoxic conditions/ Eutrophication/ Ecosystem disturbance/ Trophic structure/ Pollution effects/ Estuaries/ Bays/ Coastal waters/ Semi enclosed seas/ Marginal seas/ Pollution monitoring/ Pollution control/ Pollution legislation/ Research/ Aquatic sciences/ Marine sciences/ Coastal states/ World/ Nutrients/ Water management/ Fertilizers/ Legislation/ environmental policy/ Legislation (on water resources)/ Water policy/ Europe/ North America/ Asia/ Oceania/ ANE, Baltic Sea/ ANE,

North Sea/ MED, Adriatic Sea/ MED, Black Sea/ ASW, Mexico Gulf/ INW, Japan, Seto Naikai Sea/ Pollution Control and Prevention/ Prevention and control/ Pollution control/ Environmental action/ Water Resources and Supplies/ General Environmental Engineering
Abstract: Nutrient over-enrichment has resulted in major changes in the coastal ecosystems of developed nations in Europe, North America, Asia, and Oceania, mostly taking place over the narrow period of 1960 to 1980. Many estuaries and embayments are affected, but the effects of this eutrophication have been also felt over large areas of semi-enclosed seas including the Baltic, North, Adriatic, and Black Seas in Europe, the Gulf of Mexico, and the Seto Inland Sea in Japan. Primary production increased, water clarity decreased, food chains were altered, oxygen depletion of bottom waters developed or expanded, seagrass beds were lost, and harmful algal blooms occurred with increased frequency. This period of dramatic alteration of coastal ecosystems, mostly for the worse from a human perspective, coincided with the more than doubling of additions of fixed nitrogen to the biosphere from human activities, driven particularly by a more than 5-fold increase in use of manufactured fertilizers during that 20-year period. Nutrient over-enrichment often interacted synergistically with other human activities, such as overfishing, habitat destruction, and other forms of chemical pollution, in contributing to the widespread degradation of coastal ecosystems that was observed during the last half of the 20th century. Science was effective in documenting the consequences and root causes of nutrient over-enrichment and has provided the basis for extensive efforts to abate it, ranging from national statutes and regulations to multi-jurisdictional compacts under the Helsinki Commission for the Baltic Sea, the Oslo-Paris Commission for the North Sea, and the Chesapeake Bay Program, for example. These efforts have usually been based on a relatively arbitrary goal of reducing nutrient inputs by a certain percentage, without much understanding of how and when this would affect the coastal ecosystem. While some of these efforts have succeeded in achieving reductions of inputs of phosphorus and nitrogen, principally through treatment of point-source discharges, relatively little progress has been made in reducing diffuse sources of nitrogen. Second-generation management goals tend to be based on desired outcomes for the coastal ecosystem and determination of the load reductions needed to attain them, for example the Total Daily Maximum Load approach in the U.S. and the Water Framework Directive in the European Union. Science and technology are now challenged not just to diagnose the degree of eutrophication and its causes, but to contribute to its prognosis and treatment by determining the relative susceptibility of coastal ecosystems to nutrient over-enrichment, defining desirable and achievable outcomes for rehabilitation efforts, reducing nutrient sources, enhancing nutrient sinks, strategically targeting these efforts within watersheds, and predicting and observing responses in an adaptive management framework.

223. **Challenges of pest control with enhanced toxicological and environmental safety. An overview.**
Duke, S. O.; Menn, J. J.; and Plimmer, J. R.
ACS Symposium Series (American Chemical Society) (524): 1-13. (1993)
NAL Call #: QD1.A45;
ISSN: 0097-6156 [ACSMC].
Notes: In the series analytic: Pest control with enhanced environmental safety / edited by S.O. Duke, J.J. Menn, and J.R. Plimmer.
Includes references.
Descriptors: pest control/ plant protection/ legislation/ microbial pesticides/ pesticides/ genetic engineering/ environmental protection
Abstract: Much of the increase in agricultural productivity over the past half century has been due to more efficacious and economical pest control through the use of synthetic chemical pesticides (SCPs). However, there is continued and growing social and legislative pressure to reduce the toxicological and environmental risks associated with control of agricultural pests with SCPs. Public and private sector research is being conducted to develop biorational pesticides and to replace or reduce the use of SCPs with natural product-based pesticides, biocontrol (including classical biocontrol), genetically-engineered pest resistance, and combinations of these replacement strategies. Nevertheless, these emerging pest control technologies will likely represent only a small percentage of the pest control market by the year 2000. Therefore, methods to reduce use rates of synthetic pesticides and to develop more environmentally and toxicologically benign pesticides are also important in risk abatement. Such strategies as biorational design, development of pesticide synergists, and development of crops resistant to more environmentally safe herbicides, insects, and plant pathogens can improve the environmental quality, food safety, and allay societal fears concerning crop protection technology.
This citation is from AGRICOLA.

224. **Challenging targets for future agriculture.**
Kirchmann, H. and Thorvaldsson, G.
European Journal of Agronomy 12 (3/4): 145-161. (2000)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: agriculture/ trends/ prediction/ sustainability/ ecosystems/ pesticides/ water/ leaching/ soil fertility/ soil compaction/ emission/ crop quality/ biodiversity/ organic farming/ ethics/ soil degradation/ agricultural research/ health foods/ site specific crop management / cropping systems/ soil biology/ cycling/ literature reviews
This citation is from AGRICOLA.

225. **Change in soil carbon following afforestation.**
Paul, K. I.; Polglase, P. J.; and Khanna, P. K.
Forest Ecology and Management 168 (1-3): 241-257. (2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127.
Notes: Publisher: Elsevier Science
Descriptors: Land use / Climatic conditions/ Afforestation/ Reforestation/ Soil nutrients/ Carbon cycle/ Forest management/ Pinus radiata/ Monterey pine/ Radiata pine/ Management
Abstract: Quantifying changes in soil C may be an important consideration under large-scale afforestation or reforestation. We reviewed global data on changes in soil C following afforestation, available from 43 published or unpublished studies, encompassing 204 sites. Data were

highly variable, with soil C either increasing or decreasing, particularly in young (10-year) forest stands. Because studies varied in the number of years since forest establishment and the initial soil C content, we calculated change in soil C as a weighted-average (i.e. sum of C change divided by sum of years since forest establishment) relative to the soil C content under previous agricultural systems at 10, >10 and 30cm sampling depths. On average, soil C in the 10cm (or 30cm) layers generally decreased by 3.46% per year (or 0.63% per year) relative to the initial soil C content during the first 5 years of afforestation, followed by a decrease in the rate of decline and eventually recovery to C contents found in agricultural soils at about age 30. In plantations older than 30 years, C content was similar to that under the previous agricultural systems within the surface 10cm of soil, yet at other sampling depths, soil C had increased by between 0.50 and 0.86% per year. Amounts of C lost or gained by soil are generally small compared with accumulation of C in tree biomass. The most important factors affecting change in soil C were previous land use, climate and the type of forest established. Results suggest that most soil C was lost when softwoods, particularly Pinus radiata plantations, were established on ex-improved pastoral land in temperate regions. Accumulation of soil C was greatest when deciduous hardwoods, or N2-fixing species (either as an understorey or as a plantation), were established on ex-cropped land in tropical or subtropical regions. Long-term management regimes (e.g. stocking, weed control, thinning, fertiliser application and fire management) may also influence accumulation of soil C. Accumulation is maximised by maintaining longer (20-50 years) forest rotations. Furthermore, inclusion of litter in calculations reversed the observed average decrease in soil C, so that amount of C in soil and litter layer was greater than under preceding pasture.

226. **Changes to the soil environment under conservation tillage.**
Johnson, A. M. and Hoyt, G. D.
HortTechnology 9 (3): 380-393. (July 1999-Sept. 1999)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: conservation tillage/ soil chemistry/ soil physical properties/ soil biology/ soil degradation/ erosion/ sloping land/ soil water content/ costs/ cultivation/ soil temperature/ soil fertility/ phosphorus/ nutrient availability/ nitrogen/ soil ph/ cation exchange capacity/ base saturation/ nitrogen cycle/ carbon cycle/ soil organic matter/ soil flora/ microbial flora/ cover crops/ losses from soil/ literature reviews
This citation is from AGRICOLA.

227. **Channelization and Levee Construction of Illinois: Review and Implications for Management.**
Mattingly, R. L.; Herricks, E. E.; and Johnston, D. M.
Environmental Management 17 (6): 781-795. (1993)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: streams/ environmental impact/ riparian environments/ United States, Illinois/ environmental impact/ environment management/ river basin management/ dams/ rivers/ environmental effects/ resources management/ channeling/ levees/ construction/ riparian vegetation/ channelization/ levees/ mitigation/ Management/ Law, policy, economics and social sciences/ Protective measures and control/ Conservation/ Ecological impact of water development/ Structures
Abstract: The environmental impact of loss of natural stream and riparian habitat is of concern throughout the United States and Europe. Environmental impacts related to such activities as channelization of and levee construction along streams and rivers are particularly apparent in the Midwestern United States. The objective of the research presented here was to delineate the extent, relative degree of impact, and implications for management of channelization and levee construction along watercourses located in the state of Illinois. According to records maintained through the Illinois Streams Information System data base (Illinois Department of Conservation), nearly 25% of surface water resources in the state have been modified directly by channelization and/or levee construction. Reviews of agency records, elaboration of case histories, interviews with agency personnel, and inspections of impacted sites indicated that these alterations have occurred without the benefit of effective mitigation. Although permit records may provide suggestions for mitigation to be incorporated in the design of a particular project, permits issued generally do not require even minimal instream habitat and bank stabilization efforts in conjunction with channel alteration. Information derived from policy and case study analyses suggests that institutional constraints, rather than lack of particular understanding about mitigation, provide major barriers to protecting the state's surface water resources in terms of regulatory review, policy interpretation and implementation, and project evaluation. Recommendations for environmental management efforts regarding these and similar channel alterations are elaborated from these findings.

228. **Characteristics of animal wastes and waste-amended soils: An overview of the agricultural and environmental issues.**
Sims, J. T.
In: Animal waste and the land-water interface.
Boca Raton, Fla.: Lewis Publishers, 1995; pp. 1-13.
ISBN: 1566701899
NAL Call #: TD930.A55-1995
Descriptors: animal wastes/ soil amendments/ characteristics/ soil fertility/ management/ waste utilization/ pollution/ pollution control/ environmental control/ environmental impact/ waste management
This citation is from AGRICOLA.

229. **Characteristics of wood ash and influence on soil properties and nutrient uptake: An overview.**
Demeyer, A.; Voundi Nkana, J. C.; and Verloo, M. G.
Bioresource Technology 77 (3): 287-295. (May 2001)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB].
Notes: Reviews issue.
Includes references.
Descriptors: waste utilization/ application to land/ soil fertility/ soil biology/ soil chemistry
This citation is from AGRICOLA.

230. **Chemical mixtures: Current risk assessment methodologies and future directions.**
Seed, Jennifer; Brown, Ronald P; Olin, Stephen S; and Foran, Jeffery A
Regulatory Toxicology and Pharmacology 22 (1): 76-94. (1995);
ISSN: 0273-2300
Descriptors: biphenyls/ carcinogen/ pesticides/ polychlorinated biphenyls/ toxicity
Abstract: Some of the most challenging problems that toxicologists confront are determining how biological effects of components in a complex mixture may interact, determining how these interactions affect the overall toxicity of the mixture, and determining how to incorporate this information into risk assessments of chemical mixtures. There has been considerable effort in this area since the publication of the U.S. Environmental Protection Agency's guidelines for risk assessment of chemical mixtures in 1986. This paper reviews the terminology used to describe chemical interactions and the methodologies that have been developed for conducting risk assessments of chemical mixtures. Particular attention is directed towards an examination of the applicability and validity of the methods for the assessment of risk posed by exposure to environmentally relevant concentrations of chemical mixtures. Limited, yet compelling, data are reviewed that suggest that for noncancer endpoints, adverse effects are unlikely to occur when the individual components in the mixture are present at levels well below their respective thresholds. Synergistic or antagonistic effects, not readily predicted from the mechanisms of action of the individual components, are possible when the mixture components are present at levels equal to or above their individual thresholds. Finally, synergistic carcinogenic effects have been observed in animal studies of mixtures, even at relatively low doses.
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231. **Chemicals from nature for weed management.**
Duke, S. O.; Dayan, F. E.; Rimando, A. M.; Schrader, K. K.; Aliotta, G.; Oliva, A.; and Romagni, J. G.
Weed Science 50 (2): 138-151. (Mar. 2002-Apr. 2002)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: weeds/ weed control/ phytotoxicity/ herbicides/ phytotoxins/ mode of action/ pest management/ fish culture/ cyanobacteria/ allelochemicals/ chemical structure/ structure activity relationships/ literature reviews
Abstract: Natural products represent a vast repository of materials and compounds with evolved biological activity, including phytotoxicity. Some of these compounds can be used directly or as templates for herbicides. The molecular target sites of these compounds are often unique. Strategies for the discovery of these materials and compounds are outlined. Numerous examples of individual phytotoxins and crude preparations with weed management potential are provided. An example of research to find a natural product solution of a unique pest management problem (blue-green algae in aquaculture) is described. Finally, the problems associated with natural products for pest control are discussed.
This citation is from AGRICOLA.

232. **Chesapeake Bay area nutrient management programs: An overview.**
United States. Environmental Protection Agency. Chesapeake Bay Program. Nutrient Subcommittee. Nutrient Management Workgroup.
Annapolis, MD: Chesapeake Bay Program; Series: Chesapeake Bay Program technology transfer report; 7 p.: ill. (1996)
Notes: Printed by the Environmental Protection Agency for the Chesapeake Bay Program; "March 1996." "CBP/TRS 143/96, EPA-903-R-96-001"--Cover.
NAL Call #: TD225.C43C45--1996
Descriptors: Nutrient pollution of water---Chesapeake Bay Region---Md and Va/ Water quality management---Chesapeake Bay Region---Md and Va
This citation is from AGRICOLA.

233. **Chesapeake Bay riparian handbook: A guide for establishing and maintaining riparian forest buffers.**
Palone, Roxane S.; Todd, Albert H.; United States. State and Private Forestry. Northeastern Area; United States. Natural Resources Conservation Service; and United States. Cooperative State Research, Education and Extension Service.
Morgantown, WV: U.S. Dept. of Agriculture, Forest Service, Northeastern Area State & Private Forestry: Natural Resources Conservation Services: Cooperative State Research, Education, and Extension Service; Series: NA-TP 97-02 (Rev. June 1998). (1998)
Notes: Title from web page. "May 1997." Description based on content viewed May 6, 2003. Includes bibliographical references.
NAL Call #: aSB763.A115-N38-no.-97-02
http://www.chesapeakebay.net/pubs/subcommittee/nsc/forest/riphbk.pdf
Descriptors: Riparian forests---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Riparian ecology---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Water quality management---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Buffer zones---Ecosystem management---Chesapeake Bay---Md and Va---Handbooks, manuals, etc
This citation is from AGRICOLA.

234. **Citronelle ponds: Little-known wetlands of the central Gulf Coastal Plain, USA.**
Folkerts, George W
Natural Areas Journal 17 (1): 6-16. (1997)
NAL Call #: QH76.N37;
ISSN: 0885-8608
Descriptors: Kaolinite/ Kaolinite dissolution/ Pond cypress/ Swamp tupelo/ Water fluctuation/ Freshwater ecology/ Habitat/ Forested depression wetland/ Dominant species/ Citronelle ponds/ Conservation/ crustaceans (Crustacea Unspecified)/ insects (Insecta Unspecified)/ Crustacea (Crustacea Unspecified)/ Insecta (Insecta Unspecified)/ Nyssa biflora (Nyssaceae)/ Taxodium ascendens (Coniferopsida)/ angiosperms/ animals/ arthropods/ crustaceans/ dicots/ gymnosperms/ invertebrates/ plants/ spermatophytes/ vascular plants/ Central Gulf coastal plain
Abstract: Citronelle ponds are forested depression wetlands occurring on relatively flat uneroded surfaces of the Citronelle Formation along the Gulf coast of the United States from Mississippi to the central Florida Panhandle. The depressions seem to have formed by the dissolution of kaolinite in the substrate and associated loss of volume. Most are temporarily flooded, typically from early winter to late spring. Soils are

usually of the Grady series. Few depressions have connections with surface or subsurface drainage. Nearly all Citronelle ponds were forested in their primeval state, characteristically supporting pondcypress (Taxodium ascendens Brogn.) and swamp tupelo (Nyssa biflora (Walt.) Sarg.) as dominants. The fauna consists of species that can tolerate water fluctuation and frequent drying and includes a large diversity of crustaceans and insects. Fishes are seldom present. Most of the ponds are isolated amid lands used for agriculture and forestry. Few remain in anything resembling a natural state. Action to preserve representative Citronelle ponds is urgently needed.
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235. **Classical biological control: A critical review of recent programs against citrus pests in Florida.**
Michaud, J P
Annals of the Entomological Society of America 95 (5): 531-540. (2002); *ISSN:* 0013-8746
Descriptors: Ageniaspis citricola [brown citrus aphid] (Hymenoptera): pest/ Lipolexis scutellaris (Hymenoptera): biological control agent/ Lysiphlebia japonica (Hymenoptera): biological control agent/ Tamarixia radiata (Hymenoptera): biological control agent/ citrus (Rutaceae): tropical subtropical fruit crop/ Angiosperms/ Animals/ Arthropods/ Dicots/ Insects/ Invertebrates/ Plants/ Spermatophytes/ Vascular Plants/ biological control/ integrated pest management
Abstract: Classical biological control is often considered a cornerstone of integrated pest management, although the introduction of exotic natural enemies can have unpredictable and wide-ranging impacts on native ecosystems. In this article, I question the wisdom of using the classical approach as an automatic first response to invasive pests. I critically evaluate some classical biological control programs recently implemented against invasive pests of citrus in Florida including: Lysiphlebia japonica Ashmead and Lipolexis scutellaris Mackauer (Hymenoptera: Aphidiidae) introduced against the brown citrus aphid, Ageniaspis citricola Logviniskaya (Hymenoptera: Encyrtidae) against the citrus leafminer, and Tamarixia radiata (Waterston) (Hymenoptera: Eulophidae) against the Asian citrus psyllid. I advance the following contentions: (1) Not all invasive pests are appropriate targets for the classical approach, especially those that lack natural enemies specific to, or effective against them. (2) Some invasive pests may be effectively controlled by generalist predators within a time frame similar to that required for evaluation of introduced parasitoids. (3) The contributions of native species are often ignored when postrelease evaluations focus on introduced species. (4) Parasitism is a highly apparent phenomenon in the field, while predation is less apparent and far more difficult to quantify, an empirical disparity that may generate an undue bias regarding the perceived importance of introduced parasites relative to indigenous predators in biological control. (5) Classical programs have immediate political appeal to agricultural sectors seeking quick solutions to new pest problems, and to the government agencies seeking to respond to their demands for action. Thus, funding incentives for research may be biased toward 'rear and release' classical programs and away from other, ecologically sound approaches to pest management such as conservation biological control. I conclude that classical programs are typically employed as a reflexive response to invasive pests, often without adequate evaluation of the pest as a potential, rather than automatic, target for this approach, and without prerelease surveys to document indigneous natural enemies. A classical program may be embarked on regardless of whether or not suitable candidate species for introduction can be identified, and often without objective postrelease evaluations. The net result is a prevailing tendency to underestimate the potential ecological resiliency of established insect communities to invasive pests.
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236. **Clean coastal waters: Understanding and reducing the effects of nutrient pollution.**
National Research Council. Committee on the Causes and Management of Eutrophication
Washington DC: National Academies Press; 428 p. (2000); *ISBN:* 0-309-06948-3
http://www.nap.edu/books/0309069483/html/
Descriptors: coastal water/ nutrient enrichment/ estuaries/ monitoring/ models/ water quality

237. **Clean water and productive rangelands.**
Alexander, Susan V.; Shulman, Roberta F.; Terrene Institute; and United States. Environmental Protection Agency. Region VI. Water Quality Management Branch.
Washington, DC: Terrene Institute; 15 p.: ill. (some col.). (1994)
Notes: "A challenge for Southwestern ranchers"--Cover. "April 1994."
NAL Call #: SF85.35.A165A44--1994
Descriptors: Rangelands---Southwest---Water supply/ Rangelands---New Mexico---Water supply/ Range management---Southwest/ Range management---New Mexico
This citation is from AGRICOLA.

238. **Climate and biological control in organic crops.**
Stacey, D. A.
International Journal of Pest Management 49 (3): 205-214. (2003)
NAL Call #: SB950.A1P3; *ISSN:* 0967-0874.
Notes: Number of References: 159; Publisher: Taylor & Francis Ltd
Descriptors: Entomology/ Pest Control/ biological control/ climate change/ insect pests/ IPM/ natural enemies/ organic farming/ pesticides/ elevated atmospheric CO2/ insect herbivore interactions/ natural enemies/ beauveria bassiana/ winter wheat/ beneficial arthropods/ species composition/ erynia neoaphidis/ orius laevigatus/ entomopathogenic fungus
Abstract: Organic farming has increased in popularity in recent years, primarily as a response to the perceived health and conservation benefits. While it is likely that conventional farming will be able to respond rapidly to variations in pest numbers and distribution resulting from climatic change, it is not clear if the same is true for organic farming. Few studies have looked at the responses of biological control organisms to climate change. Here, I review the direct and indirect effects of changes in temperature, atmospheric carbon dioxide and other climatic factors on the predators, parasitoids and pathogens of pest insects in temperate agriculture.

Finally, I consider what research is needed to manage the anticipated change in pest insect dynamics and distributions.

239. **Climate change and its effect on water quality and soil resources.**
Ankeny, Iowa: Soil and Water Conservation Society; 2003. (application/pdf)
http://www.swcs.org/docs/Climate%20change-final.pdf
Abstract: The Soil and Water Conservation Society has reviewed the literature and with an expert panel produced a report that connects climate change as a possible cause for set backs in progress, effecting water quality and preservation of soil resources. The report also gives suggestions of what needs to happen to circumvent these set backs. Suggestions include a new way for conservation planning and highlights areas where more information is needed.

240. **Climate change and plant disease management.**
Melugin, Coakley Stella; Scherm, Harald; and Chakraborty, Sukumar
Annual Review of Phytopathology 37: 399-426. (1999)
NAL Call #: 464.8 An72;
ISSN: 0066-4286
Descriptors: host pathogen interaction/ disease resistance/ physiological change/ Climatology (Environmental Sciences)/ Pest Assessment Control and Management/ Epidemiology (Population Studies)

241. **Closure of earthen manure structures (including basins, holding ponds and lagoons).**
Jones, D. D.; Koelsch, R. K.; Mukhtar, S.; Sheffield, R. E.; and Worley, J. W.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

242. **Collaborative planning for wetlands and wildlife: Issues and examples.**
Porter, Douglas R. and Salvesen, David.
Washington, DC: Island Press; x, 293 p.: ill., maps. (1995)
NAL Call #: QH76.C65--1995;
ISBN: 1559632879
Descriptors: Wetland conservation---United States---Planning/ Wildlife conservation---United States---Planning
This citation is from AGRICOLA.

243. **Combining inferences from models of capture efficiency, detectability, and suitable habitat to classify landscapes for conservation of threatened bull trout.**
Peterson, J. T. and Dunham, J.
Conservation Biology 17 (4): 1070-1077. (2003)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892.
Notes: Number of References: 20
Descriptors: Environment/ Ecology
Abstract: Effective conservation efforts for at-risk species require knowledge of the locations of existing populations. Species presence can be estimated directly by conducting field-sampling surveys or alternatively by developing predictive models. Direct surveys can be expensive and inefficient, particularly for rare and difficult-to-sample species, and models of species presence may produce biased predictions. We present a Bayesian approach that combines sampling and model-based inferences for estimating species presence. The accuracy and cost-effectiveness of this approach were compared to those of sampling surveys and predictive models for estimating the presence of the threatened bull trout (Salvelinus confluentus) via simulation with existing models and empirical sampling data. Simulations indicated that a sampling-only approach would be the most effective and would result in the lowest presence and absence misclassification error rates for three thresholds of detection probability. When sampling effort was considered, however, the combined approach resulted in the lowest error rates per unit of sampling effort. Hence, lower probability-of-detection thresholds can be specified with the combined approach, resulting in lower misclassification error rates and improved cost-effectiveness.

244. **Commercial application of enzyme technology for poultry production.**
Acamovic, T.
World's Poultry Science Journal 57 (3): 225-242. (Sept. 2001)
NAL Call #: 47.8-W89;
ISSN: 0043-9339 [WPSJAO].
Notes: Paper presented at the 21st World's Poultry Congress, August 20-24, 2000, Montreal, Canada. Includes references.
Descriptors: chickens / turkeys/ production costs/ feed grains/ antinutritional factors/ enzyme preparations/ feed additives/ nutrient-nutrient interactions/ O-glycoside hydrolases/ proteinases/ phytase/ esterases/ triacylglycerol lipase/ enzyme activity/ digesta/ viscosity/ digestibility/ poultry manure/ literature reviews
This citation is from AGRICOLA.

245. **Comparability of suspended sediment concentration and total suspended solids data.**
Gray, John R. and Geological Survey (U.S.).
Reston, Va.: U.S. Dept. of the Interior, U.S. Geological Survey; vi, 14 p.: ill.; Series: Water-resources investigations report 00-4191. (2000)
Notes: "WRIR 00-4191"--Cover. "August 2000"--Cover. Includes bibliographical references (p. 12-14).
NAL Call #: GB701-.W375-no.-2000-4191
Descriptors: Suspended sediments---United States/ Water quality---United States
This citation is from AGRICOLA.

246. **Comparative study of methods of preparing hydraulic-head surfaces and the introduction of automated hydrogeological-GIS techniques.**
Salama, R. B.; Ye, L.; and Broun, J.
Journal of Hydrology 185 (1/4): 115-136. (Nov. 1996)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7]
Descriptors: hydrology/ groundwater flow/ saturated flow/ aquifers/ surfaces/ geographical information systems/ automation/ mapping/ maps/ geology/ topography/ water table/ watersheds/ regression analysis/ saturated hydraulic conductivity/

kriging/ wells/ statistical analysis/ western Australia/ New South Wales/ hydrogeomorphic units/ hydrogeology/ reduced water levels/ geostatistics
Abstract: Construction of hydraulic-head surface (HHS) maps is the most commonly used technique for groundwater evaluation. A review of methods used for constructing HHS maps showed that, of the manual methods, the hydrogeological interpretative technique produces a better surface than the equally spaced approach. Geostatistical methods gave similar surfaces to the manual methods; they share the problem of groundwater contours intersecting surface contours and the inability to identify groundwater discharge areas. The results showed that the automated hydrogeological-GIS (geographical information system) techniques, which take into account the hydrogeomorphic and topographic controls, produced the most realistic surfaces. Groundwater contours follow the hydrogeomorphic trends, do not intersect surface contours and can properly identify areas of groundwater discharge. The major advantage of the hydrogeological-GIS technique is the ability to prepare HHS maps with a small number of data points. It is also possible to use regressions from other catchments to prepare HHS maps for catchments with similar hydrogeomorphic characteristics and elevation ranges but which have no data.
This citation is from AGRICOLA.

247. **Comparison of Chlorpyrifos Fate and Effects in Outdoor Aquatic Micro- and Mesocosms of Various Scale and Construction.**
Leeuwangh, P.
In: Freshwater Field Tests for Hazard Assessment of Chemicals/ Hill, I. R.; Heimbach, F.; Leeuwangh, P.; and Mattiessen, P.
Boca Raton, FL: Lewis Publishers, 1994; pp. 217-248.
Notes: Conference: European Workshop on Freshwater Field Tests, Potsdam (Germany), 25-26 Jun 1992;
ISBN: 0-87371-940-9
Descriptors: pesticides/ fate/ pollution effects/ experimental research/ freshwater ecology/ aquatic communities/ literature reviews/ fate of pollutants/ aquatic environment/ literature review/ insecticides/ taxonomy/ water pollution effects/ chlorpyrifos/ aquatic environments/ chlorpyrifos/ Effects on organisms/ Effects of pollution/ Freshwater pollution
Abstract: Various micro- and mesocosms simulating the natural environment have been used to study the fate and effects of the insecticide chlorpyrifos. Literature was reviewed to observe the influence of scale, test design and meteorological conditions on the fate and effects of chlorpyrifos. The disappearance of chlorpyrifos from water is consistent in all studies, despite variation in system dimensions (9 to 450 m super(3)) and in physico-chemical and biological properties. In most studies however, the product has no effect on the physico-chemical characteristics of the water. It is possible that intermesocosm variability, especially that due to the macrophyte biomass at the time of application of the pesticide, obscures subtle effects. The primary effects of chlorpyrifos were consistent in all studies, even though wide differences were apparent in the composition of the main taxonomic groups at the time of application of the pesticide. Indirect effects of chlorpyrifos in micro- and mesocosms are much more variable, in both direction and magnitude. In some, but not all studies, phytoplankton, periphyton, rotifers, oligochaetes, some mollusc taxa and the isopod Asellus have shown a tendency to increase in biomass or abundance. Reductions in chlorpyrifos-sensitive invertebrate forage species resulted in transient reduced growth of endemic larval fathead minnows. The complexity of natural ecosystems and the lack of qualitative and quantitative a priori information on trophic structure can make prediction of indirect effects very difficult. In the reviewed literature there were no indications of direct or indirect effects on macrophytes, Coelenterata or Arachnida. No mention was made of other taxa.
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248. **Comparison of different techniques to measure ammonia emission after manure application.**
Ferm, M. and Institutet for vatten och luftvardsforskning (Sweden).
Goteborg: IVL Swedish Environmental Research Institute; 14 p.: ill.; Series: IVL report B 1383. (2000)
Notes: Cover title. "juni 2000" Includes bibliographical references (p. 13-14).
NAL Call #: S654-.C66-2000
Descriptors: Ammonia as fertilizer/ Manure gases/ Ammonia---Physiological effect
This citation is from AGRICOLA.

249. **Compensation ratios for wetland mitigation.**
King, Dennis M.; Bohlen, Curtis C.; and Chesapeake Biological Laboratory.
Solomons, Md.: University of Maryland, Center for Environmental and Estuarine Studies, Chesapeake Biological Laboratory; 14 leaves: 1 ill. (1994)
Notes: Subtitle: Guidelines and tables for applying the methodology described in Wetland mitigation: A framework for determining compensation ratios; Cover title. "April 1, 1994." "University of Maryland, CEES working paper UMCEES-CBL-94-10."
NAL Call #: QH76.K563--1994
Descriptors: Wetland conservation---Mathematical models
This citation is from AGRICOLA.

250. **Competing values and moral imperatives: An overview of ethical issues in biological control.**
Lockwood, J. A.
Agriculture and Human Values 14 (3): 205-210. (Sept. 1997)
NAL Call #: HT401.A36;
ISSN: 0889-048X [AHVAED].
Notes: Special issue: Ethical Issues in Biological Control / edited by J.A. Lockwood.
Descriptors: pest management/ biological control/ bioethics/ moral values/ environmental impact/ literature reviews
This citation is from AGRICOLA.

251. **The complete book of pesticide management: Science, regulation, stewardship, and communication.**
Whitford, Fred.
New York: J. Wiley; Series: Environmental Protection magazine series; xxiv, 787 p.: ill. (2002)
Notes: Contents note: The Evolution of Pesticide Regulations: The Shift From Benefits to Risks / F. Whitford, et al.-- Human Health Risk Assessment: Evaluating Potential Effects of Pesticides on Human / F. Whitford, et al.-- Epidemiology: Validating Human Risk Assessments / F. Whitford, et al.-- Ecological Risk Assessments: Evaluating Pesticide Risks to Nontarget Species / F.

Whitford, et al.-- Water Quality Risk Assessment: Predicting Complex Interactions Between Pesticides and the Environment / F. Whitford, et al.-- Product Development and Registration: Blending Scientific Information into Public Policy Decisions / F. Whitford, et al.-- Pesticide Lables: The Convergence of Science, Public Policy, and User Responsibility / F. Whitford, et al.-- Liabilities and Lawsuits: Understanding Regulations, Inspections, and the Courts / F. Whitford, et al.-- Environmental Site Assessments: Managing the Facility Against Contamination / F. Whitford, et al.-- Occupational Use of Pesticides: Handling Products in the Workplace / F. Whitford, et al.-- Personal Protective Equipment: Selection, Care, and Use / F. Whitford, et al.-- The Employee Bulletin Board: Where Employers Communicate Policies, Procedures, and Practices / F. Whitford, et al.-- Planning for Emergencies: Preventing and Reacting to Emergencies in the Workplace / F. Whitford, et al.-- The Insurance Policy: Protecting Yourself Against the Unexpected / F. Whitford, et al.-- Educating the Community and the Workforce About Hazardous Chemicals / F. Whitford, et al.-- Educating Your Consumer Clientele: A Holistic Approach to Pest Management / F. Whitford, et al.-- Pesticides and Risk Communication: Interactions and Dialogues with the Public / F. Whitford, et al.) -- Today's Discussions, Tomorrow's Issues / F. Whitford, et al.
NAL Call #: RA1270.P4-C65-2002;
ISBN: 0471407283
Descriptors: Pesticides Toxicology/ Pesticides Health aspects/ Pesticides Safety measures/ Health risk assessment/ Pesticides---Government policy---United States
This citation is from AGRICOLA.

252. **Components of dairy manure management systems.**
Horn, H. H. van; Wilkie, A. C.; Powers, W. J.; and Nordstedt, R. A.
Journal of Dairy Science 77 (7): 2008-2030. (1994)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

253. **Compost as an alternative weed control method.**
Ozores, Hampton Monica
HortScience 33 (6): 938-940. (1998)
NAL Call #: SB1.H6;
ISSN: 0018-5345
Descriptors: weeds (Tracheophyta)/ Plants/ Vascular Plants
© Thomson

254. **Compost utilization for vegetable and fruit crops.**
Roe, Nancy E
HortScience 33 (6): 934-937. (1998)
NAL Call #: SB1.H6;
ISSN: 0018-5345
Descriptors: orange (Rutaceae): fruit crop/ Brassica chinensis [Chinese white cabbage] (Cruciferae): vegetable crop/ Capsicum annuum [Chinese white cabbage] (Solanaceae): vegetable crop/ Daucus carota [tomato] (Umbelliferae): vegetable crop/ Hibiscus esculenta [Chinese white cabbage] (Malvaceae): vegetable crop/ Lycopersicon esculentum [tomato] (Solanaceae): vegetable crop/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants/ compost utilization/ nutrient uptake
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255. **Compost utilization in horticultural cropping systems.**
Stoffella, Peter J. and Kahn, Brian A.
Boca Raton, Fla.: Lewis Publishers; 414 p.: ill. (2001)
NAL Call #: S661-.C66-2001;
ISBN: 156670460X (alk. paper)
Descriptors: Compost/ Horticulture
This citation is from AGRICOLA.

256. **Compost utilization in vegetable crop production systems.**
Stoffella, P. J.; Ozores-Hampton, M.; Roe, N. E.; Li, Y. C.; and Obreza, T. A.
Acta Horticulturae (No.607): 125-128. (2003)
NAL Call #: 80 Ac82;
ISBN: 0567-757290-6605-986-9
This citation is provided courtesy of CAB International/CABI Publishing.

257. **Composting for feedlot manure management and soil quality.**
Deluca, T H and Deluca, D K
Journal of Production Agriculture 10 (2): 235-241. (1997)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
Descriptors: corn (Gramineae)/ crop (Angiospermae)/ plant (Plantae Unspecified)/ Zea mays (Gramineae)/ angiosperms/ monocots/ plants/ spermatophytes/ vascular plants/ animal husbandry/ biobusiness/ composting/ feedlot manure management/ miscellaneous method/ soil science
Abstract: Contemporary industrialized grain and livestock production is characterized by efficient, large-scale confined animal feedlot operations (CAFOs) and equally efficient and large-scale, but separate, grain operations. Though both are highly productive, feedlot operators have come to view manure as a waste management problem, while grain operations face declining soil quality and a reliance on commercial fertilizers to maximize yields. Neither type of operation can be considered sustainable. Cooperative on-farm composting may provide solutions to some of the problems facing our industrialized agricultural systems and reader the systems more sustainable. In this paper we view cooperative on-firm composting as the combination and processing of feedlot manure with crop stover to produce a beneficial natural soil amendment and fertilizer for those fields from which the stover was taken. Cooperative on-firm composting would help protect surface and groundwater from nutrient loading, save resources, and help renew social ties within the agricultural community. Composting stabilizes nutrients, kills pathogens and weed seeds, reduces moisture content, reduces odor, and improves physical properties of manure, thereby improving its value as a soil amendment and fertilizer. Although some N in raw manure is lost during composting, the end product differs from raw manure in that it exhibits minimal N loss in storage or after field application. Composted manure can become the primary fertilizer for grain production once the cumulative N mineralization from previous applications reach steady-state. The use of composted manure improves soil quality and greatly reduces total energy consumption compared with the use of commercial fertilizer. A hypothetical example illustrates how compost applications to irrigated corn (Zea mays L.) could result in a net energy savings of about 3.3 million Btu/acre, which is equivalent to the energy contained in 19.4 gallons of diesel fuel/acre.
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258. **Composting for manure management.**
Emmaus, Pa.: JG Press; 77 p. (1998)
NAL Call #: S655-.C66-1998;
ISBN: 0932424198
Descriptors: BioCycle/ Manure handling/ Compost---Economic aspects/ Agricultural wastes
This citation is from AGRICOLA.

259. **Composting for the treatment of cattle wastes.**
Bujang KB and Lopez Real JM
Compost Science and Utilization 1 (3): 38-40; 8 ref. (1993)
NAL Call #: TD796.5.C58
This citation is provided courtesy of CAB International/CABI Publishing.

260. **Composting manure for value-added products: BioCycle.**
Emmaus, Pa.: JG Press; 85 p. (2001)
NAL Call #: S655-.C67-2001;
ISBN: 0932424228
Descriptors: Farm manure/ Manure handling/ Compost/ Organic wastes---Recycling
This citation is from AGRICOLA.

261. **Composting module: Environmentally assured.**
McGuire, Kellie. and National Pork Producers Council (U.S.).
Des Moines, Iowa: National Pork Producers Council; 78, 7 p.: ill. (1997)
Notes: "Environmental Assurance Program (EAP)." Cover title. "Environmentally assured"--cover. Includes bibliographical references.
NAL Call #: TD930-.C67-1997
Descriptors: Animal industry---Environmental aspects/ Swine---Carcasses---Environmental aspects/ Compost
This citation is from AGRICOLA.

262. **Composting piggery waste: A review.**
Imbeah, M.
Bioresource Technology 63 (3): 197-203. (Mar. 1998)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB]
Descriptors: pig manure
Abstract: For many centuries, composting has been used as a means of recycling organic matter back into the soil to improve soil structure and fertility. The composting process has received much attention in recent years because of pollution concerns and the search for environmentally-sound methods for treating animal waste. The pig industry faces increasing problems from waste production as intensive pig production increases and pig units become bigger. This paper reviews information on the use of composting for treating piggery waste as a means of addressing the environmental pollution concerns. Ways in which composting has been used for treating pig manure, pig carcasses and pig litter as well as factors influencing the composting process are discussed. Suggestions for possible future applications are also presented.
This citation is from AGRICOLA.

263. **Concept and Determination of Exchangeable Phosphate in Aquatic Sediments.**
Aminot, A. and Andrieux, F.
Water Research 30 (11): 2805-2811. (Nov. 1996)
NAL Call #: TD420.W3;
ISSN: 0043-1354
Descriptors: phosphates/ sediment water interfaces/ sediments/ phosphorus/ hydrogen ion concentration/ estuaries/ evaluation/ literature review/ sorption/ comparison studies/ phosphorus cycle/ eutrophication/ sediment chemistry/ sediment water interface/ exchangeable phosphate/ Chemical processes/ Estuaries/ Behavior and fate characteristics/ Freshwater pollution
Abstract: Exchangeable phosphate represents a reservoir of bioavailable phosphorus, since it can be rapidly released into a water body when the soluble phosphate concentration decreases. In the absence of a clear definition we first propose to precisely define exchangeable phosphate with reference to phosphate released in extreme conditions of solid dilution. A survey of the literature indicates that a variety of methods have been developed to provide its determination. The theoretical approach behind the corresponding release experiments is presented to support an evaluation of these methods with respect to the definition given. It appears that most are not based on the rigorous application of thermodynamic principles. Therefore, we have presented an infinite dilution extrapolation (IDE) approach, both rigorous and simple, enabling reliable comparison to be made. The method is based on extraction in natural water or a soluble substitute. The effect of pH was studied. Experimental conditions for use of the described method have been developed and various side applications are shown such as comparison of the extracting power of extractants. Results of application to estuarine sediments are briefly presented.
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264. **The concept of agricultural sustainability.**
Schaller, Neill
Agriculture Ecosystems and Environment 46 (1-4): 89-97. (1993)
NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: agriculture/ food production/ profit/ resource management
Abstract: Sustainable agriculture has become a popular code word for an environmentally sound, productive, economically viable, and socially desirable agriculture. This paper reviews reasons for growing interest in agricultural sustainability (mainly the unanticipated, adverse side-effects of conventional farming), examines the proposed ends and means of sustainability, and discusses two issues frequently debated - the profitability of sustainable farming and the adequacy of food production from sustainable systems. The concept of agricultural sustainability does not lend itself to precise definition, partly because it implies a way of thinking as well as of using farming practices, and because the latter cannot be specified as final answers. Consequently, people's beliefs and values will continue to mold public understanding of the concept. Two different views of sustainable agriculture are held. One is that fine- tuning of conventional agriculture - more careful and efficient farming with sensitive technologies - will reduce or eliminate many undesirable effects of conventional agriculture. The other is that fundamental changes in agriculture are needed, requiring a major transformation of societal values. Those who believe that only fine-tuning is needed tend to argue that sustainable farming is inherently unprofitable. If widely adopted, it would not feed the world's expanding population as well as conventional agriculture. Those who see a need for more fundamental changes in conventional systems believe that sustainable farming, on the contrary, can be even more profitable than the

conventional, especially when the calculation of profit counts all of the benefits and costs of farming. Further, resource conservation, protection of the environment, and farming in partnership with nature - all requirements of sustainability - will enhance, not reduce, global food production. Other issues, such as the connections between sustainable farming and the rest of the food and fiber system, and the implications of sustainability for rural communities and society as a whole, have yet to be addressed significantly.
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265. **Concepts and directions in arthropod pest management.**
Funderburk, J.; Higley, L.; and Buntin, G. D.
Advances in Agronomy 51: 125-172. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: integrated pest management/ insecticides/ arthropod pests/ crop damage/ economic impact/ pest resistance/ cultural control/ biological control/ population dynamics/ selection pressure/ environmental impact/ ecosystems/ literature reviews/ economic injury level
This citation is from AGRICOLA.

266. **Conceptual model and indicators for assessing the ecological condition of agricultural lands.**
Hess, George R.; Campbell, C. Lee; Fiscus, Daniel A.; Hellkamp, Anne S.; McQuaid, Betty F.; Munster, Michael J.; Peck, Steven L.; and Shafer, Steven R.
Journal of Environmental Quality 29 (3): 728-737. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425.
Notes: Publisher: AMERICAN SOC OF AGRONOMY INC, MADISON, WI, (USA)
Descriptors: Farms/ Ecosystems/ Mathematical models/ Agricultural products/ Productivity/ Environmental protection/ Societies and institutions/ Agricultural lands/ Agroecosystem/ Sustainability/ Agricultural Machinery and Equipment/ Agricultural Machinery and Equipment/ Biology/ Numerical Methods/ Agricultural Products/ Environmental Impact and Protection/ Biology/ Numerical Methods/ Agricultural Products/ Environmental Impact and Protection
Abstract: As part of an environmental monitoring and assessment effort, we developed a conceptual model for measuring and assessing the condition and sustainability of agroecosystems. An agroecosystem is a field, pasture, or orchard and the associated border areas. We focused on ecological sustainability and defined the goals for agroecosystems in terms of the values people place on them. The purpose of an agroecosystem is to produce food and fiber. Other desired outcomes can be considered as goals for the larger landscape and the rest of the world, and they sometimes function as constraints on production. Condition is defined by agroecosystem productivity and the degree to which farmers use management and stewardship practices that conserve and protect valued natural resources in the landscape and the rest of the world. An agroecosystem in good condition is productive and is managed to conserve valued resources. Sustainability is the maintenance of good condition over time. We developed indicators that link system condition and sustainability to societal values and goals. These indicators measure productivity, management practices that promote sustainability at the agroecosystem scale, and management practices that promote sustainability at landscape and global scales. Our initial efforts focused on annually harvested herbaceous crops; however, the concepts we used can be adapted to other plant and livestock systems. Our conceptual approach may be used to evaluate the effectiveness of several major programs now being implemented, including the USDA's Environmental Quality Incentive and Conservation Reserve Programs.
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267. **Concrete manure storages handbook.**
Pedersen, John H.; Runestad, Jay A.; and Midwest Plan Service.
Ames, IA: Midwest Plan Service, Agricultural and Biosystems Engineering Dept., Iowa State University; 70 p.: ill. (1993)
Notes: 1st ed.; "Most of this book updates and compiles information previously published by the Midwest Plan Service"--Pref. "MWPS-36." Includes bibliographical references (p. [65]) and index.
NAL Call #: S635.P44--1994;
ISBN: 0893730823 (pbk.)
Descriptors: Farm manure---Storage---Handbooks, manuals, etc/ Concrete tanks---Design and construction---Handbooks, manuals, etc
Abstract: This handbook emphasizes planning and design of rectangular and circular concrete manure storages for depths to 14 feet. Designs for rectangular tanks include tanks with open tops, solid tops up to 16 feet wide, and slats up to 12 feet wide. Circular tanks include designs for above- and below-ground open top tanks for diameters up to 120 feet. One appendix includes information on concrete characteristics, and equations and assumptions used in designs. A section with design aids includes useful tables, conversions, and 14 illustrated data sheets to record design decisions. A chapter with example problems shows how to use the tables and data sheets.
© Midwest Plan Service (MWPS)

268. **Confined animal production and manure nutrients.**
Gollehon, Noel R. and United States. Dept. of Agriculture. Economic Research Service.
Washington, DC: U.S. Dept. of Agriculture, Economic Research Service; iv, 35 p.: col. ill., col. maps; Series: Agriculture information bulletin no. 771. (2001)
Notes: Cover title. "June 2001"--P. [i]. Includes bibliographical references (p. 33-34).
NAL Call #: 1-Ag84Ab-no.-771
http://www.ers.usda.gov/publications/aib771/
Descriptors: Confinement farms Waste disposal---United States/ Livestock Manure Handling---United States/ Poultry Manure Handling---United States/ Organic wastes as fertilizer---United States/ Farm manure---Environmental aspects---United States
This citation is from AGRICOLA.

269. **Conservation implications of climate change: Soil erosion and runoff from cropland.**
Soil and Water Conservation Society (U.S.).
Ankeny, Iowa: Soil and Water Conservation Society; 24 p.: ill., maps. (2003)
Notes: "January 2003." Includes bibliographical references (p. 21-22).
NAL Call #: S624.A1-S642-2003

Descriptors: Soil erosion---United States/ Soil conservation---United States/ Runoff---United States/ Precipitation---Meteorology---United States
This citation is from AGRICOLA.

270. **Conservation management of freshwater habitats: Lakes, rivers and wetlands.**
Maitland, Peter S. and Morgan, N. C.
London; New York: Chapman & Hall; x, 233 p.: ill.; Series: Conservation biology series 9. (1997)
Notes: Includes bibliographical references (p. [207]-223) and index.
NAL Call #: QH75.M34--1997;
ISBN: 0412594102
Descriptors: Wetland conservation/ Fishery conservation/ Wildlife conservation/ Conservation of natural resources/ Freshwater fishes
This citation is from AGRICOLA.

271. **Conservation of aquatic insects: Worldwide crisis or localized threats.**
Polhemus, D. A.
American Zoologist 33 (6): 588-598. (1993)
NAL Call #: 410-Am3;
ISSN: 0003-1569 [AMZOAF].
Notes: Paper presented at the Symposium, "The Crisis in Invertebrate Conservation," Annual Meeting of the American Society of Zoologists and the Canadian Society of Zoologists, December 27-30, 1992, Vancouver, British Columbia. Includes references.
Descriptors: aquatic insects/ nature conservation/ endangered species/ species diversity/ legislation/ literature reviews/ biodiversity/ ambrysus amargosus
This citation is from AGRICOLA.

272. **The conservation of challenge in agriculture and the role of entomologists.**
Van Hook, T.
Florida Entomologist 77 (1): 42-73. (Mar. 1994)
NAL Call #: 420-F662;
ISSN: 0015-4040 [FETMAC].
Notes: Symposium: Insect Behavioral Ecology--'93. Includes references.
Descriptors: arthropods/ conservation/ sustainability/ landscape ecology/ environmental education/ legislation/ literature reviews/ biodiversity/ endangered species act
This citation is from AGRICOLA.

273. **The Conservation Reserve Program: Opportunities for research in landscape-scale restoration.**
Jelinski, D. E. and Kulakow, P. A.
Restoration and Management Notes 14 (2): 137-139. (1996);
ISSN: 0733-0707
Descriptors: research programs/ environmental restoration/ conservation/ agricultural land/ soil conservation/ United States/ agriculture/ cultivated lands/ land management/ Reclamation/ Environmental action/ Watershed protection
© Cambridge Scientific Abstracts (CSA)

274. **Conservation tillage: An ecological approach to soil management.**
Blevins, R. L. and Frye, W. W.
Advances in Agronomy 51: 33-78. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
This citation is provided courtesy of CAB International/CABI Publishing.

275. **Conservation tillage and depth stratification of porosity and soil organic matter.**
Kay, B. D. and VandenBygaart, A. J.
Soil and Tillage Research 66 (2): 107-118. (2002)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

276. **Conservation tillage and macropore factors that affect water movement and the fate of chemicals.**
Shipitalo, M J; Dick, W A; and Edwards, W M
Soil and Tillage Research 53 (3-4): 167-183. (2000)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: chemical: transport/ solute: transport/ chemical fate/ groundwater/ leaching/ macropore factors/ preferential flow/ water movement
Abstract: A thorough understanding of how conservation tillage influences water quality is predicted on knowledge of how tillage affects water movement. This paper summarizes the effects of conservation tillage on water movement and quality mainly based on long-term experiments on Luvisols at the North Appalachian Experimental Watershed near Coshocton, OH, USA. Conservation tillage can have a much larger effect on how water moves through the soil than it does on the total amount percolating to groundwater. Soil macroporosity and the proportion of rainfall moving through preferential flow paths often increase with the adoption of conservation tillage and can contribute to a reduction in surface runoff. In some medium- and fine-textured soils most of the water that moves to the subsoil during the growing season (May-October) is probably transmitted by macropores. If a heavy, intense storm occurs shortly after surface application of an agricultural chemical to soils with well-developed macroporosity, the water transmitted to the subsoil by the macropores may contain significant amounts of applied chemical, up to a few per cent, regardless of the affinity of the chemical for the soil. This amount can be reduced by an order of magnitude or more with the passage of time or if light rainstorms precede the first major leaching event. Because of movement into the soil matrix and sorption, solutes normally strongly adsorbed by the soil should only be subject to leaching in macropores in the first few storms after application. Even under extreme conditions, it is unlikely that the amount of additional adsorbed solute transported to groundwater will exceed a few per cent of the application when conservation tillage is used instead of conventional tillage. In the case of non-adsorbed solutes, such as nitrate, movement into the soil matrix will not preclude further leaching. Therefore, when recharge occurs during the dormant season thorough flushing of the soil, whether macropores are present or not, can move the remaining solutes to groundwater. Thus, the net effect of tillage treatment on leaching of non-adsorbed solutes should be minimal.
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277. **Conservation tillage as a tool to improve soil, water and air quality.**
Tebrugge, F.
In: Proceedings 8th International Congress on Mechanization and Energy in Agriculture. (Held 15 Oct 2002-17 Oct 2002 at Kusadasi, Turkey.) Evcim, U.; Bilgen, H.; Degirmencioglu, A.; Demir, V.; Yalcin, H.; and Ozden, K. (eds.)

Ege (Turkey) University, Faculty of Agriculture: Bornova-Izmir, Turkey; pp. 83-86; 2002.
Notes: Document no.: 975-483-560-8
This citation is provided courtesy of CAB International/CABI Publishing.

278. **Conservation tillage for carbon sequestration.**
Lal, R and Kimble, J M
Nutrient Cycling in Agroecosystems 49 (1-3): 243-253. (1997)
NAL Call #: S631 .F422;
ISSN: 1385-1314
Descriptors: carbon/ agriculture/ agroecosystems/ biobusiness/ burning/ carbon/ conservation tillage/ nutrient cycling/ sequestration/ soil science
Abstract: World soils represent the largest terrestrial pool of organic carbon (C), about 1550 Pg compared with about 700 Pg in the atmosphere and 600 Pg in land biota. Agricultural activities (e.g., deforestation, burning, plowing, intensive grazing) contribute considerably to the atmospheric pool. Expansion of agriculture may have contributed substantially to the atmospheric carbon pool. However, the exact magnitude of carbon fluxes from soil to the atmosphere and from land biota to the soil are not known. An important objective of the sustainable management of soil resources is to increase soil organic carbon (SOC) pool by increasing passive or non-labile fraction. Soil surface management, soil water conservation and management, and soil fertility regulation are all important aspects of carbon sequestration in soil. Conservation tillage, a generic term implying all tillage methods that reduce runoff and soil erosion in comparison with plow-based tillage, is known to increase SOC content of the surface layer. Principal mechanisms of carbon sequestration with conservation tillage are increase in micro-aggregation and deep placement of SOC in the sub-soil horizons. Other useful agricultural practices associated with conservation tillage are those that increase biomass production (e.g., soil fertility enhancement, improved crops and species, cover crops and fallowing, improved pastures and deep-rooted crops). It is also relevant to adopt soil and crop management systems that accentuate humification and increase the passive fraction of SOC. Because of the importance of C sequestration, soil quality should be evaluated in terms of its SOC content.
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279. **Conservation tillage for vegetable production.**
Hoyt, G. D.; Monks, D. W.; and Monaco, T. J.
HortTechnology 4 (2): 129-135. (1994)
NAL Call #: SB317.5.H68
This citation is provided courtesy of CAB International/CABI Publishing.

280. **Conservation tillage in U.S. agriculture: Environmental, economic, and policy issues.**
Uri, Noel D.
New York: Food Products Press; xi, 130 p.: ill. (1999)
Notes: Includes bibliographical references (p. 111-123) and index.
NAL Call #: S604-.U75-1999;
ISBN: 1560228849
Descriptors: Conservation tillage---United States
This citation is from AGRICOLA.

281. **Conservation tillage systems and management: Crop residue management with no-till, ridge-till, mulch-till, and strip-till.**
Midwest Plan Service
Ames, IA: Midwest Plan Service. (2000)
Notes: Second edition; Inlcudes bibliographical references and index. "MWPS-45"
NAL Call #: S604 .C675 2000
Descriptors: conservation tillage/ soil erosion/ water erosion/ wind erosion/ crop residues/ costs and returns/ soil compaction/ water quality/ crop management/ nutrient management/ weed control/ disease and pest management/ pesticide application
Abstract: This publication is a resource for those interested in learning about the major benefits of conservation tillage, which include soil erosion management, water conservation, improved soil tilth, lower input costs, and labor efficiency. This edition contains 29 chapters with sections devoted to growing with conservation tillage, tillage system definitions, crop residue and irrigation water management, and water quality. Other chapters discuss residue management at harvest, estimating residue cover, crop response to tillage systems, costs and returns, soil compaction, controlled traffic, and converting CRP to crop production. More than 60 university and industry specialists including agricultural and biological engineers, extension wildlife specialists, conservationists, entomologists, plant pathologists, weed and soil scientists, and agronomists contributed to the publication.
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282. **Conservation-tillage systems for cotton: A review of research and demonstration results from across the cotton belt.**
McClelland, M. R.; Valco, T. D.; and Frans, R. E.
In: Special Report - Agricultural Experiment Station, Division of Agriculture, University of Arkansas, No. 160/ McClelland, M. R.; Valco, T. D.; and Frans, R. E., 1993. 121 p.
Notes:
ISSN: 0571-0189
This citation is provided courtesy of CAB International/CABI Publishing.

283. **Constructed wetlands and wastewater management for confined animal feeding operations.**
Gulf of Mexico Program (U.S.) and Nutrient Enrichment Committee
Gainesville, Fla.: CH2MHILL; 23 p.: ill. (1997)
Notes: Cover title. [Author:] "Gulf of Mexico Program, Nutrient Enrichment Issue Committee"--P. [4] of cover. Funded by U.S. Environmental Protection Agency, Gulf of Mexico Program.
NAL Call #: TD756.5.C662--1997
Descriptors: Constructed wetlands---North America/ Feedlot runoff---North America/ Agricultural pollution---North America
This citation is from AGRICOLA.

284. **Constructed wetlands for animal waste treatment: A manual on performance, design, and operation with case histories.**
CH2M Hill, Inc.; Payne Engineering; Gulf of Mexico Program (U.S.); Nutrient Enrichment Committee; Alabama Soil and Water Conservation Committee; and National Council of the Paper Industry for Air and Stream Improvement (U.S.).
Washington, D.C.: U.S. Environmental Protection Agency, Gulf of Mexico Program. (1997)
Notes: "Prepared for the Gulf of Mexico Program Nutrient Enrichment Committee, under a contract to the Alabama Soil and Water Conservation

Committee (ASWCC) and National Council of the Pulp and Paper Industry for Air and Stream Improvement (NCASI)." "June 1997." Includes bibliographical references.
NAL Call #: TD930.2-.C64-1997
Descriptors: Animal waste---Management/ Constructed wetlands/ Mexico, Gulf of---Nutrients
This citation is from AGRICOLA.

285. **Constructed wetlands for livestock wastewater management: Literature review, database, and research synthesis.**
Gulf of Mexico Program (U.S.); Nutrient Enrichment Committee; CH2MHILL (Firm); and Payne Engineering (Firm)
Washington, D.C.: U.S. Environmental Protection Agency; 1 v. (various pagings): ill. (1997)
Notes: "Prepared under contract to National Council of the Paper Industry for Air and Stream improvement (NCASI) and Alabama Soil and Water Conservation Committee." "January 1997." Includes bibliographical references.
NAL Call #: TD930.2.C65--1997
Descriptors: Animal waste---Management/ Constructed wetlands
This citation is from AGRICOLA.

286. **Constructed wetlands for pollution control: Processes, performance, design and operation.**
International Water Association. IWA Specialist Group on Use of Macrophytes in Water Pollution Control.
London: IWA Pub.; xii, 156 p.: ill.; Series: Scientific and technical report (International Water Association) no. 8. (2000)
Notes: Includes bibliographical references (p. 141-149) and index.
NAL Call #: TD756.5-.C76-2000
Descriptors: Constructed wetlands/ Sewage---Purification---Biological treatment
This citation is from AGRICOLA.

287. **Constructed Wetlands for Wastewater Treatment.**
Sundaravadivel, M. and Vigneswaran, S.
Critical Reviews in Environmental Science and Technology 31 (4): 351-409. (2001)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: Reviews/ Pollutant removal/ Wastewater treatment/ Wetlands/ Technology/ Tropical environments/ Developing countries/ Biodegradation/ Biodegradation/ Tropical regions/ Water Pollution Treatment/ Artificial Wetlands/ Sewage & wastewater treatment/ Sewage/ Water quality control/ Water & Wastewater Treatment
Abstract: In the field of wastewater treatment, energy-intensive and highly mechanized technologies are giving way to nature-based technologies that utilize solar energy and living organisms. Constructed treatment wetland (CTW) technology has played an important role in bringing about the change. Wetland technology can provide cheap and effective wastewater treatment in both temperate and tropical climates, and are suitable for adoption in both industrialized as well as developing nations. Currently, CTWs are being utilized for removal of a range of pollutants and a broad variety of wastewaters worldwide. The objective of this article is to provide a comprehensive review of the CTW technology and to present the pollutant removal performance experiences gathered through the application of this technology around the world.
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288. **Constructed wetlands for wastewater treatment and wildlife habitat: 17 case studies.**
United States. Environmental Protection Agency.
Washington, DC: U.S. Environmental Protection Agency; iv, 174 p.: ill. (some col.), maps. (1993)
Notes: Cover title. Shipping list no.: 95-0161-P. "September 1993." "EPA832-R-93-005." Includes bibliographical references (p. 8-10). SUDOCS: EP 1.2:W 53/7.
NAL Call #: TD756.5.C65--1993
Descriptors: Constructed wetlands---United States---Case studies/ Sewage---Purification---Biological treatment---United States---Case studies/ Habitat---Ecology---Modification---United States---Case studies
This citation is from AGRICOLA.

289. **Constructed wetlands for wastewater treatment in cold climates.**
Mander, U. and Jenssen, P. D.
Southampton, UK; Boston: WIT Press; 325 p.: ill., map; Series: Advances in ecological sciences 1369-8273 (11). (2003)
NAL Call #: QH540-.I67-v.-11;
ISBN: 1853126519
Descriptors: Constructed wetlands---Cold weather conditions/ Sewage---Purification---Biological treatment/ Sewage---Purification---Cold weather conditions
This citation is from AGRICOLA.

290. **Constructed wetlands for water quality improvement.**
Moshiri, Gerald A.
Boca Raton: Lewis Publishers; 632 p.: ill., maps. (1993)
Notes: Papers presented at the Pensacola conference. Includes bibliographical references and index.
NAL Call #: TD756.5.M67--1993;
ISBN: 0873715500 (acid-free paper)
Descriptors: Constructed wetlands---Congresses/ Water quality management---Congresses/ Constructed wetlands---Case studies---Congresses
This citation is from AGRICOLA.

291. **Constructed wetlands in the sustainable landscape.**
Campbell, Craig S. and Ogden, Michael
New York: Wiley; xiv, 270 p.: ill., maps. (1999)
Notes: Includes bibliographical references (p. 259-264) and index; Contents note: The concept of sustainable development; The nature of wetland processes / Craig Campbell -- Constructed wetlands and wastewater treatment design; Design, operation, and maintenance of constructed wetlands / Michael Ogden -- Stormwater renovation with constructed wetlands; Single-family residential systems; The pond; Wildlife considerations and management; Art, engineering, and the landscape; Examples of multiple-use constructed wetlands / Craig Campbell.
NAL Call #: TD756.5-.C35-1999;
ISBN: 0471107204 (paper)
Descriptors: Constructed wetlands---Design and construction/ Landscape architecture
This citation is from AGRICOLA.

292. **Constructed Wetlands to Treat Wastewater From Dairy and Swine Operations: A Review.**
Cronk, J. K.
Agriculture, Ecosystems and Environment 58 (2-3): 97-114. (July 1996)

NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: dairy industry/ wetlands/ wastewater treatment/ waste management/ barn wastewater/ eutrophication/ design standards/ cost analysis/ maintenance/ artificial wetlands/ dairies/ constructed wetlands/ dairy industry/ artificial wetlands/ Wastewater treatment processes/ Pollution control/ Sewage & wastewater treatment
Abstract: Animal wastewater can be a major contributor to the cultural eutrophication of surface waters. Constructed wetlands are under study as a best management practice to treat animal wastewater from dairy and swine operations. Preliminary results are promising when wetlands are a component of a farm-wide waste management plan, but they are ineffective without pretreatment of the wastewater. The feasibility of constructed wetlands varies with waste characteristics and climate. While the cost of wetland construction is low, the site must be maintained in order for the initial investment in the wetland to be worthwhile. In addition, several design iterations may be necessary before effective treatment is obtained. The design of animal wastewater treatment wetlands is still being researched and a number of the present projects will help provide recommendations for the use of constructed wetlands at animal operations.
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293. **Constructing wetlands in the Intermountain West: Guidelines for land resource managers.**
Olson, Richard Arnold.
Laramie, Wyo.: University of Wyoming; Series: B (Laramie, Wyo.) 1078. (1999)
Notes: Title from title page of source document. Includes bibliographical references.
NAL Call #: 100-W99-1-no.-1078
http://www.uwyo.edu/ces/PUBS/B-1078.pdf
Descriptors: Constructed wetlands---West---United States/ Constructed wetlands---Rocky Mountains
This citation is from AGRICOLA.

294. **Control of gaseous emissions from livestock buildings and manure stores.**
Hartung J and Phillips VR
Journal of Agricultural Engineering Research 57 (3): 173-189; 85 ref. (1994)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

295. **Control of Water Pollution from Agriculture.**
Ongley, E. D.
Food and Agriculture Organization of the United Nations [Also available as: FAO Irrigation and Drainage Paper 55; ISBN 92-5-103875-9], 1996 (application/pdf)
ftp://ftp.fao.org/agl/aglw/docs/idp55e.pdf
Descriptors: water pollution/ water quality/ water resources/ agricultural land/ sustainable agriculture/ sustainable development/ nonpoint source pollution/ agricultural runoff/ irrigation/ fertilizers/ pesticides/ nutrient enrichment/ nitrate nitrogen/ sedimentation/ precipitation/ sediment yield/ erosion control/ environmental models/ environmental monitoring

296. **Controlled drainage: Effects on subsurface runoff and nitrogen flows.**
Wesstrom, Ingrid.
Uppsala: Swedish University of Agricultural Sciences; 1 v. (various pagings): ill.; Series: Acta Universitatis Agriculturae Sueciae. Agraria 1401-6249 (350). (2002)
Notes: Thesis (doctoral)--Swedish University of Agricultural Sciences, 2002. Includes bibliographical references.
NAL Call #: S419-.A28-no.-350;
ISBN: 9157661618
Descriptors: Subirrigation---Sweden/ Drainage---Environmental aspects---Sweden/ Soils---Nitrogen content---Sweden
This citation is from AGRICOLA.

297. **Cooling of manure in manure culverts: A method of reducing ammonia emissions in pig buildings.**
Andersson, Mats.
Lund: Swedish University of Agricultural Sciences, Dept. of Agricultural, Biosystems and Technology; 40 p.: ill.; Series: Specialmeddelande 218. (1995)
Notes: "SLU-JBT-SPM--218--SE." Includes bibliographical references (p. 35-36).
NAL Call #: TH4911.A1U6--no.218
This citation is from AGRICOLA.

298. **Correlating microbes to major odorous compounds in swine manure.**
Zhu, J. and Jacobson, L. D.
Journal of Environmental Quality 28 (3): 737-744. (May 1999-June 1999)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Descriptors: pig manure/ odor emission/ bacteria/ literature reviews
Abstract: Malodor generation from swine manure is complicated by the involvement of many bacterial species that produce an extensive array of volatile organic compounds (VOCs). A lack of understanding of the basic manure microbiology further complicates the problem. This review covers pertinent detailed information about the indigenous bacterial genera in swine manure and their potential for producing odorous volatile compounds. It addresses not only the odorous compounds in swine manure but also the relations between bacterial species and the related compounds. It appears that volatile fatty acids may be the major odorous compounds in swine manure, and two bacterial genera, Eubacterium and Clostridium, are most likely the major contributors to these odorous acids. More research is needed to identify the bacterial species within these two genera to better understand the kinetics of malodor production by the bacteria.
This citation is from AGRICOLA.

299. **Costs associated with development and implementation of comprehensive nutrient management plans: Nutrient management, land treatment, manure and wastewater handling and storage, and recordkeeping.**
United States. Natural Resources Conservation Service.
Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service. (2003)
Notes: Part 1; Title from web page viewed Sept. 30, 2003. "June 2003" Includes bibliographical references.
NAL Call #: aTD930.2-.C67-2003
http://www.nrcs.usda.gov/technical/land/pubs/cnmp1.html

Descriptors: Animal waste---Economic aspects---United States/ Animal feeding---Economic aspects---United States/ Agricultural pollution---Economic aspects---United States
This citation is from AGRICOLA.

300. **Cover crop effects on soil water relationships.**
Unger, P. W. and Vigil, M. F.
Journal of Soil and Water Conservation 53 (3): 200-207. (1998)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

301. **Cover crop impacts on watershed hydrology.**
Dabney, S. M.
Journal of Soil and Water Conservation 53 (3): 207-213. (1998)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Paper presented at the conference on "Cover Crops, Soil Quality and Ecosystems" held March 12-14, 1997, Sacramento, California. Includes references.
Descriptors: cover crops/ catchment hydrology/ relationships/ evaporation/ runoff/ infiltration/ evapotranspiration/ soil water/ storage/ erosion control/ tillage/ no-tillage/ experimental plots/ watersheds/ soil structure/ subsurface layers/ porosity/ reviews
This citation is from AGRICOLA.

302. **Cover crops and rotations.**
Reeves, D. W.
In: Crops residue management. Boca Raton, Fla.: Lewis Publishers, 1994; pp. 125-172.
ISBN: 1566700035
NAL Call #: S627.C76C76-1994
Descriptors: cover crops/ rotations/ plant disease control/ pest control/ crop yield/ weed control/ erosion control/ soil physical properties/ rooting depth/ soil water/ nutrients/ nitrogen content/ nitrogen fertilizers/ literature reviews
This citation is from AGRICOLA.

303. **The cow as a geomorphic agent: A critical review.**
Trimble, S. W. and Mendel, A. C.
Geomorphology 13 (1/4): 233-253. (1996); *ISSN:* 0169-555X
This citation is provided courtesy of CAB International/CABI Publishing.

304. **Created and natural wetlands for controlling nonpoint source pollution.**
Olson, Richard K.; United States. Environmental Protection Agency. Office of Research and Development; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
Boca Raton, Fla.: C.K. Smoley; v, 216 p.: ill., maps. (1993)
Notes: "U.S. EPA, Office of Research and Development, and Office of Wetlands, Oceans, and Watersheds." Includes bibliographical references.
NAL Call #: TD223.C73-1993;
ISBN: 0873719433 (alk. paper)
Descriptors: Water quality management---United States/ Water---Pollution---United States/ Wetland conservation---United States/ Constructed wetlands---United States
This citation is from AGRICOLA.

305. **Creating freshwater wetlands.**
Hammer, Donald A.
Boca Raton, Fla.: CRC Lewis Publishers; 406 p., 8 p. of plates: ill. (some col.). (1997)
Notes: 2nd ed.; Includes bibliographical references (p. 343-353) and index.
NAL Call #: QH87.3.H36--1997;
ISBN: 1566700485 (alk. paper)
Descriptors: Wetlands/ Restoration ecology
This citation is from AGRICOLA.

306. **Creative solutions to the animal waste problem.**
Zilberman, D.; Metcalfe, M.; and Ogishi, A.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001. *NAL Call #:* TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

307. **A critical assessment of the sensitivity concept in geomorphology.**
Brunsden, Denys
Catena 42 (2-4): 99-123. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: erosion pattern/ geomorphology/ landform change/ landscape sensitivity/ shock absorption capacity/ spatial change/ temporal change
Abstract: The landscape sensitivity concept concerns the likelihood that a given change in the controls of a system or the forces applied to the system will produce a sensible, recognisable, and persistent response. The idea is an essential element of the fundamental proposition of landscape stability. This is described as a function of the spatial and temporal distributions of the resisting and disturbing forces and is known as the factor of safety or the stability index. The resistance of a system is defined by the system specifications: its structure, strength properties, transmission linkages, coupling efficiency, shock absorption capacity, complexity and resilience. The disturbing forces include the steady application of energy from the specified tectonic, climatic, biotic, marine and human environmental controls. Change takes place through time and space as a normal process-response function to these specifications and involves material transport, morphological evolution and structural rearrangement. These, in turn, progressively change the system specifications, which alters the performance through time. To make progress with these issues, the nature of waves of aggression, temporal adjustments to disturbing forces, spatial interactions with structure, divergent pathways of change propagation, evolution of 'barriers to change,' effects of inheritance, decoupling, and the effects of change on system specifications all need to be understood at all temporal and spatial scales.
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308. **A critical review of the aerial and ground surveys of breeding waterfowl in North America.**
Smith, Graham W. and United States. National Biological Service.
Washington, D.C.: U.S. Dept. of the Interior, National Biological Service; iii, 252 p.: ill. (1995)
Notes: "July 1995." Includes bibliographical references (p. 26).
NAL Call #: QH301.B5656--no.5
Descriptors: Waterfowl---North America---Breeding
This citation is from AGRICOLA.

309. **Crop allelopathy and its role in ecological agriculture.**
Batish, D. R.; Singh, H. P.; Kohli, R. K.; and Kaur, S.
Journal of Crop Production 4 (2): 121-161. (2001)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Allelopathy in Agroecosystems / edited by R.K. Kohli, H.P. Singh, and D.R. Batish. Includes references.
Descriptors: crops/ allelopathy/ allelopathins/ plant ecology/ ecosystems/ agriculture/ interactions/ growth/ plant development/ crop yield/ phytotoxicity/ phytotoxins/ continuous cropping/ no-tillage/ pollen/ decomposition/ crop residues/ cultivars/ weed control/ pest management/ integrated pest management/ green manures/ sustainability/ literature reviews
This citation is from AGRICOLA.

310. **Crop cultivars with allelopathic capability.**
Wu, H.; Pratley, J.; Lemerle, D.; and Haig, T.
Weed Research 39 (3): 171-180. (June 1999)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: crops/ cultivars/ allelopathy/ plant breeding/ weed control/ biological control/ integrated pest management/ allelochemicals/ growth/ inhibition/ genotypes/ artificial selection/ literature reviews
This citation is from AGRICOLA.

311. **Crop management for soil carbon sequestration.**
Jarecki, M. K. and Lal, R.
Critical Reviews in Plant Sciences 22 (6): 471-502. (2003)
NAL Call #: QK1.C83;
ISSN: 0735-2689.
Notes: Number of References: 220; Publisher: CRC Press Llc
Descriptors: Plant Sciences/ Animal & Plant Science/ crop rotation/ greenhouse effect/ global C cycle/ ley farming/ soil fertility/ precision farming/ organic matter turnover/ winter cover crops/ no-tillage corn/ nitrogen fertilization/ aggregate stability/ microbial biomass/ chemical properties/ agroforestry systems/ physical properties/ residue management
Abstract: Reducing emissions of greenhouse gases (GHG) from agriculture is related to increasing and protecting soil organic matter (SOM) concentration. Agricultural soils can be a significant sink for atmospheric carbon (C) through increase of the SOM concentration. The natural ecosystems such as forests or prairies, where C gains are in equilibrium with losses, lose a large fraction of the antecedent C pool upon conversion to agricultural ecosystems. Adoption of recommended management practices (RMPs) can enhance the soil organic carbon (SOC) pool to fill the large C sink capacity on the world's agricultural soils. This article collates, reviews, and synthesizes the available information on SOC sequestration by RMPs, with specific references to crop rotations and tillage practices, cover crops, ley farming and agroforestry, use of manure and biosolids, N fertilization, and precision farming and irrigation. There is a strong interaction among RMPs with regards to their effect on SOC concentration and soil quality. The new equilibrium SOC level may be achieved over 25 to 50 years. While RMPs are being adapted in developed economies, there is an urgent need to encourage their adoption in developing countries. In addition to enhancing SOC concentration, adoption of RMPs also increases agronomic yield. Thus, key to enhancing soil quality and achieving food security lies in managing agricultural ecosystems using ecological principles which lead to enhancement of SOC pool and sustainable management of soil and water resources.
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312. **Crop residue management to reduce erosion and improve soil quality: Appalachia and northeast.**
Blevins, R. L.; Moldenhauer, W. C.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; Series: Conservation research report no. 41; v, 97 p.: ill. (1995)
Notes: Distributed by Conservation Technology Information Center (West Lafayette, IN); "August 1995." One folded col. map in pocket. Includes bibliographical references.
NAL Call #: A279.9--Ag8-no.41
Descriptors: Crop residue management---Appalachian Region/ Crop residue management---Northeastern States/ Conservation tillage---Appalachian Region/ Conservation tillage---Northeastern States
This citation is from AGRICOLA.

313. **Crop residue management to reduce erosion and improve soil quality: North central.**
Moldenhauer, W. C.; Mielke, L. N.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 97 p.: ill.; Series: Conservation research report no. 42. (1995)
Notes: "November 1995." One folded col. map in pocket. Includes bibliographical references; Distributed by Conservation Technology Information Center,
West Lafayette, IN
NAL Call #: A279.9--Ag8-no.42
Descriptors: Crop residue management---Middle West/ Conservation tillage---Middle West
This citation is from AGRICOLA.

314. **Crop residue management to reduce erosion and improve soil quality: Northern Great Plains.**
Moldenhauer, W. C.; Black, A. L.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 84 p.: ill.; Series: Conservation research report no. 38. (1994)
Notes: "September 1994." One folded col. map in pocket. Includes bibliographical references.
NAL Call #: A279.9--Ag8-no.38
Descriptors: Crop residue management---Great Plains/ Conservation tillage---Great Plains
This citation is from AGRICOLA.

315. **Crop residue management to reduce erosion and improve soil quality: Northwest.**
Papendick, Robert I.; Moldenhauer, W. C.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; iv, 64 p.: ill.; Series: Conservation research report no. 40. (1995)
Notes: "May 1995." One folded col. map in pocket. Includes bibliographical references.
NAL Call #: A279.9--Ag8-no.40

Descriptors: Crop residue management---Northwestern States/ Conservation tillage---Northwestern States
This citation is from AGRICOLA.

316. **Crop residue management to reduce erosion and improve soil quality: Southeast.**
Langdale, G. W.; Moldenhauer, W. C.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 53 p.: ill.; Series: Conservation research report no. 39. (1995)
Notes: "January 1995"--Cover. One folded col. map in pocket. Includes bibliographical references.
NAL Call #: A279.9--Ag8-no.39
Descriptors: Crop residue management---Southern States/ Conservation tillage---Southern States
This citation is from AGRICOLA.

317. **Crop residue management to reduce erosion and improve soil quality: Southern Great Plains.**
Stewart, B. A.; Moldenhauer, W. C.; and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; vi, 70 p.: ill.; Series: Conservation research report no. 37. (1994)
Notes: "September 1994." One folded col. map in pocket. Includes bibliographical references.
NAL Call #: A279.9--Ag8-no.37
Descriptors: Crop residue management---Great Plains/ Conservation tillage---Great Plains
This citation is from AGRICOLA.

318. **Crop residues reduce soil erosion.**
McGregor, K. C.; Cullum, R. F.; and Mutchler, C. K.
In: ASAE/CSAE-SCGR Annual International Meeting. (Held 18 Jul 1999-21 Jul 1999 at Toronto, Ontario, Canada.)
St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); pp. 15 pp.; 1999.
Notes: ASAE Paper No. 992045
This citation is provided courtesy of CAB International/CABI Publishing.

319. **Cropland reclamation.**
Dunker, R. E. and Barnhisel, R. I.
In: Reclamation of drastically disturbed lands/ Barnhisel, R. I.; Darmody, R. G.; and Daniels, W. L.
Urbana, Illinois: University of Illinois, 2000; pp. 323-369.
ISBN: 0-89118-146-6;
Chapter 13 in monograph.
This citation is provided courtesy of CAB International/CABI Publishing.

320. **Crops and Drops: Making the Best Use of Water for Agriculture.**
Food and Agriculture Organization, Land and Water Development Division.
Food and Agriculture Organization of the United Nations, 2000 (application/pdf)
ftp://ftp.fao.org/docrep/fao/005/y3918e/y3918e00.pdf
Descriptors: water resources/ hydrologic cycle/ water use/ agricultural land/ irrigation/ food production/ food biosecurity/ food supply/ water pollution/ drought/ floods/ sustainable development/ precipitation/ arid lands/ cropping systems/ crop management/ agricultural policy/ water management/ water conservation

321. **Cryptosporidium and public health: From watershed to water glass.**
Gradus, M. S.
Clinical Microbiology Newsletter 22 (4): 25-32. (2000);
ISSN: 0196-4399
This citation is provided courtesy of CAB International/CABI Publishing.

322. **Cryptosporidium Contamination of Water in the USA and UK: A Mini-Review.**
Lisle, J. T. and Rose, J. B.
Aqua: Journal of Water Services Research and Technology 44 (3): 103-117. (1995)
NAL Call #: TD201.A72;
ISSN: 0003-7214
Descriptors: USA/ drinking water/ public health/ water treatment/ water quality control/ bacteria/ pathogens/ disinfection/ resistance/ parasites/ parasitic diseases/ human diseases/ disease transmission/ hazard assessment/ water supply/ microbial contamination/ water purification/ United States/ British Isles/ Cryptosporidium/ Cryptosporidium/ Sources and fate of pollution/ Public health/ medicines/ dangerous organisms/ water pollution/ water quality/ Freshwater pollution
Abstract: During the past 10 years the protozoan parasite Cryptosporidium has been recognised as a public health threat in drinking waters. Recently, the largest outbreak to date occurred in Milwaukee, Wisconsin, USA. Over 1.5 million consumers were exposed to this intestinal pathogen, of which 403 000 became ill. Many of those who were immunocompromised died. The probability of an outbreak of cryptosporidiosis occurring in drinking water systems, relative to that of bacterial and viral pathogens, is increased due to the resistant nature of oocysts to concentrations of disinfectants routinely used in drinking-water treatment. Surveys of surface and drinking waters in the USA and UK have shown Cryptosporidium oocysts to be present in polluted, pristine and drinking waters at concentrations that may put the consumer at risk of infection, based upon current risk assessment models. This mini-review is an attempt to present the most recent literature concerning Cryptosporidium in regard to outbreaks, occurrence, monitoring and detection, and regulatory implications.
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323. **Cumulative impact analysis of wetlands using hydrologic indices: Final report.**
Nestler, John M.; Long, Katherine S.; and United States. Army. Corps of Engineers. Wetlands Research Program (U.S.).
Vicksburg, MS: U.S. Army Corps of Engineers, Waterways Experiment Station; 19, 17 p.: ill., map; Series: Wetlands Research Program technical report WRP-SM-3. (1994)
Notes: At head of title: Wetlands Research Program. "Prepared for U.S. Army Corps of Engineers." "September 1994." Includes bibliographical references (p. 17-19).
NAL Call #: QH541.5.M3N47--1994
Descriptors: Wetlands---Environmental aspects/ Hydrology---White River---Ark and Mo/ Stream measurements---Illinois---Cache River
This citation is from AGRICOLA.

324. **Cumulative Impacts to Wetlands.**
Johnston, C. A.
Wetlands 14 (1): 49-55. (1994)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: wetlands/ United States/ environmental impact/ forest industry/ agriculture/ literature reviews/ geographic information systems/ environmental effects/ forestry/ geographic information systems/ cumulative impact analysis/ Mechanical and natural changes/ Freshwater pollution/ Effects on water of human nonwater activities/ Environmental degradation
Abstract: "Cumulative impact," the incremental effect of an impact added to other past, present, and reasonably foreseeable future impacts, was reviewed as it pertains to southern forested wetlands. In the U.S., the largest losses of forested wetlands between the 1970s and 1980s occurred in southeastern states that had the most bottomland hardwood to begin with: Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina. These losses were due primarily to forestry and agriculture. Other sources of cumulative impact include decrease in average area of individual wetlands, shift in proportion of wetland types, change in spatial configuration of wetlands, and loss of cumulative wetland function at the landscape scale. For two wetland-related functions, flood flow and loading of suspended solids, watersheds that contained less than 10% wetlands were more sensitive to incremental loss of wetland area than were watersheds with more than 10% wetlands. The relative position of wetlands within a drainage network also influenced their cumulative function. Geographic Information Systems (GIS) are becoming an important tool for evaluating cumulative impacts and their effects.
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325. **Current pest management systems for pecan.**
Reid, W.
HortTechnology 12 (4): 633-639. (Oct. 2002-Dec. 2002)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: carya illinoinensis/ integrated pest management/ orchards/ evaluation/ crop management/ seedlings/ low input agriculture/ cultivars/ intensive farming/ ecology/ monitoring/ populations/ plant pests/ biological control agents / pesticides/ natural enemies/ geographical variation/ literature reviews
Abstract: Pecans (Carya illinoinensis) are produced under a wide array of environmental conditions-from the warm humid southeastern states, to the continental climate of the central plains, to the arid climates of the American west. In addition, pecan cultural systems vary from the low-input management of native stands of seedling trees to the intensive management of single-cultivar pecan orchards. This wide diversity of pecan agroecosystems has fostered the development of innovative, site-specific approaches toward pecan pest management. Current pecan pest management programs require an intimate knowledge of orchard ecology. Growers use monitoring methods and prediction models to track pest populations. Biological control agents are conserved by habitat manipulation and/or augmented through inoculative releases. Selective pesticides are used to control target pests while conserving natural enemies. Four pecan cultural systems are described in detail to illustrate how ecological principles are applied to widely diverse pecan agroecosystems.
This citation is from AGRICOLA.

326. **Current strategies in nitrite detection and their application to field analysis.**
Dutt, J. and Davis, J.
Journal of Environmental Monitoring 4 (3): 465-471. (2002);
ISSN: 1464-0325
This citation is provided courtesy of CAB International/CABI Publishing.

327. **Current United States Department of Agriculture, Agricultural Research Service research on understanding agrochemical fate and transport to prevent and mitigate adverse environmental impacts.**
Hapeman, C. J.; McConnell, L. L.; Rice, C. P.; Sadeghi, A. M.; Schmidt, W. F.; McCarty, G. W.; Starr, J. L.; Rice, P. J.; Angier, J. T.; and Harman-Fetcho, J. A.
Pest Management Science 59 (6-7): 681-690. (June 2003-July 2003)
NAL Call #: SB951 .P47;
ISSN: 1526-498X.
Notes: Number of References: 88
Descriptors: Entomology/ Pest Control/ pesticide/ herbicide/ BMPs/ environmental fate/ air quality/ water quality/ sorption/ current use pesticides/ dissolved organic carbon/ methyl bromide emission/ management model: REMM/ plain riparian system/ Nevada mountain range/ silt loam soil/ Chesapeake Bay/ water quality/ metolachlor conformations
Abstract: Environmentally and economically viable agriculture requires a variety of cultivation practices and pest management options as no one system will be appropriate for every situation. Agrochemicals are some of the many pest control tools used in an integrated approach to pest management. They are applied with the intent of maximizing efficacy while minimizing off-site movement; however, their judicious use demands a practical knowledge of their fate and effects in agricultural and natural ecosystems. Agrochemical distribution into environmental compartments is influenced by the physical and chemical properties of the agrochemical and environmental conditions, ie soil type and structure, and meteorological conditions. Agricultural Research Service (ARS) researchers working in the area of agrochemical fate have focused on accurately describing those processes that govern the transport, degradation and bioavailability of these chemicals under conditions reflecting actual agronomic practices. Results from ARS research concerning the environmental fate and effects of agrochemicals have led to the development of science-based management practices that will protect vulnerable areas of the ecosystem. The new challenge is to identify these vulnerable areas and the temporal and spatial variations prior to use of the chemical by predicting how it will behave in environmental matrices, and using that information, predict its transport and transformation within an air- or watershed. With the development of better predictive tools and GIS (Geographic Information System)-based modeling, the risks of agricultural management systems can be assessed at the watershed and basin levels, and management strategies can be identified that

minimize negative environmental impacts.

328. **Dairy farming in the Netherlands in transition towards more efficient nutrient use.**
Bruchem, Jaap van; Schiere, Hans; and Keulen, Herman van
Livestock Production Science 61 (2-3): 145-153. (1999)
NAL Call #: SF1.L5;
ISSN: 0301-6226
Descriptors: nitrogen: nutrient/ phosphorus: nutrient/ farm nutrient flow: systems approach/ livestock system sustainability/ nutrient emissions/ nutrient use efficiency: animal conversion, soil uptake
Abstract: In the Netherlands, agriculture as a whole is not environmentally sustainable. It contributes to the emission of greenhouse gases (apprx15%), acid rain (apprx50%) and groundwater pollution (apprx85%). The surplus of phosphate, averaged over the area of cultivated land amounting to apprx40 kg P ha-1, originates apprx30 and apprx40% from dairy farming and pigs, respectively. Nitrogen surpluses, amounting to apprx350 kg ha-1, contribute to ammonia, N2O and NOx volatilization and nitrate leaching, levels that exceed present and future standards. Dairy farming contributes apprx55% of the nitrogen losses. Despite their genetic potential and advanced diet formulation, the efficiency with which animals convert nutrients into animal products remains rather low. A major part of the nutrients is excreted in faeces and urine. Hence, there is an urgent need for more sustainable nutrient management at higher hierarchical levels for production systems in which the inputs are tuned to the carrying capacity of the agro- ecosystem and the internal nutrients in animal manure, e.g. N and P, are used more efficiently. The paper discusses the effectiveness of management practices to reduce the nutrient losses, along with aspects of system behaviour. Nutrient flows of dairy farms are analysed and the most effective interventions identified to (1) maintain level of production while (2) reducing the nutrient losses to environmentally acceptable levels. Finally, results/projections of prototype experimental farms are discussed.

329. **Dairying and the environment.**
Meyer D
Journal of Dairy Science 83 (7): 1419-1427. (2000)
NAL Call #: 44.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

330. **Databases and simulation modelling in compaction and erosion studies.**
Canarache, A. and Simota, C.
Advances in Geoecology (35): 495-506. (2002);
ISSN: 0722-0723,
ISBN: 3-923381-48-4
This citation is provided courtesy of CAB International/CABI Publishing.

331. **DDT Residues in the Environment: A Review With a New Zealand Perspective.**
Boul, H. L.
New Zealand Journal of Agricultural Research 38 (2): 257-277. (1995);
ISSN: 0028-8233
Descriptors: DDT/ pesticide residues/ fate of pollutants/ soil contamination/ New Zealand/ pollutant persistence/ Sources and fate of pollution/ Land pollution
Abstract: The source, form, and fate of DDT residues in the environment are reviewed. Discussion is primarily from a New Zealand perspective, where a major use of DDT was the control of soil-dwelling pasture pests. Reasons for the persistence of DDT residues, the association between residues and soil components, and possible degradative and non-degradative losses from soils are discussed.

332. **Deactivation of the biological activity of paraquat in the soil environment: A review of long-term environmental fate.**
Roberts, Terry R; Dyson, Jeremy S; and Lane, Michael C G
Journal of agricultural and food chemistry 50 (13): 3623-3631. (2002)
NAL Call #: 381 J8223;
ISSN: 0021-8561
Descriptors: paraquat: adsorption, biodegradation, deactivation, herbicide, long term environmental fate/ soil microorganism (Microorganisms) / Microorganisms/ soil environment
Abstract: During the many years of paraquat usage, wide ranges of investigations of its environmental impact have been conducted. Much of this information has been published, but key, long-term field studies have not previously been presented and assessed. The purpose of this review is to bring together and appraise this information. Due to the nature of paraquat residues in soils, the major part (some 99.99%) of a paraquat application that reaches the soil within the typical Good Agricultural Practice (GAP) is strongly adsorbed to soils of a wide variety of textures. This is in equilibrium with an extremely low concentration in soil solution. However, the paraquat in soil solution is intrinsically biodegradable, being rapidly and completely mineralized by soil microorganisms. The deactivation of the biological activity of paraquat in soils, due to sorption, has been investigated thoroughly and systematically. It is recognized that the determination of total soil residues by severe extraction procedures provides no insight into the amount of paraquat biologically available in soil. Consequently, the key assay developed for this purpose, namely, the strong adsorption capacity-wheat bioassay (SAC-WB) method, has proved to be valuable for determination of the adsorption capacity relevant to paraquat for any particular soil. This method has been validated in the field with a series of long-term (>10 years) trials in different regions of the world. These trials have also shown that, following repeated applications of very high levels of paraquat in the field, residues not only reach a plateau but also subsequently decline. This demonstrates that the known biodegradation of paraquat in soil pore water plays an important role in field dissipation. The biological effects of paraquat in the field have been assessed under unrealistically high treatment regimes. These trials have demonstrated that the continued use of paraquat under GAP conditions will have no detrimental effects on either crops or soil-dwelling flora and fauna. Any such effects can occur only under extreme use conditions (above the SAC-WB), which do not arise in normal agricultural practice.

333. **Declining woody vegetation in riparian ecosystems of the western United States.**
Obedzinski, R. A.; Shaw, C. G.; and Neary, D. G.
Western Journal of Applied Forestry 16 (4): 169-181. (Oct. 2001)
NAL Call #: SD388.W6;
ISSN: 0885-6095
Descriptors: riparian vegetation/ woody plants/ ecosystems/ sustainability/ forest health/ forest decline/ introduced species/ invasion/ stress/ mortality/ insect pests/ plant diseases/ drought/ forest fires/ climatic change/ castor/ water availability/ groundwater extraction/ dams/ logging/ forest recreation/ grazing/ urbanization/ literature reviews/ United States
Abstract: Riparian ecosystems serve critical ecological functions in western landscapes. The woody plant components in many of these keystone systems are in serious decline. Among the causes are invasion by exotic species, stress-induced mortality, increases in insect and disease attack, drought, beaver, fire, climatic changes, and various anthropogenic activities. The latter include agricultural development, groundwater depletion, dam construction, water diversion, gravel mining, timber harvesting, recreation, urbanization, and grazing. This article examines the factors implicated in the decline and discusses the importance of interactions among these factors in causing decline. It also clarifies issues that need to be addressed in order to restore and maintain sustainable riparian ecosystems in the western United States, including the function of vegetation, silvics of the woody plant species involved, hydrologic condition, riparian zone structure, and landscape features, geomorphology, and management objectives.
This citation is from AGRICOLA.

334. **Defining reference conditions for restoration of riparian plant communities: Examples from California, USA.**
Harris, Richard R
Environmental Management 24 (1): 55-63. (1999)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: plants (Plantae)/ Plants/ community composition/ floodplain landforms/ restoration cost estimation/ riparian plant communities/ stream reaches
Abstract: Currently, there is an emphasis on restoration of riparian vegetation in the western United States. Deciding on what and where to restore requires an understanding of relationships between riparian plant communities and their environments along with establishment of targets, or reference conditions, for restoration. Several methods, including off-site data and historical analysis have been used for establishing restoration reference conditions. In this paper, criteria are proposed for interpreting reference community composition and structure from the results of multivariate cluster analysis. The approach is illustrated with data from streams in the California Sierra Nevada, Central Valley, and southern coastal region to derive descriptions of reference communities for stream reaches and floodplain landforms. Cluster analysis results can be used to quantify the areas of both degraded and reference communities within a flood-plain, thereby facilitating restoration cost estimation.
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335. **The Degradation of Organophosphorus Pesticides in Natural Waters: A Critical Review.**
Pehkonen, S. O. and Zhang, Q.
Critical Reviews in Environmental Science and Technology 32 (1): 17-72. (2002)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: Organophosphorus compounds/ Agrochemicals/ Pesticides/ Reviews/ Pollutant persistence/ Environmental impact/ Public health/ United States/ Organophosphorus Pesticides/ Degradation/ Water Pollution Effects/ Water Quality Control/ Pesticides (Organophosphorus) / Water pollution control/ Public health/ Environmental protection agencies/ Decomposition/ United States/ Freshwater pollution/ Pesticides/ Sources and fate of pollution / Water Quality
Abstract: Organophosphorus pesticides (OPs) have been widely used throughout the world since the decline in the use of organochlorine pesticides in the 1960s and 1970s. They are less persistent in the environment when compared with organochlorine pesticides and thus pose less long-term health risks to nontarget aquatic organisms and humans. However, in recent years several governmental agencies, including the USEPA, have started to reconsider the wide use of organophosphorus pesticides due to concern about their effects on the central nervous systems of humans, children in particular. This review discusses the fate of organophosphorus pesticides in the aquatic environment via processes such as adsorption, hydrolysis, oxidation, and photochemical degradation. Furthermore, the breakdown products of OPs are discussed, as new research has indicated that the products of degradation can be very harmful as well and because relatively little research has been carried out on comprehensive product identification. Recommended future research areas are highlighted.
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336. **Degradation of pesticides by actinomycetes.**
De Schrijver, Adinda and De Mot, Rene
Critical Reviews in Microbiology 25 (2): 85-119. (1999)
NAL Call #: QR1.C7;
ISSN: 1040-841X
Descriptors: pesticides: biotransformations, degradation/ xenobiotics: biotransformations, degradation/ actinomycetes (Actinomycetes and Related Organisms)/ bacteria (Bacteria)/ Bacteria/ Eubacteria/ Microorganisms/ biodegradation/ bioremediation/ cometabolism
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337. **Degradation of Pesticides in Subsurface Soils, Unsaturated Zone: A Review of Methods and Results.**
Fomsgaard, I. S.
International Journal of Environmental Analytical Chemistry 58 (1-4): 231-245. (1995);
ISSN: 0306-7319.
Notes: Conference: 4. Workshop on Chemistry and Fate of Modern Pesticides, Prague (Czech Rep.), 8-10 Sep 1993; Source: Proceedings of the 4th International Workshop on Chemistry and Fate of Modern Pesticides; Issue editors: Barcelo, D./Hajslova, J./Nielen, M.
Descriptors: water pollution sources/ fate of pollutants/ pesticides/ soil contamination/ groundwater pollution/ degradation/ aeration zone/ subsoil/

groundwater contamination/ Sources and fate of pollution/ Network design/ Land pollution
Abstract: Methods and results from degradation studies in subsoils, unsaturated zone, were reviewed for mecoprop, 2,4-D, atrazine, alachlor, aldicarb, carbofuran, linuron, oxamyl, methomyl, MCPA, dichlorprop, monochlorprop, dichlorphenol, TCA, parathion, metribuzin, metolachlor and fenamiphos. Most of the investigations were laboratory studies where small soil samples were sieved and pesticides were added in concentrations from 0.5-5 mu g/g. A few of the studies mentioned the importance of working with undisturbed samples; another few studies used isotope-labelled pesticides which made it possible to work with concentrations as low as 0.02 mu g/g. Subsoil samples were characterized according to factors as microbial activity, soil temperature, water content, oxygen content, concentration of pesticide, pretreatment of the soil and soil type, factors considered to have influence on degradation of pesticides. Chemical hydrolysis was considered to be the most dominant pathway in the degradation of aldicarb in subsoil in one of the published papers; all other investigations considered the degradation of pesticides in subsoil to be primarily microbiological. Only a few of the investigations measured the biomass or biological activity of the subsoil samples.

338. **Denitrification activity in soils amended with poultry litter.**
Johnson, William F.
Fayetteville, Arkansas: University of Arkansas, 1995.
Notes: "August 1995" Thesis (Ph. D.)
NAL Call #: ArU S592.6.N5J64-1995
Descriptors: Soils---Nitrogen content/ Poultry---Manure/ Denitrification/ Nitrous oxide
This citation is from AGRICOLA.

339. **Denitrification in Coastal Ecosystems: Methods, Environmental Controls, and Ecosystem Level Controls, a Review.**
Cornwell, J. C.; Kemp, W. M.; and Kana, T. M.
Aquatic Ecology 1: 41-54. (1999); *ISSN:* 1386-2588.
Notes: Special Issue: Coastal Eutrophication; Publisher: Kluwer Academic Publishers; DOI: 10.1023/A:1009921414151
Descriptors: Eutrophication/ Pollution effects/ Zoobenthos/ Analytical techniques/ Dissolved oxygen/ Aquatic plants/ Sediment chemistry/ Biogeochemical cycle/ Estuarine chemistry/ Coastal waters/ Literature reviews/ Denitrification/ Estuaries/ Measuring techniques/ Reviews/ United States, Chesapeake Bay/ Ecosystems/ Literature Review/ Sediments/ Aquatic Habitats/ Coastal zone/ Nitrogen/ Nutrient loading/ Biogeochemistry/ Marine environment / ANW, USA, Chesapeake Bay/ Ecosystems and energetics/ Mechanical and natural changes/ Pollution Environment/ Methodology general/ Sources and fate of pollution / Marine Pollution/ Brackish water
Abstract: In this review of sediment denitrification in estuaries and coastal ecosystems, we examine current denitrification measurement methodologies and the dominant biogeochemical controls on denitrification rates in coastal sediments. Integrated estimates of denitrification in coastal ecosystems are confounded by methodological difficulties, a lack of systematic understanding of the effects of changing environmental conditions, and inadequate attention to spatial and temporal variability to provide both seasonal and annual rates. Recent improvements in measurement techniques involving super(15)N techniques and direct N sub(2) concentration changes appear to provide realistic rates of sediment denitrification. Controlling factors in coastal systems include concentrations of water column NO super(-) sub(3), overall rates of sediment carbon metabolism, overlying water oxygen concentrations, the depth of oxygen penetration, and the presence/absence of aquatic vegetation and macrofauna. In systems experiencing environmental change, either degradation or improvement, the importance of denititication can change. With the eutrophication of the Chesapeake Bay, the overall rates of denitrification relative to N loading terms have decreased, with factors such as loss of benthic habitat via anoxia and loss of submerged aquatic vegetation driving such effects.

340. **Desert grassland and shrubland ecosystems.**
Loftin, S. R.; Aguilar, R.; Chung MacCoubrey, A. L.; and Robbie, W. A.
In: Ecology, diversity, and sustainability of the Middle Rio Grande Basin; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 1995. pp. 80-94.
NAL Call #: aSD11.A42-no.268
Descriptors: grasslands/ shrubs/ ecosystems/ deserts/ geographical distribution/ rangelands/ livestock/ overgrazing/ plant succession/ sustainability/ erosion/ pollution/ water quality/ surface water/ water resources/ geology/ climate/ soil/ hydrology/ plant communities/ vegetation/ wildlife/ land management/ fires/ fire ecology/ literature reviews/ New Mexico
This citation is from AGRICOLA.

341. **Design and development of environmental indicators with reference to Canadian agriculture.**
McRae, T.; Hillary, N.; MacGregor, R. J.; and Smith, C. A.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems / Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City.)
Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 118-139; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: biological indicators/ agriculture/ indicator species/ agricultural land/ ecosystems/ environmental assessment/ natural resources/ spatial variation/ monitoring/ climatic zones/ simulation models/ prediction/ erosion/ resource management/ tillage/ soil degradation/ erosion control/ air pollution/ carbon dioxide/ efficiency/ literature reviews/ Canada
This citation is from AGRICOLA.

342. **Design and estimation for investigating the dynamics of natural resources.**
Nusser, S. M.; Breidt, F. J.; and Fuller, W. A.
Ecological Applications 8 (2): 234-245. (May 1998)
NAL Call #: QH540.E23; *ISSN:* 1051-0761

Descriptors: Resource management/ Resource evaluation/ Sampling/ Land use/ Environmental monitoring/ United States/ temporal variations/ Methodology general/ Management
Abstract: Federal agencies, policy makers, and scientists have long been interested in monitoring natural resources and environmental conditions on a national and regional scale. One of the main objectives of these studies is to estimate temporal changes in the extent and condition of natural resources. In its simplest form, temporal change can be defined as the difference between population parameter values at two time points for a given population. A more complex investigation of change in an ecological system involves studying the underlying dynamics that produce an observed net change. We discuss the general problem of sample design and statistical estimation to support investigations of the dynamics of change in ecological systems, particularly when a limited number of temporal observations are available. We focus on large-scale natural resource monitoring surveys through the example provided by the National Resources Inventory (NRI), a longitudinal survey conducted by the U.S. Department of Agriculture (USDA). Sample design, data collection, and statistical methods for constructing an accessible database are outlined, with emphasis on features that support investigations concerned with temporal dynamics. An example from the 1992 NRI is presented to illustrate methods for investigating temporal changes in land use in relation to observed changes in erosion rates over time. Finally, we discuss how statistical methods developed for the NRI program can be applied more broadly to environmental monitoring studies.

343. **Design and implementation of rapid assessment approaches for water resource monitoring using benthic macroinvertebrates.**
Resh, V. H.; Norris, R. H.; and Barbour, M. T.
Australian Journal of Ecology 20 (1): 108-121. (1995)
NAL Call #: QH540.A8;
ISSN: 0307-692X
This citation is provided courtesy of CAB International/CABI Publishing.

344. **Design Considerations for Increased Sedimentation in Small Wetlands Treating Agricultural Runoff.**
Braskerud, B. C.
Water Science and Technology 45 (9): 77-85. (2002)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: 5. International Conference on Diffuse Pollution, Milwaukee [USA], 10-15 Jun 2001; Source: Diffuse/Non-Point Pollution and Waterhsed Management;
ISBN: 1843394154
Descriptors: Norway/ Water Pollution Control/ Nonpoint Pollution Sources/ Artificial Wetlands/ Agricultural Runoff/ Sedimentation/ Optimization/ Design Criteria/ Water Depth/ Vegetation/ Data Collections/ Reviews/ Pollution (Nonpoint sources)/ Wetlands/ Runoff (Agricultural)/ Design data/ Norway/ Water quality control/ Water Quality/ Water Pollution: Monitoring, Control & Remediation
Abstract: Some suggestions to increase the sedimentation of non-point source pollution in small surface flow wetlands are presented. The recommendations are based on results from seven Norwegian constructed wetlands (CWs) after 3-7 years of investigation, and a literature review. The wetlands were located in first and second order streams. Surface areas were 265-900 m super(2), corresponding to 0.03-0.4% of the watershed. Each CW had a volume proportional composite sampler in the inlet and outlet, in addition to sedimentation plates. The mean annual retention of soil particles, organic particles and phosphorus was 45-75%, 43-67% and 20-44%, respectively. Results showed that erosion and transportation processes in arable watersheds influenced the retention. Sedimentation was the most important retention process, and increased with runoff, because the input of larger aggregates increased. Retention of nitrogen did not follow the same pattern, and was only 3-15%. Making CWs shallow (0-0.5 m) can optimize sedimentation. The hydraulic efficiency can be increased by aquatic vegetation, large stones in the inlet, baffles and water-permeable, low dams. Vegetation makes it possible to utilize the positive effect of a short particle settling distance, by hindering resuspension of sediments under storm runoff conditions. As a result, the phosphorus retention in shallow CWs was twice that of deeper ponds.

345. **Design for stream restoration.**
Shields, F. D.; Copeland, R. R.; Klingeman, P. C.; Doyle, M. W.; and Simon, A.
Journal of Hydraulic Engineering (ASCE) 129 (8): 575-584. (2003)
NAL Call #: 290.9 Am3PS (Hy);
ISSN: 0733-9429
Descriptors: Civil Engineering/ stream improvement/ design/ restoration/ gravel bed rivers/ discharge/ channels/ management/ adjustment/ stability/ geometry/ sediment/ project/ motion
Abstract: Stream restoration, or more properly rehabilitation, is the return of a degraded stream ecosystem to a close approximation of its remaining natural potential. Many types of practices (dam removal, levee breaching, modified flow control, vegetative methods for streambank erosion control, etc.) are useful, but this paper focuses on channel reconstruction. A tension exists between restoring natural fluvial processes and ensuring stability of the completed project. Sedimentation analyses are a key aspect of design since many projects fail due to erosion or sedimentation. Existing design approaches range from relatively simple ones based on stream classification and regional hydraulic geometry relations to more complex two- and three-dimensional numerical models. Herein an intermediate approach featuring application of hydraulic engineering tools for assessment of watershed geomorphology, channel-forming discharge analysis, and hydraulic analysis in the form of one-dimensional flow and sediment transport computations is described.

346. **Detection and enumeration of coliforms in drinking water: Current methods and emerging approaches.**
Rompre, Annie; Servais, Pierre; Baudart, Julia; de Roubin, Marie; and Laurent, Patrick
Journal of Microbiological Methods 49 (1): 31-54. (2002)
NAL Call #: QR65.J68;
ISSN: 0167-7012

Abstract: The coliform group has been used extensively as an indicator of water quality and has historically led to the public health protection concept. The aim of this review is to examine methods currently in use or which can be proposed for the monitoring of coliforms in drinking water. Actually, the need for more rapid, sensitive and specific tests is essential in the water industry. Routine and widely accepted techniques are discussed, as are methods which have emerged from recent research developments. Approved traditional methods for coliform detection include the multiple-tube fermentation (MTF) technique and the membrane filter (MF) technique using different specific media and incubation conditions. These methods have limitations, however, such as duration of incubation, antagonistic organism interference, lack of specificity and poor detection of slow-growing or viable but non-culturable (VBNC) microorganisms. Nowadays, the simple and inexpensive membrane filter technique is the most widely used method for routine enumeration of coliforms in drinking water. The detection of coliforms based on specific enzymatic activity has improved the sensitivity of these methods. The enzymes beta-D galactosidase and beta-D glucuronidase are widely used for the detection and enumeration of total coliforms and Escherichia coli, respectively. Many chromogenic and fluorogenic substrates exist for the specific detection of these enzymatic activities, and various commercial tests based on these substrates are available. Numerous comparisons have shown these tests may be a suitable alternative to the classical techniques. They are, however, more expensive, and the incubation time, even though reduced, remains too long for same-day results. More sophisticated analytical tools such as solid phase cytometry can be employed to decrease the time needed for the detection of bacterial enzymatic activities, with a low detection threshold. Detection of coliforms by molecular methods is also proposed, as these methods allow for very specific and rapid detection without the need for a cultivation step. Three molecular-based methods are evaluated here: the immunological, polymerase chain reaction (PCR) and in-situ hybridization (ISH) techniques. In the immunological approach, various antibodies against coliform bacteria have been produced, but the application of this technique often showed low antibody specificity. PCR can be used to detect coliform bacteria by means of signal amplification: DNA sequence coding for the lacZ gene (beta-galactosidase gene) and the uidA gene (beta-D glucuronidase gene) has been used to detect total coliforms and E. coli, respectively. However, quantification with PCR is still lacking in precision and necessitates extensive laboratory work. The FISH technique involves the use of oligonucleotide probes to detect complementary sequences inside specific cells. Oligonucleotide probes designed specifically for regions of the 16S RNA molecules of Enterobacteriaceae can be used for microbiological quality control of drinking water samples. FISH should be an interesting viable alternative to the conventional culture methods for the detection of coliforms in drinking water, as it provides quantitative data in a fairly short period of time (6 to 8 h), but still requires research effort. This review shows that even though many innovative bacterial detection methods have been developed, few have the potential for becoming a standardized method for the detection of coliforms in drinking water samples.
This citation is from AGRICOLA.

347. **Detection and occurrence of indicator organisms and pathogens.**
Baker, K. H.
Water Environment Research 67 (4): 406-410. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ bioindicators/ bacteria/ Protozoa/ viruses/ pathogens/ drinking water/ wastewater/ analytical methods/ microbiological analysis/ pollution detection/ pollutant identification/ pollution indicators/ indicator species/ analytical techniques/ wastewater/ water pollution/ protozoa/ Identification of pollutants/ Freshwater pollution/ water pollution/ water quality/ Methods and instruments
Abstract: This review covers the detection and occurrence of bacterial, protozoan and viral indicator organisms and pathogens in drinking water and wastewater. In view of the continued emergence of infections carried by water-borne routes, opportunistic pathogens and non-traditional indicators are included also.
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348. **Detection and occurrence of indicator organisms and pathogens.**
Baker, Katherine H and
Bovard, Debrah S
Water Environment Research 68 (4): 406-416. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: biosolids/ indicator organism/ pollution control/ water pollution/ water quality/ invertebrate (Invertebrata Unspecified)/ microorganism (Microorganisms Unspecified)/ protozoa (Protozoa Unspecified)/ viruses (Viruses General)/ Invertebrata (Invertebrata Unspecified)/ animals/ invertebrates/ microorganisms/ protozoans
© Thomson

349. **Detection and occurrence of indicator organisms and pathogens.**
Baker, K. H. and Hegarty, J. P.
Water Environment Research 69 (4): 403-415. (June 1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ pathogens/ pollutant identification/ monitoring/ bioindicators/ analytical methods/ risk/ water sampling/ microorganisms/ reviews/ indicator species/ pollution monitoring/ risk assessment/ Escherichia coli/ literature reviews/ pollution indicators/ pollution detection/ microbial contamination/ public health/ Escherichia coli/ Identification of pollutants/ Environmental/ Freshwater pollution/ Public health/ medicines/ dangerous organisms
Abstract: Geldrich (1996) reviewed the detection and occurrence of pathogenic organisms, including bacteria, enteric viruses, protozoa, and parasitic worms, in freshwater supplies. He summarized an enormous amount of data on the sources of these organisms, their occurrence, and their detection in water supplies. Because routine monitoring for pathogens is often unrealistic, Geldrich argued that the use of indicator organisms, specifically coliforms and fecal coliforms, should be the mainstay of

routine monitoring programs. He suggested that the lack of correlation between these organisms and pathogens such as protozoa and viruses may be a reflection of the vast difference in sample sizes used for the analysis (100 mL for coliforms versus greater than 1 L for viruses and protozoa) and recommended that the standard sample size for analysis of indicator organisms should be increased. Finally, Geldrich presented several case studies of waterborne disease outbreaks with a complete discussion of not only the source of the pathogenic organisms but also the measures that were successful in controlling the outbreaks. Gale (1996), in a review of microbial risk assessment, also addressed the difficulties in comparing densities of indicator organisms from samples of different volumes. As he noted, current information on the occurrence of pathogens in drinking water supplies is only available for sample volumes significantly larger that the amount ingested daily by any individual, and little information is available on how organisms are dispersed within these large volumes. This makes the estimation of risk to the individual consumer difficult, if not impossible, to determine. Dufour (1996) and Edberg (1996) reviewed water and wastewater microbiology. Both emphasized the importance of enzymatic and molecular techniques in the detection and enumeration of indicator bacteria. Busse et al. (1996) reviewed the techniques available for the identification of bacteria. In addition to the traditional biochemical and physiological tests, they discussed more recent chemotaxonomic approaches such as analysis of quinone system, fatty acid profiles, polar lipid patterns, polyamine patterns, whole cell sugars, and peptidoglycan diamino acids; analytical fingerprinting and cellular protein patterning; and nucleic acid techniques such as 16S rDNA (deoxyribonucleic acid) sequencing, restriction fragment length polymorphism (RFLP), macrorestriction analysis, and random amplified polymorphic DNA (RAPD).

350. **Detection and occurrence of indicator organisms and pathogens.**
Baker, Katherine H
Water Environment Research 70 (4): 405-418. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: bacteria (Bacteria): pollution indicator/ coliforms (Enterobacteriaceae): pollution indicator/ protozoa (Protozoa): pollution indicator/ viruses (Viruses): pollution indicator/ Animals/ Bacteria/ Eubacteria/ Invertebrates/ Microorganisms/ Protozoans/ Viruses/ groundwater/ microbial contamination/ pathogens/ recreational water/ water contamination/ water quality

351. **Detection and Occurrence of Waterborne Bacterial and Viral Pathogens.**
Black, E. K. and Finch, G. R.
Water Environment Research 65 (6): 295-299. (1993)
NAL Call #: TD419.R47
Descriptors: Literature review/ Pathogenic bacteria/ Pathogens/ Pollutant identification/ Reviews/ Viruses/ Waterborne diseases/ AIDS/ Aeromonas/ Coliforms/ Cryptosporidium/ Drinking water/ Enteric bacteria/ Escherichia coli/ Giardia/ Groundwater/ Immunoassay/ Mycobacterium/ Protozoa/ Public health/ Salmonella/ Surface water/ Wastewater/ Identification of pollutants/ Sources and fate of pollution
Abstract: The occurrence and detection of waterborne pathogens in drinking water, surface water, groundwater, and wastewater is important to world health as shown by numerous epidemics that have caused disease in humans. The most frequently reported bacteria in drinking water, surface water, groundwater, and wastewater were Escherichia coli, followed by the coliform group. Surveys have shown seasonal variation in bacterial pathogens in surface waters and correlations between total coliforms and other pathogenic bacteria. Surveys of river water and recreational water showed that virus levels varied throughout the year. The infectivity of viruses from lawns irrigated with wastewater was examined using an animal model. Fewer piglets exposed for 2 hr to lawns irrigated with 40,000 50% cell-culture infectious dose (CCID50) virus particles became positive than piglets inoculated with 100 CCID50 virus particles. The survival of human immunodeficiency viruses in wastewater was less than that of polio viruses. The survival of the protozoan Cryptosporidium parvum was robust in all water types examined. Viable but non-culturable organisms present a problem when detecting organisms in water. Pre-enrichment and selective enrichment of samples, as well as the newer technologies of gene probes and immunoassays, improve the detection of injured and stressed organisms. Developments in gene probe and immunoassay technologies are making these detection methods more accessible to routine water analysis laboratories. Immunoassays can detect toxins produced by organisms or the organisms themselves, however, viability determination of the detected cells is not reliable. A new technology that shows promise is the combined use of conductance and immunology. Beads coated with the antigen for a specific pathogen are exposed to the organism. After a short incubation, the beads are separated, washed, and re-suspended in broth. The change in conductance of the broth is measured, and the resulting curve is specific for the organism. Characteristic substances produced by Mycobacterium species have been detected by gas chromatography-mass spectrometry. (Geiger-PTT) 35 001232021

352. **Detection of endocrine-disrupting pesticides by enzyme-linked immunosorbent assay (ELISA): Application to atrazine.**
Gascon, Jordi; Oubina, Anna; and Barcelo, Damia
Trends in Analytical Chemistry 16 (10): 554-562. (1997)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: atrazine: endocrine disrupting pesticide
Abstract: An overview of biological and toxicological effects of relevant endocrine-disrupting compounds is given. Special attention is paid to the determination of atrazine, a relevant pesticide that is considered an endocrine disrupter, by ELISA.

353. **Determination of odour emission rates from cattle feedlots: A review.**
Smith, R. J. and Watts, P. J.
Journal of Agricultural Engineering Research 57 (3): 145-155. (Mar. 1994)
NAL Call #: 58.8-J82;
ISSN: 0021-8634 [JAERA2].
Notes: Subtitle: [Part] I.
Descriptors: cattle/ feedlots/ odor emission/ odor abatement/ measurement/ wind tunnels/ models/ air pollution
This citation is from AGRICOLA.

354. **Determining the 'health' of estuaries: Priorities for ecological research.**
Fairweather, Peter G
Australian Journal of Ecology 24 (4): 441-451. (1999)
NAL Call #: QH540.A8;
ISSN: 0307-692X
Descriptors: algae (Algae)/ shipworm (Oligochaeta)/ Algae/ Animals/ Annelids/ Invertebrates/ Microorganisms / Nonvascular Plants/ Plants/ ecosystem health / environmental assessment/ mangrove leaf decomposition/ predator prey interactions/ soft sediment habitat
Abstract: 'Ecosystem health' is a relatively new concept for environmental science and management. Although at least two international journals use the term in their titles, there have been few applications of it for estuaries and soft-sediment habitats around the world. In this paper I: (i) introduce the ideas behind ecosystem health, and assess their relation with other usage such as 'integrity' or 'quality'; (ii) sketch the sorts of multidisciplinary studies that could contribute to an assessment of health of an estuary and how these must be approached in developing useful indicators; and (iii) make a case for including measurements of the rates of ecological processes in such an assessment. These rate measurements, termed 'ecoassays', focus on important processes such as decomposition, recruitment, predator-prey interactions, and the like. A case study is introduced wherein these processes were assessed in mangrove stands of estuaries around Sydney, New South Wales, by explicitly comparing the rates of herbivory and decomposition of mangrove leaves, attack of fallen wood by shipworms, and colonization of pneumatophores by algae, as well as with more traditional estimates of 'standing stocks'. Not surprisingly, the different measures retrieved various patterns and the challenge now is to integrate these into a scheme that indicates something of value. The potential utility of such measures is discussed in relation to the various scientific and managerial requirements of environmental monitoring.
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355. **Developing an invertebrate index of biological integrity for wetlands.**
Helgen, Judy.; United States. Environmental Protection Agency. Office of Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
In: Methods for evaluating wetland condition; Washington, D.C: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Original title: Developing an invertebrate index of biological integrity for wetlands (#9); Title from web page. "March 2002." "EPA-822-R-02-019." Description based on content viewed April 10, 2003. "Prepared jointly by U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)" Includes bibliographical references.
NAL Call #: QH541.5.M3-H46-2002
http://www.epa.gov/waterscience/criteria/wetlands/9Invertebrate.pdf
Descriptors: Wetlands---United States/ Aquatic invertebrates---Environmental aspects---United States
This citation is from AGRICOLA.

356. **Developing indicators for monitoring catchment health: The challenges.**
Reuter, D. J.
Australian Journal of Experimental Agriculture 38 (7): 637-648. (1998)
NAL Call #: 23-Au792;
ISSN: 0816-1089.
Notes: In the special issue: Moving towards precision with soil and plant analysis. Proceedings of the Second National Conference and Workshops of the Australian Soil and Plant Analysis Council, November 23-26, 1997, Launceston, Tasmania. Includes references.
Descriptors: watersheds/ watershed management/ indicators/ soil analysis/ plant analysis/ monitoring/ sustainability/ literature reviews/ Australia/ catchment health indicators/ ecosystem health
This citation is from AGRICOLA.

357. **Developing metrics and indexes of biological integrity.**
Teels, Billy M.; Adamus, Paul R.; United States. Environmental Protection Agency. Office of Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Science and Technology and Office of Wetlands, Oceans and Watersheds, 2002.
Notes: Original title: Developing metrics and indexes of biological integrity (#6); Title from web page. "March 2002." "EPA-822-R-02-016." Description based on content viewed April 10, 2003. Includes bibliographic references.
NAL Call #: QH541.15.E22-T44-2002
http://www.epa.gov/waterscience/criteria/wetlands/6Metrics.pdf
Descriptors: Ecological assessment---United States/ Ecological integrity---United States/ Wetlands---United States
This citation is from AGRICOLA.

358. **Development of alternative weed management strategies.**
Buhler, D. D.
Journal of Production Agriculture 9 (4): 501-505. (1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
This citation is provided courtesy of CAB International/CABI Publishing.

359. **Development of composting technology in animal waste treatment: Review.**
Haga K
Asian Australasian Journal of Animal Sciences 12 (4): 604-606; 3 ref. (1999)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

360. **Development of environmentally superior technologies: Two-year progress report for technology determination per agreements between the Attorney General of North Carolina and Smithfield Foods, Premium Standards Farms and Frontline Farmers.**
Williams, C. M.
Raleigh, N.C.: North Carolina State University. (2002)
NAL Call #: TD930.2 .W56 2002
http://www.cals.ncsu.edu/agcomm/waste/report.pdf
Descriptors: Animal waste---North Carolina---Management/ Swine---Housing---Waste disposal---North Carolina/ Water quality management---North Carolina/ Livestock---Housing---Odor control---North Carolina/ Farm manure, Liquid---Odor control---North Carolina/ Feedlot runoff---North Carolina---Measurement/ Feedlots---Environmental aspects---North Carolina
This citation is from AGRICOLA.

361. **The development of improved willow clones for eastern North America.**
Kopp, R. F.; Smart, L. B.; Maynard, C. A.; Isebrands, J. G.; Tuskan, G. A.; and Abrahamson, L. P.
Forestry Chronicle 77 (2): 287-292. (Mar. 2001-Apr. 2001)
NAL Call #: 99.8-F7623;
ISSN: 0015-7546 [FRCRAX]
Descriptors: salix/ clones/ genetic improvement/ plant breeding/ biomass production/ bioremediation/ streams/ stream erosion/ erosion control/ germplasm/ DNA fingerprinting/ heterosis/ literature reviews/ United States
Abstract: Efforts aimed at genetic improvement of Salix are increasing in North America. Most of these are directed towards developing improved clones for biomass production, phytoremediation, nutrient filters, and stream bank stabilization in the Northeast and North-central United States. Native species are of primary interest, but a small number of clones containing non-native germplasm are also being used in the breeding program to provide valuable traits. Parent combinations for controlled crosses are being selected with the hope of maximizing the probability of producing clones exhibiting heterosis for traits of interest, such as rapid early growth, pest resistance, general adaptability, etc. The present strategy is to test as many parent clone combination as possible, and then repeat the most promising crosses to produce large families from which the best clones will be selected for further testing. Molecular fingerprinting technology will be applied to accelerate the rate of improvement. National and international cooperation would facilitate regional clone development and promotion of willow as a bioenergy crop.
This citation is from AGRICOLA.

362. **Development of new technologies for minimization of nutrient excretion losses and odours in swine manure.**
Grandhi, Raja R.; Saskatchewan. Agriculture Development Fund; and Canada. Agriculture and Agri Food Canada.
Saskatchewan: Agriculture Development Fund; 13, 10 p. (2000)
Notes: "March 2000"--Cover. "102-04506"--Mounted on label. Includes bibliographical references (p. 11-12). 97000322.
NAL Call #: SF396.5-.G722-2000
Descriptors: Swine---Feeding and feeds/ Swine---Manure---Environmental aspects
This citation is from AGRICOLA.

363. **Development of P-hyperaccumulator plant strategies to remediate soils with excess P concentrations.**
Novak, J. M. and Chan, A. S. K.
Critical Reviews in Plant Sciences 21 (5): 493-509. (2002)
NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3].
Notes: Special issue Phytoremediation I / edited by B.V. Conger. Includes references.
Descriptors: plants/ bioremediation/ phosphorus/ nutrient excesses/ soil pollution/ livestock/ intensive husbandry/ manures/ nutrient uptake/ roots/ plant morphology/ organic acids/ plant breeding/ genetic engineering/ plant composition/ nutrient content/ literature reviews
This citation is from AGRICOLA.

364. **Development of Phosphorus Indices for Nutrient Management Planning Strategies in the United States.**
Sharpley, A. N.; Weld, J. L.; Beegle, D. B.; Kleinman, P. J. A.; Gburek, W. J.; Moore, P. A.; and Mullins, G.
Journal of Soil and Water Conservation 58 (3): 137-151. (2003)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: freshwater/ eutrophication/ soil nutrients/ water pollution/ phosphorus/ nutrient management/ soil erosion/ soil management/ nonpoint source pollution/ water quality
© Cambridge Scientific Abstracts (CSA)

365. **Development of weed IPM: Levels of integration for weed management.**
Cardina, J.; Webster, T. M.; Herms, C. P.; and Regnier, E. E.
Journal of Crop Production 2 (1): 239-267. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler.
Includes references.
Descriptors: weeds/ weed control/ integrated pest management/ population dynamics/ adaptation/ sustainability/ spatial variation/ time/ information/ rotations/ herbicide resistant weeds/ decision making/ habitats/ agricultural policy/ cropping systems/ literature reviews/ integrated weed management
This citation is from AGRICOLA.

366. **Developments in aerial pesticide application methods for forestry.**
Payne, Nicholas J
Crop Protection 17 (2): 171-180. (1998)
NAL Call #: SB599.C8;
ISSN: 0261-2194
Descriptors: aerial pesticide/ forestry/ pesticide environmental impact/ spray dispersal modeling
Abstract: Appropriate application methods play an important role in the success of pesticide use, both in relation to ensuring good efficacy and also minimising environmental impact. Scientific and technological developments pertaining to aerial pesticide application in forestry are reviewed, including developments in the design and characterization of hydraulic and rotary pesticide dispersal systems, application parameter research, use of spray dispersal modelling, and mitigation of pesticide environmental impact, including the use of buffer zones.
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367. **Diagnosing causes of bird population declines.**
Green, R. E.
Ibis 137 (Supplement 1): S47-S55. (1995);
ISSN: 0963-0856.
Notes: Conference: British Ornithologists' Union Conference on Bird Conservation: The Science and the Action, Shuttleworth College, Bedford (UK), 6-10 Apr 1994
Descriptors: Aves/ population decline/ diagnosis/ methodology/ Methodology general/ Birds
Abstract: The value to bird conservation of determining the causes of population declines is considered and the diagnostic methods available are reviewed, with examples. Diagnosis of the cause or causes of a decline in bird numbers is likely to be helpful in deciding the priority of conservation actions, though actions which aim to reverse the changes in external conditions which caused the decline need not be the most effective in initiating recovery. The methods for diagnosing causes of declines in bird numbers with the widest application make use of comparisons between geographical areas or time periods with different trends. Correlations between trends in numbers and measurements of external factors are examined across areas or periods or both. The danger of spurious correlations is minimized by drawing up a list of plausible causes based on studies of the natural history of the species. The effects of all of these candidates should be examined, subject to availability of data. The consistency of observed changes over time, or differences among areas, in survival rate or breeding success with the postulated demographic mechanism of the decline should be examined. Conclusions based on correlations across geographical areas between trends in numbers and external factors may be misleading if birds are able to move between the areas selected for comparison and if their pattern of settlement depends upon external factors thought to be implicated in the decline. Manipulative experiments should be carried out to test conclusions drawn from correlative studies. However, it must be recognized that the capacity of birds to move between areas means that experiments may measure effects of manipulations on settlement patterns or distribution rather than population size. Experiments that appear well designed in terms of controls and replication may be misleading when applied to the conservation of bird populations if their geographical scale is inappropriate.

368. **Diatom indicators of stream and wetland stressors in a risk management framework.**
Stevenson, Jan R
Environmental Monitoring and Assessment 51 (1-2): 107-118. (1998)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: total phosphorus/ diatom (Chrysophyta): periphyton/ Algae/ Microorganisms/ Nonvascular Plants/ Plants/ biotic integrity/ ecological risk assessment/ periphytic assemblages/ risk management/ species composition/ specific pH/ water quality
Abstract: Ecological risk assessment and risk management call for "state-of-the-science" methods and sound scientific assessments of ecosystem health and stressor effects. In this paper recent developments of periphyton indicators of biotic integrity and ecosystem stressors of streams and wetlands are related in a framework of ecological metrics that can be used to quantify risk assessment and risk management options. Many periphyton metrics have been employed in past assessments of water quality and a periphyton indices of biotic integrity has been applied by the state of Kentucky. In addition, the sensitivity of species composition of periphytic diatom assemblages has been shown to respond predictably to ecological stressors so that specific pH, conductivity, and total phosphorus in wetlands and streams can be inferred with weighted average indices. Inference of nutrient conditions by diatom indicators of total phosphorus is shown to have sufficient precision to be a valuable complement to one-time measurement of highly variable total phosphorus in streams. Quantitative indices of sustainability and restorability of ecosystem integrity are proposed, respectively, as the changes in ecological conditions that can occur without significant change in ecological integrity or changes that are necessary to restore ecological integrity.

369. **Direct and indirect water re-use.**
Westerhoff, G. P.; Anderson, J.; Mancuso, P. C. S.; Rodrigues, J. M. C.; Filho, J. L.; Zachariou, M.; Rantala, P.; Bersillon, J. L.; Zanarek, A.; and Michail, M.
Water Supply 12 (1/2): IR9-1-IR9/29. (1994)
NAL Call #: TD201.W346;
ISSN: 0735-1917 [WASUDN].
Notes: Paper presented at the "19th International Water Supply Congress and Exhibition," October 2-8, 1993, Budapest, Hungary. Includes International Report and 13 National Reports. Includes references.
Descriptors: water reuse/ groundwater recharge/ irrigation water/ waste water/ Australia/ Brazil/ Cyprus/ Finland/ France/ Israel/ Italy/ Japan/ Netherlands/ Portugal/ Sweden/ UK/ United States
This citation is from AGRICOLA.

370. **Disinfection resistance of waterborne pathogens on the United States Environmental Protection Agency's Contaminant Candidate List (CCL).**
Gerba, Charles P; Nwachuku, Nena; and Riley, Kelley R
Journal of Water Supply Research and Technology (AQUA) 52 (2): 81-94. (2003);
ISSN: 1606-9935
Descriptors: Adenovirus (Adenoviridae): disinfection resistance, pathogen/ Aeromonas hydrophila (Aeromonadaceae): pathogen, waterborne/ Calicivirus (Caliciviridae): disinfection resistance, pathogen/ Coxsackievirus (Picornaviridae): disinfection resistance, pathogen/ Echovirus (Picornaviridae): disinfection resistance, pathogen/ Encephalitozoon intestinalis (Cnidosporidea): disinfection resistance, pathogen, waterborne/ Mycobacterium avium (Mycobacteriaceae): disinfection resistance, pathogen/ bacteria (Bacteria): pathogen, waterborne/ cyanobacteria (Cyanobacteria): pathogen, waterborne/ organism (Organisms): disinfection resistance, waterborne pathogen/ Animals/ Bacteria/ Cyanobacteria/ Double Stranded DNA Viruses/ Eubacteria/ Invertebrates/ Microorganisms/ Organisms/ Positive Sense Single Stranded RNA Viruses/ Protozoans/ Viruses/ Contaminant Candidate List [CCL]/ drinking water

Abstract: In 1999, the United States Environmental Protection Agency developed a list of emerging waterborne microbial pathogens that may pose a risk in drinking water. This review deals with the disinfection resistance of microorganisms on the Contaminate Candidate List or CCL. Current disinfection practices in the United States appear to be capable of dealing with most of the microorganisms on the CCL, with the exception of Mycobacterium avium and adenoviruses. Mycobacterium avium is more resistant to most disinfectants than other waterborne bacteria and adenoviruses are the most resistant waterborne microorganisms to inactivation by ultraviolet disinfection. The microsporidium, Encephalitozoon intestinalis, shows significant resistance to inactivation by chemical disinfectants and further research on additional species of microsporidia appears to be warranted.

371. **Dissolved and water-extractable organic matter in soils: A review on the influence of land use and management practices.**
Chantigny, M. H.
Geoderma 113 (3/4): 357-380. (2003)
NAL Call #: S590.G4;
ISSN: 0016-7061
This citation is provided courtesy of CAB International/CABI Publishing.

372. **Distinguishing Human From Animal Faecal Contamination in Water: A Review.**
Sinton, L. W.; Finlay, R. K.; and Hannah, D. J.
New Zealand Journal of Marine and Freshwater Research 32 (2): 323-348. (1998);
ISSN: 0028-8330
Descriptors: Pollution detection/ Domestic wastes/ Agricultural runoff/ Sewage/ Pollutant identification / Literature reviews/ Feces/ Contamination/ Water Pollution/ Animal Wastes/ Water Analysis/ Water Pollution Sources/ Fecal coliforms/ Humans/ Microbial contamination/ Statistical analysis/ Rhodococcus coprophilus/ Bacteroides fragilis/ Bifidobacterium/ New Zealand/ Bifidobacterium/ Bacteroides fragilis/ Rhodococcus coprophilus/ human wastes/ Methods and instruments/ Sources and fate of pollution/ Freshwater pollution
Abstract: Management of faecal contamination of water would be improved if sources could be accurately identified through water analysis. Human faeces are generally perceived as constituting a greater human health risk than animal faeces, but reliable epidemiological evidence is lacking. United States waterborne disease data suggest that human-specific enteric viruses account for over half the documented outbreaks. However, in New Zealand, where there is a high grazing animal:human ratio (increasing the relative importance of water-transmissible zoonoses), it seems prudent to assume that human and animal faecal pollution both constitute a risk to human health. Irrespective of the relative risks, the ability to identify sources would assist in overall management of microbial water quality. Faecal streptococci do not appear to provide reliable faecal source identification. Human and animal sources, respectively, may be distinguishable by two tests on Bifidobacterium spp. - growth at 45 degree C in trypticase phytone yeast broth and sorbitol fermentation. Different species of Bacteroides tend to be present in humans and animals, but poor survival in water is a problem. Phages of the Bacteroides fragilis strain HSP40 appear to be human specific, but low counts in effluent in some countries, including New Zealand, may limit their usefulness. Different F-RNA phage subgroups appear to be associated with human and animal faecal sources. The actinomycete Rhodococcus coprophilus has potential as a grazing animal indicator but it is persistent, and existing culturing techniques are time consuming. The development of DNA-based techniques, such as polymerase chain reaction (PCR), may assist in the assay of some microbial faecal source indicators. Various faecal sterol isomers offer the possibility of distinguishing between human and animal sources, and even between different animals. Washing powder constituents such as fluorescent whitening agents, sodium tripolyphosphate and linear alkyl benzenes, offer useful human source identifiers. It is unlikely that any single determinand will be useful in all situations, but statistical analysis of appropriate "baskets" of microbial and chemical determinands offers the possibility of identifying and apportioning human and animal faecal inputs to natural waters.

373. **Distribution of major herbicides in ground water of the United States.**
Barbash, J. E. and National Water Quality Assessment Program (U.S.).
Sacramento, Calif. U.S. Dept. of the Interior, U.S. Geological Survey, 1999. 57 p.
Notes: "National Water-Quality Assessment Program"--Cover.
NAL Call #: GB701-.W375-no.-98-4245
http://ca.water.usgs.gov/pnsp/rep/wrir984245/
Descriptors: Pesticides---Environmental aspects---United States/ Herbicides---Environmental aspects---United States/ Water---Pollution---United States
This citation is from AGRICOLA.

374. **Do created wetlands replace the wetlands that are destroyed?**
Hunt, Randall J. and Geological Survey (U.S.).
Madison, Wis.: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-246-96. (1998)
Notes: Title from caption. Includes bibliographical references.
NAL Call #: QH76.H86-1998
http://wi.water.usgs.gov/pubs/FS-246-96/index.html
Descriptors: Wetlands---United States/ Wetlands---Wisconsin/ Wetland conservation---United States/ Wetland conservation---Wisconsin/ Wetland ecology---United States/ Wetland ecology---Wisconsin
This citation is from AGRICOLA.

375. **Do organic farming practices reduce nitrate leaching.**
Kirchmann, H. and Bergstrom, L.
Communications in Soil Science and Plant Analysis 32 (7/8): 997-1028. (2001)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Special issue: Potential use of innovative nutrient management alternatives to increase nutrient use efficiency, reduce losses, and protect soil and water quality/edited by J. Delgado. Proceedings of the Annual Conference of the Soil and Water Conservation Society held Aug. 8-11, 1999, Biloxi, Mississippi.
Includes references.
Descriptors: organic farming/ nitrate nitrogen/ leaching/ rotations/ nitrogen

fertilizers/ animal manures/ soil fertility/ nutrient uptake/ farming/ nitrogen content/ crops/ literature reviews/ conventional farming
Abstract: Agriculture is a contributor of nitrate to natural waters and there is concern about the excess nitrogen burden loadings from agriculture on natural waters. Agricultural practices that reduce nitrate leaching from arable land are needed. It is postulated by certain groups that organic farming practices reduce nitrate leaching among other environmental benefits. The objectives of this paper are: (1) to compile, summarize and critically analyse information about NO3-N leaching from farming systems that were managed according to organic farming principles; (2) to compare NO3-N leaching from organic farming systems with that from conventional systems. This review consists of several parts. The available literature on leaching of NO3-N from organic farming and conventional farming systems was analysed. Leachable amounts of NO3-N in soils from two types of farming systems were compared. Finally NO3-N leaching from animal manure versus inorganic fertilizer was examined. In all studies we found in the literature, both the sequence and type of crops grown, and the input intensity of N was different in organic and conventional systems. Organic farming systems had on average a lower N input and more legumes in rotation. Average leaching of NO3-N from organic farming systems over a crop rotation period was somewhat lower than in conventional agriculture. If the different input intensities of N between organic and conventional systems were taken into account and corrected for, no differences in leaching losses between systems were found. However, a proper comparison of leaching between the two types of systems should take the yield into account. Attempting to do this in this review, we found only two studies which provided data for this. In both studies, specific conditions of the soil-a high organic matter content resulting in a high N mineralization at one site and a heavy clay texture resulting in very small leaching losses at the other site-did not enable us to come up with a clear-cut answer. Nevertheless, we could not find any evidence that nitrate leaching will be reduced by the introduction of organic farming practices, if the goal is to maintain the same crop yield levels as in conventional farming systems. Reduction of nitrate leaching is not a question of organic or conventional farming, but rather of introduction and use of appropriate counter- measures. This insight should guide our thinking when developing environmentally friendly and sustainable cropping systems.
This citation is from AGRICOLA.

376. **Do U.S. Environmental Protection Agency water quality guidelines for recreational waters prevent gastrointestinal illness? A systematic review and meta-analysis.**
Wade, T. J.; Pai, N.; Eisenberg, J. N. S.; and Colford, J. M. Jr.
Environmental Health Perspectives 111 (8): 1102-1109. (2003)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
This citation is provided courtesy of CAB International/CABI Publishing.

377. **Does low biodiversity resulting from modern agricultural practice affect crop pollination and yield.**
Richards, A. J.
Annals of Botany 88 (2): 165-172. (Aug. 2001)
NAL Call #: 450-An7;
ISSN: 0305-7364 [ANBOA4]
Descriptors: agriculture/ biodiversity/ pollination/ crop yield/ environmental impact/ foods/ crop quality/ intensive production/ habitat destruction/ pesticides/ transgenic plants/ genetic engineering/ herbicides/ literature reviews
Abstract: This Botanical Briefing examines the hypothesis that modern agricultural practice affects natural biotic pollination to the extent that crop yields suffer. Few staple foods depend on animal pollination and relatively few other crops are totally dependent on animal pollination. However, there are many crops of local economic importance whose yield or quality may be enhanced by good pollinator activity: studies of these deserve more attention. Amongst those cases already documented, intensification and habitat loss are the most frequent causes of pollinator impoverishment reducing crop yield. As yet there is no clear example of low crop yield resulting from the effect of pesticides or transgenic plants on pollinators, and only one example involving herbicides, although each of these agents can affect populations of crop pollinators.
This citation is from AGRICOLA.

378. **Drainage Design for Water Quality Management: Overview.**
Guitjens, J. C.; Ayars, J. E.; Grismer, M. E.; and Willardson, L. S.
Journal of Irrigation and Drainage Engineering 123 (3): 148-153. (1997)
NAL Call #: 290.9 AM3Ps (IR);
ISSN: 0733-9437.
Notes: DOI: 10.1061/(ASCE)0733-9437(1997)123:3(148)
Descriptors: Hydrodynamics/ Water Quality Management/ Subsurface Drainage/ Model Studies/ Design Criteria/ Solute Transport/ Water quality control/ Agricultural runoff/ Pollution control/ Drainage/ Simulation/ Control of water on the surface/ Prevention and control/ Freshwater pollution
Abstract: Drainage design for water quality management in irrigated areas requires use of hydrodynamic models the delineate flow paths of subsurface water moving to drains. Use of only traditional drainage design equations for protection against water logging and salinization are inadequate for water quality management; these equations should be coupled with mechanistic models that account for transport and chemical changes in the vadose and saturated zones that replace those associated with a leaching fraction, or requirement concepts. Drainage designs should now make use of hydrodynamic and chemical models that simulate flow and transport of water and chemical constituents from infiltration to drainage discharge. Management should be able to manipulate the models prior to implementing steps aimed at controlling the quantity and quality of drainage discharge.

379. **Drainage manual: A water resources technical publication: A guide to integrating plant, soil, and water relationships for drainage of irrigated lands.**
United States. Bureau of Reclamation.
Denver, Colo.: U.S. Dept. of the Interior, Bureau of Reclamation, xviii, 321 p.: ill. (1993)
Notes: "Revised reprint 1993" Includes bibliographical references and index.

NAL Call #: TC970.D73--1993
Descriptors: Drainage---Handbooks, manuals, etc/ Irrigation---Handbooks, manuals, etc
This citation is from AGRICOLA.

380. **Drainage of irrigated lands: A manual.**
Ritzema, H. P.; Kselik, R. A. L.; Chanduvi, Fernando.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; viii, 74 p.: ill.; Series: Irrigation water management training manual no. 9. (1996)
Notes: "M-56."--T.p. verso. Includes bibliographical references (p. 73-74).
NAL Call #: S621.R58--1996;
ISBN: 9251037795
Descriptors: Drainage/ Irrigation---Management
This citation is from AGRICOLA.

381. **Drainage principles and applications.**
International Institute for Land Reclamation and Improvement.
Wageningen, Netherlands: International Institute for Land Reclamation and Improvement; 1125 p.: ill., map; Series: Publication (International Institute for Land Reclamation and Improvement) 16. (1994)
Notes: 2nd ed.; Includes bibliographies and index.
NAL Call #: 54.9--In8-no.16
Descriptors: Drainage
This citation is from AGRICOLA.

382. **Dynamic cropping systems: An adaptable approach to crop production in the Great Plains.**
Tanaka, D. L.; Krupinsky, J. M.; Liebig, M. A.; Merrill, S. D.; Ries, R. E.; Hendrickson, J. R.; Johnson, H. A.; and Hanson, J. D.
Agronomy Journal 94 (5): 957-961. (2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962
This citation is provided courtesy of CAB International/CABI Publishing.

383. **Dynamics and availability of the non-exchangeable NH4-N: A review.**
Scherer HW
European Journal of Agronomy 2 (3): 149-160; 115 ref. (1993)
NAL Call #: SB13.E97
This citation is provided courtesy of CAB International/CABI Publishing.

384. **Dynamics of leaf litter accumulation and its effects on riparian vegetation: A review.**
Xiong ShaoJun and Nilsson, C.
Botanical Review 63 (3): 240-264. (1997)
NAL Call #: 450 B6527 DNAr;
ISSN: 0006-8101
This citation is provided courtesy of CAB International/CABI Publishing.

385. **Earthen manure storage design considerations.**
Wright, P.; Grajko, W.; Lake, D.; Perschke, S.; Schenne, J.; Sullivan, D.; and Tillapaugh, B.
Ithaca, N.Y.: Natural Resource, Agriculture, and Engineering Service, Cooperative Extension; Series: NRAES 109; ix, 90 p.: ill., map. (1999)
Notes: Includes bibliographical references (p. 90).
NAL Call #: S675-.N72-no.-109;
ISBN: 0935817387 (pbk.)
Descriptors: Farm manure---Storage/ Earth construction
Abstract: Earthen manure storages are becoming more common for economic, environmental, and management reasons, but there is a lack of information about safe, environmentally sound, practical designs. This book was written to meet the needs of producers, engineers, and design professionals who are seeking information about designing, constructing, and managing earthen storages. It covers environmental policies (both existing and pending legislation); design standards and planning documents (such as nutrient management and waste management plans); manure characteristics; storage planning (determining size and location, loading and unloading methods, on-site soils investigations, and regulations); storage design (stability and drainage issues, types of liners, and safety); construction (quality assurance, earthwork, topsoil placement, seeding, and documentation); management (maintaining the structure, clearing drains, and manure management); and liability. A lengthy appendix provides guidelines and calculations for soil liners; other appendixes provide pump information, cost estimate information, and addresses for helpful organizations.
© Natural Resource, Agriculture and Engineering Service (NRAES)

386. **Eastern Sierra Nevada riparian field guide.**
Weixelman, Dave.; Zamudio, Desiderio C.; and Zamudio, Karen A.
Sparks, NV: Humbolt-Toiyabe National Forest; 1 v. (various pagings): ill. (some col.). (1999)
Notes: Humboldt National Forest (Nev.) and Toiyabe National Forest (Nev. and Calif.).
NAL Call #: QH541.5.R52-W436-1999
Descriptors: Riparian ecology---California---Sierra Nevada---Handbooks, manuals, etc/ Riparian ecology---Nevada---Sierra Nevada---Handbooks, manuals, etc
This citation is from AGRICOLA.

387. **Ecological approaches and the development of "truly integrated" pest management.**
Thomas, M. B.
Proceedings of the National Academy of Sciences 96 (11): 5944-5951. (1999);
ISSN: 0027-8424
Descriptors: Pest control/ Biological control/ Integrated control/ Crop production/ Reviews/ Insecta/ Insects/ Control/ Agricultural & general applied entomology
Abstract: Recent predictions of growth in human populations and food supply suggest that there will be a need to substantially increase food production in the near future. One possible approach to meeting this demand, at least in part, is the control of pests and diseases, which currently cause a 30-40% loss in available crop production. In recent years, strategies for controlling pests and diseases have tended to focus on short-term, single-technology interventions, particularly chemical pesticides. This model frequently applies even where so-called integrated pest management strategies are used because in reality these often are dominated by single technologies (e.g., biocontrol host plant resistance, or biopesticides) that are used as replacements for chemicals. Very little attention is given to the interaction or compatibility of the different technologies used. Unfortunately evidence suggests that such approaches rarely yield satisfactory results and are unlikely to provide sustainable pest control solutions for the future. Drawing on two case histories, this paper demonstrates that by increasing our basic understanding of how individual pest control

technologies act and interact, new opportunities for improving pest control can be revealed. This approach stresses the need to break away from the existing single-technology, pesticide-dominated paradigm and to adopt a more ecological approach built around a fundamental understanding of population biology at the local farm level and the true integration of renewable technologies such as host plant resistance and natural biological control, which are available to even the most resource-poor farmers.

388. **Ecological costs of livestock grazing in western North America.**
Fleischner, T. L.
Conservation Biology 8 (3): 629-644. (1994)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
This citation is provided courtesy of CAB International/CABI Publishing.

389. **Ecological forecasting and the urbanization of stream ecosystems: Challenges for economists, hydrologists, geomorphologists, and ecologists.**
Nilsson, C.; Pizzuto, J. E.; Moglen, G. E.; Palmer, M. A.; Stanley, E. H.; Bockstael, N. E.; and Thompson, L. C.
Ecosystems 6 (7): 659-674. (2003)
NAL Call #: QH540.E3645;
ISSN: 1432-9840.
Notes: Number of References: 117; Publisher: Springer-Verlag
Descriptors: Environment/ Ecology/ land use change/ ecological forecasts/ limitations of modeling/ streams/ urbanization/ watersheds/ urban land use/ headwater streams/ water resources/ riparian zones/ flow/ management/ nitrogen/ rivers/ cover/ sediment
Abstract: The quantity and quality of freshwater resources are now being seriously threatened, partly as a result of extensive worldwide changes in land use, and scientists are often called upon by policy makers and managers to predict the ecological consequences that these alterations will have for stream ecosystems. The effects of the urbanization of stream ecosystems in the United States over the next 20 years are of particular concern. To address this issue, we present a multidisciplinary research agenda designed to improve our forecasting of the effects of land-use change on stream ecosystems. Currently, there are gaps in both our knowledge and the data that make it difficult to link the disparate models used by economists, hydrologists, geomorphologists, and ecologists. We identify a number of points that practitioners in each discipline were not comfortable compromising on-for example, by assuming an average condition for a given variable. We provide five instructive examples of the limitations to our ability to forecast the fate of stream and riverine ecosystems one drawn from each modeling step: (a) Accurate economic methods to forecast land-use changes over long periods (such as 20 years) are not available, especially not at spatially explicit scales; (b) geographic data are not always available at the appropriate resolution and are not always organized in categories that are hydrologically, ecologically, or economically meaningful; (c) the relationship between low flows and land use is sometimes hard to establish in anthropogenically affected catchments; (d) bed mobility, suspended sediment load, and channel form-all of which are important for ecological communities in streams-are difficult to predict; and (e) species distributions in rivers are not well documented, and the data that do exist are not always publicly available or have not been sampled at accurate scales, making it difficult to model ecological responses to specified levels of environmental change. Meeting these challenges will require both interdisciplinary cooperation and a reviewed commitment to intradisciplinary research in the fields of economics, geography, quantitative spatial analysis, hydrology, geomorphology, and ecology.

390. **Ecological impacts of arable intensification in Europe.**
Stoate, C.; Boatman, N.; Borralho, R.; Carvalho, C.; Snoo, G.; and Eden, P.
Journal of environmental management 63 (4): 337-365. (2001)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797.
Notes: Publisher: Academic Press
Descriptors: Agricultural practices/ Land use/ Agriculture/ Environmental impact/ Crops/ Biological diversity/ Soil contamination/ Groundwater pollution/ Air pollution/ Ecology/ Europe/ Agricultural Runoff/ Cultivated Lands/ Soil Erosion/ Water Pollution Sources/ Surface Runoff/ Nutrients/ Pesticides/ Farms/ Organic Matter/ Environmental Quality/ Agricultural pollution/ Community composition/ Man induced effects/ Ecosystem disturbance/ Ecological crisis/ Biodiversity/ Pollution effects/ Nutrients (mineral)/ Eutrophication/ Europe/ arable landscapes/ Cultivated lands/ farms/ Environmental degradation / Environmental action/ Sources and fate of pollution/ Mechanical and natural changes
Abstract: Although arable landscapes have a long history, environmental problems have accelerated in recent decades. The effects of these changes are usually externalised, being greater for society as a whole than for the farms on which they operate, and incentives to correct them are therefore largely lacking. Arable landscapes are valued by society beyond the farming community, but increased mechanisation and farm size, simplification of crop rotations, and loss of non-crop features, have led to a reduction in landscape diversity. Low intensity arable systems have evolved a characteristic and diverse fauna and flora, but development of high input, simplified arable systems has been associated with a decline in biodiversity. Arable intensification has resulted in loss of non-crop habitats and simplification of plant and animal communities within crops, with consequent disruption to food chains and declines in many farmland species. Abandonment of arable management has also led to the replacement of such wildlife with more common and widespread species. Soils have deteriorated as a result of erosion, compaction, loss of organic matter and contamination with pesticides, and in some areas, heavy metals. Impacts on water are closely related to those on soils as nutrient and pesticide pollution of water results from surface runoff and subsurface flow, often associated with soil particles, which themselves have economic and ecological impacts. Nitrates and some pesticides also enter groundwater following leaching from arable land. Greatest impacts are associated with simplified, high input arable systems. Intensification of arable farming has been associated with pollution of air by pesticides, NO sub(2)and CO sub(2), while the loss

of soil organic matter has reduced the system's capacity for carbon sequestration. Copyright 2001 Academic Press

391. **Ecological implications of using thresholds for weed management.**
Norris, R. F.
Journal of Crop Production 2 (1): 31-58. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler.
Includes references.
Descriptors: weeds/ weed control/ integrated pest management/ environmental assessment/ tolerance/ crop weed competition/ decision making/ insect pests/ population dynamics/ economic analysis/ yield losses/ seed banks/ plant density/ seed output/ establishment/ literature reviews/ economic thresholds
This citation is from AGRICOLA.

392. **Ecological issues related to wetland preservation, restoration, creation and assessment.**
Whigham, Dennis F
Science of the Total Environment 240 (1-3): 31-40. (1999)
NAL Call #: RA565.S365;
ISSN: 0048-9697
Descriptors: ecologically based Hydrogeomorphic approach/ wetland assessment/ wetland creation/ wetland ecosystem function/ wetland-no-net-loss policy/ wetland preservation/ wetland restoration
Abstract: A wide range of local, state, federal, and private programs are available to support the national (USA) policy of wetland 'No Net Loss'. Implementation of programs, however, has resulted in the continued loss of natural wetlands on the premise that restored or created wetlands will replace the functions and values lost by destruction of natural wetlands. What are the ecological implications and consequences of these programs from a biodiversity and ecosystem perspective? From a biodiversity perspective, ongoing wetland protection policies may not be working because restored or created wetlands are often very different from natural wetlands. Wetland protection policies may also be inadequate to preserve and restore ecological processes such as nutrient cycling because they mostly focus on individual wetlands and ignore the fact that wetlands are integral parts of landscapes. Wetland mitigation projects, for example, often result in the exchange of one type of wetland for another and result in a loss of wetland functions at the landscape level. The most striking weakness in the current national wetlands policy is the lack of protection for 'dry-end' wetlands that are often the focus of debate for what is and what is not a wetland. From an ecological perspective, dry-end wetlands such as isolated seasonal wetlands and riparian wetlands associated with first order streams may be the most important landscape elements. They often support a high biodiversity and they are impacted by human activities more than other types of wetlands. The failings of current wetland protection and mitigation policies are also due, in part, to the lack of ecologically sound wetland assessment methods for guiding decision making processes. The ecologically based Hydrogeomorphic (HGM) approach to wetland assessment has the potential to be an effective tool in managing biodiversity and wetland ecosystem function in support of the national 'No Net Loss' policy.

393. **Ecological management of vertebrate pests in agricultural systems.**
Van Vuren, D. and Smallwood, K. S.
Biological Agriculture and Horticulture 13 (1): 39-62. (1996)
NAL Call #: S605.5.B5;
ISSN: 0144-8765 [BIAHDP]
Descriptors: vertebrate pests/ pest management/ farming systems/ sustainability/ control methods/ literature reviews
This citation is from AGRICOLA.

394. **Ecological relative risk (EcoRR): Another approach for risk assessment of pesticides in agriculture.**
Sanchez-Bayo, F.; Baskaran, S.; and Kennedy, I. R.
Agriculture, Ecosystems and Environment 9 (1/3): 37-57. (Sept. 2002)
NAL Call #: S601 .A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: gossypium hirsutum/ environmental impact/ risk assessment/ pesticides/ toxicity/ application rates/ evaluation/ persistence/ residual effects/ water/ sediment/ soil/ vegetation/ air/ simulation models
Abstract: Summary: A site-specific methodology was developed to assess and compare the ecotoxicological risk that agricultural pesticides pose to ecosystems. The ecological relative risk (EcoRR) is a composite scoring index for comparing relative risks between different plant protection products, and is used to assess the potential ecological impact their residues have after being applied to agricultural systems. The EcoRR model is based on standard frameworks for risk assessment (e.g. PEC/toxicity), but takes account of factors such as persistence of residues and biodiversity of ecosystems. The exposure module considers the environmental concentrations of a substance, its persistence, bioaccumulation and probability of exposure in several environmental compartments (water, sediment, soil, vegetation, air). The toxicity module takes into account the biodiversity of the ecosystems affected, whereby the endpoints used are weighted by the proportional contribution of each taxon in a given environmental compartment. EcoRR scores are calculated independently for each compartment and affected areas, thus enabling pinpointing of where risks will occur. The procedure to calculate EcoRR scores is explained using an example, and a sensitivity analysis of the model is included. A simulated risk assessment of 37 pesticides intended for use in a cotton development is also given as a case study. Exposure data were obtained using fugacity model II in areas previously defined by spray drift models. Toxicity data to vertebrate taxa and crustaceans were obtained from several databases, and biodiversity data from local sources. EcoRR scores were calculated for each compartment both on- and off-farm, during a normal growing season and during a flood, and a comparative relative assessment for all pesticides is discussed. EcoRR scores were also compared to traditional assessments using quotients for some taxa in the aquatic and terrestrial environments, revealing a good correlation between both models in some cases. It is apparent that EcoRR scores reflect adequately the potential risk of those

chemicals to ecosystems, though they are less dependent on toxicity to sensitive species than the simple quotient. This methodology can be used either with field measured data or model predicted data, so management options for new chemicals can be tested prior to their application on crops.
This citation is from AGRICOLA.

395. **Ecological restoration and creation: A review.**
Anderson, P.
Biological Journal of the Linnean Society 56 (suppl.A): 187-211. (Dec. 1995)
NAL Call #: QH301.B56;
ISSN: 0024-4066 [BJLSBG].
Notes: Special issue: The National Trust and Nature Conservation--100 years on / edited by D.J. Bullock and H.J. Harvey. Proceedings of a conference held June 20-21, 1994, London, England.
Includes references.
Descriptors: nature conservation/ wildlife conservation/ nature reserves/ habitat destruction/ grasslands/ heathland/ woodlands/ vegetation management/ grazing/ mowing/ prescribed burning/ literature reviews/ Europe/ habitat restoration/ habitat creation
This citation is from AGRICOLA.

396. **Ecological risk assessment for aquatic organisms from over-water uses of glyphosate.**
Solomon, Keith R and Thompson, Dean G
Journal of Toxicology and Environmental Health: Part B, Critical Reviews 6 (3): 289-324. (2003)
NAL Call #: RA565.A1J6;
ISSN: 1093-7404
Descriptors: Induce: pesticide, surfactant/ Roundup: pesticide, surfactant/ Vision: pesticide, surfactant / X 77: pesticide, surfactant, toxin/ glyphosate [Rodeo formulation]: accidental overspray, efficacy, enzyme inhibitor, herbicide, over water uses, soil pollutant, toxicodynamics, toxicokinetics, toxin, water pollutant/ estuary/ forestry area/ pond/ sediment/ soil/ stream/ water bodies/ wetland
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397. **Ecology and integrated pest management.**
Lenteren, J C van and Overholt, W A
Insect Science and its Application 15 (6): 557-582. (1994)
NAL Call #: QL461.I57;
ISSN: 0191-9040
Descriptors: animals (Animalia Unspecified)/ Animalia (Animalia Unspecified)/ animals/ behavior/ ecology/ integrated pest management/ pest/ pest management/ pesticides/ population dynamics
Abstract: The struggle to control Populations of organisms that feed on agricultural crops, livestock, and directly on humans is as old as recorded history, and will continue into the perceivable future. Only 30 years ago, the availability of relatively cheap and highly effective synthetic organic pesticides was thought to be the ultimate solution to pest populations. However, our naivete regarding the ability of pest Populations to rapidly adapt to simplistic man-induced selection pressures has become increasingly apparent, as have the detrimental impacts of pesticides on the environment. The evolution of the integrated pest management paradigm can be traced to these concerns, and it is now accepted that sustainable solutions to the management of pest populations will only be borne out of an increased understanding of the functioning of ecosystems. Knowledge of the population dynamics, and underlying causes of density changes in pest populations, behavioural ecology, and population genetics of pests and natural enemies, are essential elements for designing appropriate biologically intensive strategies for pest management. Progress is being made, and several examples of innovative strategies and promising areas of research, are discussed. Future work must continue to be based on a solid foundation of ecological understanding, to avoid the pitfalls of simple opportunistic solutions.
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398. **Ecology and management of Arundo donax, and approaches to riparian habitat restoration in southern California.**
Bell, G. P.
In: Plant invasions studies from North Ameria and Europe/ Brock, J. H.; Wade, M.; Pysek, P.; and Green, D. Leiden, Netherlands: Backhuys, 1997; pp. 103-113.
ISBN: 9073348234
NAL Call #: SB613.5.P582-1997
Descriptors: arundo donax/ ecology/ weed control/ habitats/ riparian vegetation/ riparian forests/ plant succession/ wildfires/ water quality/ rivers/ plant competition/ wildlife/ species diversity/ competitive ability/ asexual reproduction/ integrated pest management/ glyphosate/ literature reviews/ California
This citation is from AGRICOLA.

399. **Ecology of insect communities in nontidal wetlands.**
Batzer, D. P. and Wissinger, S. A.
Annual Review of Entomology 41: 75-100. (1996)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: insects/ wetlands/ community ecology/ habitats/ interactions/ colonization/ nature conservation/ insect communities/ reviews/ freshwater ecology
This citation is from AGRICOLA.

400. **The ecology of interfaces: Riparian zones.**
Naiman, R. J. and Decamps, H.
Annual Review of Ecology and Systematics 28: 621-658. (1997);
ISSN: 0066-4162
This citation is provided courtesy of CAB International/CABI Publishing.

401. **Ecology of wetlands and associated systems.**
Majumdar, Shyamal K.; Miller, E. Willard; and Brenner, Fred J.
Easton, PA: Pennsylvania Academy of Science; xv, 685 p.: ill., maps. (1998)
NAL Call #: QH541.5.M3E38-1998;
ISBN: 094580914X
Descriptors: Wetland ecology/ Wetlands
This citation is from AGRICOLA.

402. **The economic and environmental consequences of nutrient management in agriculture.**
Huang, Wen Yuan. and Uri, Noel D.
Commack, N.Y.: Nova Science; viii, 174 p. (1999)
NAL Call #: S651-.H826-1999;
ISBN: 1560727543
Descriptors: Nitrogen fertilizers/ Nitrogen fertilizers---Environmental aspects
This citation is from AGRICOLA.

403. **Economic and environmental contribution of wetlands in agricultural landscapes.**
Janssen, Larry.
Brookings, S.D.: Economics Dept., South Dakota State University; ii, 34 p.: ill.; Series: Economic staff paper series no. 95-3. (1995)
Notes: "May 1995." Includes bibliographical references (p. 19-21).
NAL Call #: HD1775.S8E262--no.95-3
This citation is from AGRICOLA.

404. **Economic and environmental contributions of wetlands in agricultural landscapes.**
Janssen, Larry. and South Dakota State University. Economics Dept.
Brookings, S.D.: Economics Dept. South Dakota State University; ii, 35 p.: ill., map; Series: Economics staff paper series 95-3. (1995)
Notes: "Revised July 1995." Includes bibliographical references (p. 19-21).
NAL Call #: HD1775.S8E262-no.95-3-1995
Descriptors: Wetlands---South Dakota/ Wetland conservation---South Dakota/ Wetland ecology---South Dakota
This citation is from AGRICOLA.

405. **Economic evaluation of manure management and farm gate applications: A literature review of environmental and economic aspects of manure management in Alberta's livestock sectors.**
Unterschultz, James R.
Edmonton, Canada: Dept. of Rural Economy, Faculty of Agriculture & Forestry, and Home Economics, University of Alberta; 64 p.: ill.; Series: Project report (University of Alberta. Dept. of Rural Economy) 01-03. (2001)
Notes: Includes bibliographical references (p. 35-43).
NAL Call #: HD1790.A35-P76-no.-2001-03
This citation is from AGRICOLA.

406. **Economics and environmental benefits and costs of conservation tillage.**
United States. Dept. of Agriculture. Economic Research Service and United States. Natural Resources Conservation Service.
Washington, DC: ERS, USDA; vi, 88 leaves: col. ill., col. maps. (1998)
Notes: Cover title. "February 1998"--P. [i]. Includes bibliographical references.
NAL Call #: aS604-.E26-1998
Descriptors: Conservation tillage---Environmental aspects/ Conservation tillage---Economic aspects
This citation is from AGRICOLA.

407. **Economics of dryland cropping systems in the Great Plains: A review.**
Dhuyvetter, K. C.; Thompson, C. R.; Norwood, C. A.; and Halvorson, A. D.
Journal of Production Agriculture 9 (2): 216-222. (1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
This citation is provided courtesy of CAB International/CABI Publishing.

408. **The economics of prescribed burning: A research review.**
Hesseln, H.
Forestry Sciences 46 (3): 322-334. (Aug. 2000)
NAL Call #: 99.8-F7632;
ISSN: 0015-749X [FOSCAD]
Descriptors: prescribed burning/ wildfires/ risk factors/ economic analysis/ literature reviews/ fire management/ risk management
This citation is from AGRICOLA.

409. **Ecosystems, sustainability, and animal agriculture.**
Heitschmidt, R. K.; Short, R. E.; and Grings, E. E.
Journal of Animal Science 74 (6): 1395-1405. (June 1996)
NAL Call #: 49-J82;
ISSN: 0021-8812 [JANSAG].
Notes: Presented at a symposium titled "Toward Sustainability: Animal Agriculture in the Twenty-First Century" at the ASAS 86th Annu. Mtg., Minneapolis, MN.
Includes references.
Descriptors: beef cattle/ animal production/ sustainability/ input output analysis/ ecological balance/ energy relations/ energy expenditure/ feed intake/ grazing/ dry lot feeding/ irrigated farming/ alfalfa hay/ maize silage/ barley/ pastures/ body weight/ body protein/ body fat/ calving rate
Abstract: The long-term sustainability of animal agriculture is examined in an ecological context. As an aid to defining agriculture, animal agriculture, and sustainable agriculture, a broad overview of the structural and functional aspects of ecosystems is presented. Energy output/cultural energy input ratios were then calculated for 11 beef cattle management systems as relative measures of their long-term sustainability. Energy output was estimated by direct conversion of whole body mass of steers to caloric values. Cultural energy inputs were estimated using published forage and cereal grain production budgets in combination with estimated organic matter intakes. Cultural energy inputs included raw materials, manufacturing, distribution, maintenance, and depreciation of all equipment and products used in a 250-animal cow-calf farm/ranch operation. Management systems evaluated included 1) spring calving with slaughter beginning at either weaning (age of calf approximately 6 mo) or after 84, 168, or 252 d in postweaning finishing lot; 2) spring calving with slaughter beginning at about 18 mo of age after either 0, 42, 84, or 126 d in finishing lot; and 3) fall calving with slaughter beginning at about 14 mo of age after either 63, 126, or 189 d in finishing lot. Estimate efficiencies were < 1.0 in all treatments, even wine: assumed marketed calf crop was 100%. Product energy output/cultural energy input ratios ranged from a high of .40 in the spring calving leads to stocker leads to 126 d in finishing lot treatment to a low of .23 in the spring calving leads to slaughter at weaning treatment. The low levels of efficiency were found to be largely the result of the interaction effects of the high levels of culture energy required to maintain a productive cow herd and grow and finish calves in the rather harsh environment of the Northern Great Plains. Result pointedly reveal the high level of dependency of the U.S. beef cattle industry on fossil fuels. These finding in turn bring into question the ecological and economic risks associated with the current technology driving North American animal agriculture.
This citation is from AGRICOLA.

410. **Ecotoxicity tests for compost applications.**
Kapanen, A and Itavaara, M
Ecotoxicology and Environmental Safety 49 (1): 1-16. (2001)
NAL Call #: QH545.A1E29;
ISSN: 0147-6513
Descriptors: enzymes/ microbe (Microorganisms)/ plant (Plantae)/ Microorganisms/ Plants/ biodegradation/ composted material toxicity/ soil fauna
Abstract: Interest in the ecological effects of composting has been

growing recently. However, no established methods are available for testing the toxicity of composted materials. Despite this, international and national quality requirements define that compost shall not contain any environmentally harmful substances. Safety requirements have to be fulfilled if the produced compost is intended for agricultural use. This literature review focuses on methods that could potentially be used to evaluate the ecotoxicity of compost. The toxicity test methods discussed are those employing microbes, enzymes, soil fauna, and plants.
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411. **Ecotoxicological risk assessment of soil fauna recovery from pesticide application.**
Straalen, N. M. van. and
Rijn, J. P. van
Reviews of Environmental Contamination and Toxicology 154: 83-141. (1998)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: soil fauna/ pesticides/ toxicology/ risk assessment / literature reviews
This citation is from AGRICOLA.

412. **Ecotoxicology and Wetland Ecosystems: Current Understanding and Future Needs.**
Catallo, W. J.
Environmental Toxicology and Chemistry 12 (12): 2209-2224. (1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: wetlands/ contaminants/ ecosystem analysis/ toxins/ ecosystems/ pollutants/ environmental policy/ aquatic environment/ literature reviews/ ecotoxicology/ Wetlands/ Sources and fate of pollution/ Freshwater pollution/ Pollution Environment
Abstract: The term wetlands refers to a mosaic of important ecosystems that typically form transition zones between uplands and aquatic environments. These areas provide support functions for natural and living resources and mediate biogeochemical transformations of global significance. It is becoming clear that the introduction of toxic and other contaminants to large wetland areas has contributed to a series of undesirable trends in habitat quality; availability of valuable fish and wildlife; and quality of associated resources, including surface and ground waters. The purpose of this review is to indicate the importance of wetlands to regional and global ecology and discusses research on the effects of contaminants in wetland ecosystems. Areas of needed future research also are suggested.
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413. **Effect of Agricultural Production on the Chemistry of Natural Waters: A Survey.**
Khilchevskiy, V. K.
Hydrobiological Journal / Gidrobiologicheskiy Zhurnal 29/30 (1): 82-93. (1994);
ISSN: 0018-8166
Descriptors: literature reviews/ agricultural pollution/ water pollution/ agricultural runoff/ literature review/ natural waters/ geochemistry/ nonpoint pollution sources/ erosion/ nonpoint pollution/ Characteristics, behavior and fate/ Sources and fate of pollution/ Freshwater pollution
Abstract: The effect of agriculture on the chemical composition of natural waters is surveyed, focusing on the factors through which it acts (chemical melioration, use of pesticides, hydromelioration), the sources of pollution (surface runoff from nonirrigated farming, drainage from reclaimed lands, effluent from livestock-raising farms) and the role of erosion.
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414. **Effect of animal production on environment.**
Vondraskova S
Studijni Informace Zivocisna Vyroba 3: 1-31. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

415. **Effect of Land Development and Forest Management on Hydrologic Response in Southeastern Coastal Wetlands: A Review.**
Richardson, C. J. and Mccarthy, E. J.
Wetlands 14 (1): 56-71. (1994)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: forest industry/ land use/ hydrology/ United States, Southeast/ wetlands/ literature reviews/ United States, North Carolina/ resource management/ runoff/ evapotranspiration/ environmental impact/ land development/ forest management/ hydrologic models/ environmental effects/ forest management/ Mechanical and natural changes/ Ecosystems and energetics/ Freshwater pollution/ Effects on water of human nonwater activities/ Environmental degradation
Abstract: Land development activities such as agriculture, clear cutting, peat mining, and the planting of forest plantations on wetlands can affect the hydrologic behavior of these ecosystems by affecting their water storage and release patterns on the landscape. The effects of these development activities on hydrologic fluxes in peatlands (Typic Medisaprists) were compared to the effects of forest management practices in North Carolina using a field-tested hydrologic simulation model (DRAINMOD). Simulations revealed that natural peat-based (Histosol) pocosin systems lose 66% (80 cm) of the 123 cm of average annual rainfall by evapo-transpiration (ET) and 34% (42 cm/yr) via annual runoff. Annual runoff values were 63 cm/yr for peat mining areas, 48 cm/yr for cleared peatlands, 46 cm/yr for peatlands converted to agriculture and 34 cm/yr for pine plantations, once the forest canopy is closed. Thus, these wetlands alterations, except for forestry, significantly increased runoff and decreased ET compared to the natural ecosystem. Forest pine plantation management decreased runoff and increased ET. A case study of the effects of forest management practices was reviewed for a 15-year-old drained loblolly pine plantation growing on fine sandy loam soils (Thermic Typic umbraquults) in the coastal plains of North Carolina. Forestry activities such as thinning (i.e., reduced leaf area index by 50%) decreased ET and canopy interception and nearly doubled drainage loss (38 cm/yr to 60 cm/yr). Commonly applied forest practices, such as drainage, increased the average number of flow events with flows > 5 mm/day to 86 days per year from 26 days per year under natural conditions.
© Cambridge Scientific Abstracts (CSA)

416. **The Effect of Macrobenthos on the Mass Exchange at the Water-Sediment Interface (Review).**
Brekhovskikh, V. F. and Vishnevskaya, G. N.
Water Resources / Vodnye Resursy 21 (3): 301-307. (1994);
ISSN: 0097-8078
Descriptors: Erosion and sedimentation/ Geochemistry of sediments
Abstract: The effect of macrobenthos on the mass exchange at the water-sediment interface is considered. Evidence is presented on the intensification of mass exchange processes in the presence of benthos organisms, specifically, an increase in the dissolved substance fluxes through the water-sediment interface, the oxygen consumption by the sediment, as well as the washout of bound bottom material.

417. **Effect of milk yield level and feeding systems on N excretion in dairy cows.**
Delaby L; Peyraud JL; and Verite R.
In: 2emes rencontres autour des recherches sur les ruminants. (Held 13 1995 at Paris, France.); pp. 349-353; 1995.
Notes: 10 ref.
This citation is provided courtesy of CAB International/CABI Publishing.

418. **Effect of phytase on production parameters and nutrient availability in broilers and laying hens: A review.**
Hatten, L. F.; Ingram, D. R.; and Pittman, S. T.
Journal of Applied Poultry Research 10 (3): 274-278. (Fall 2001)
NAL Call #: SF481.J68;
ISSN: 1056-6171
Descriptors: broilers / hens/ phytase/ nutrient availability/ poultry manure/ nutrient content/ phosphorus/ leaching/ runoff/ excretion/ water pollution/ feed additives/ cations/ calcium/ magnesium/ zinc/ copper/ nitrogen/ proteinases/ phytic acid/ literature reviews
This citation is from AGRICOLA.

419. **Effect of soil properties and water quality on concentrated flow erosion (rills, ephermal gullies and pipes).**
Bradford, J. M.; Shainberg, I.; Norton, L. D.; and United States-Israel Binational Agricultural Research and Development Fund.
Bet Dagan, Israel: BARD; 1 v. (various pagings): ill. (1996)
Notes: Final report. Project no. US-2039-91. Includes bibliographical references.
NAL Call #: S623.B69--1996
Descriptors: Soil erosion
This citation is from AGRICOLA.

420. **Effect of Stream Channel Size on the Delivery of Nitrogen to the Gulf of Mexico: Nature.**
Alexander, R. B.; Smith, R. A.; and Schwarz, G. E.
Macmillan Journals, 2000.
http://water.usgs.gov/nawqa/sparrow/nature/nature_alexetal.pdf (preprint)
NAL Call #: TD223.5-.A64-2000
Descriptors: Water---Nitrogen content---Environmental aspects---Mexico, Gulf of/ Eutrophication---Control---Mexico, Gulf of/ Hypoxia---Water---Mexico, Gulf of/ Agricultural chemicals---Environmental aspects---Mexico, Gulf of / Water Pollution---Environmental aspects---Mexico, Gulf of/ Rivers---Environmental aspects---Mexico, Gulf of/ Stream flow---Environmental aspects---Mexico, Gulf of/ Nitrogen/ Electronic publications/ Government publications/ Basins---Geology/ Mexico, Gulf of---Channels/ Mexico, Gulf of/ United States Dept of the Interior---Geological Survey
Abstract: The U.S. Geological Survey (USGS) presents the article entitled "Effect of Stream Channel Size on the Delivery of Nitrogen to the Gulf of Mexico," written by Richard B. Alexander, Richard A. Smith, and Gregory E. Schwarz. This paper offers an analysis of data from 374 U.S. monitoring stations that shows a rapid decline in the average first-order rate of nitrogen loss with channel size. The authors find that the closeness of sources to large streams and rivers is an important determinant of nitrogen delivery to the estuary in the Mississippi basin.
This citation is from AGRICOLA.

421. **The effectiveness and restoration potential of riparian ecotones for the management of nonpoint source pollution, particularly nitrate.**
Fennessy, M S and Cronk, J K
Critical Reviews in Environmental Science and Technology 27 (4): 285-317. (1997)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: carbon/ nitrate: loading, pollutant, removal, uptake/ nutrients: surface retention/ channel morphology/ denitrification/ land use/ nitrogen cycling/ nonpoint source pollution/ restoration potential/ riparian ecotones/ seasonal dynamics/ stream vegetation/ subsurface flow/ surface water contamination/ terrestrial systems/ water quality

422. **Effects of agricultural diversification on the abundance, distribution, and pest control potential of spiders: A review.**
Sunderland, K. and Samu, F.
Entomologia Experimentalis et Applicata 1: 1-13. (2000);
ISSN: 0013-8703
Descriptors: Population density/ Population dynamics/ Agricultural practices/ Pest control/ Araneae/ Agricultural & general applied entomology
Abstract: A review of the literature showed that spider abundance was increased by diversification in 63% of studies. A comparison of diversification modes showed that spider abundance in the crop was increased in 33% of studies by `aggregated diversification' (e.g. intercropping and non-crop strips) and in 80% of studies by `interspersed diversification' (e.g., undersowing, partial weediness, mulching and reduced tillage). It is suggested that spiders tend to remain in diversified patches and that extending the diversification throughout the whole crop (as in interspersed diversification) offers the best prospects for improving pest control. There is little evidence that spiders walk in significant numbers into fields from uncultivated field edges, but diversification at the landscape level serves to foster large multi-species regional populations of spiders which are valuable as a source of aerial immigrants into newly planted crops. There are very few manipulative field studies where the impact of spiders on pests has been measured in diversified crops compared with undiversified controls. It is encouraging, however, that in those few studies an increased spider density resulted in improved pest control. Future work needs are identified.

423. **Effects of atmospheric ammonia (NH3) on terrestrial vegetation: A review.**
Krupa, S. V.
Environmental Pollution 124 (2): 179-221. (2003)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491.
Notes: Number of References: 327
Descriptors: ammonia/ effects/ terrestrial vegetation/ ecosystems/ critical levels/ critical loads/ pine/ Pinus sylvestris/ Vulgaris l hull/ young coniferous trees/ long term exposure/ root zone acidity/ bound amino acids/ Arnica Montana l/ Flexuosa l trin/ nitrogen deposition/ air pollution
Abstract: At the global scale, among all N (nitrogen) species in the atmosphere and their deposition on to terrestrial vegetation and other receptors, NH3 (ammonia) is considered to be the foremost. The major sources for atmospheric NH3 are agricultural activities and animal feedlot operations, followed by biomass burning (including forest fires) and to a lesser extent fossil fuel combustion. Close to its sources, acute exposures to NH3 can result in visible foliar injury on vegetation. NH3 is deposited rapidly within the first 4-5 km from its source. However, NH3 is also converted in the atmosphere to fine particle NH4+ (ammonium) aerosols that are a regional scale problem. Much of our current knowledge of the effects of NH3 on higher plants is predominantly derived from studies conducted in Europe. Adverse effects on vegetation occur when the rate of foliar uptake of NH3 is greater than the rate and capacity for in vivo detoxification by the plants. Most to least sensitive plant species to NH3 are native vegetation > forests > agricultural crops. There are also a number of studies on N deposition and lichens, mosses and green algae. Direct cause and effect relationships in most of those cases (exceptions being those locations very close to point sources) are confounded by other environmental factors, particularly changes in the ambient SO2 (Sulfur dioxide) concentrations. In addition to direct foliar injury, adverse effects of NH3 on higher plants include alterations in: growth and productivity, tissue content of nutrients and toxic elements, drought and frost tolerance, responses to insect pests and disease causing microorganisms (pathogens), development of beneficial root symbiotic or mycorrhizal associations and inter species competition or biodiversity. In all these cases, the joint effects of NH3 with other air pollutants such as all-pervasive O-3 or increasing CO2 concentrations are poorly understood. While NH3 uptake in higher plants occurs through the shoots, NH4+ uptake occurs through the shoots, roots and through both pathways. However, NH4+ is immobile in the soil and is converted to NO3- (nitrate). In agricultural systems, additions of NO3- to the soil (initially as NH3 or NH4+) and the consequent increases in the emissions of N2O (nitrous oxide, a greenhouse gas) and leaching of NO3- into the ground and surface waters are of major environmental concern. At the ecosystem level NH3 deposition cannot be viewed alone, but in the context of total N deposition. There are a number of forest ecosystems in North America that have been subjected to N saturation and the consequent negative effects. There are also heathlands and other plant communities in Europe that have been subjected to N-induced alterations. Regulatory mitigative approaches to these problems include the use of N saturation data or the concept of critical loads. Current information suggests that a critical load of 5-10 kg ha(-1) year(-1) of total N deposition (both dry and wet deposition combined of all atmospheric N species) would protect the most vulnerable terrestrial ecosystems (heaths, bogs, cryptogams) and values of 10-20 kg ha(-1) year(-1) would protect forests, depending on soil conditions. However, to derive the best analysis, the critical loa

424. **Effects of Disturbance on Birds of Conservation Concern in Eastern Oregon and Washington.**
Bull, E. L. and Wales, B. C.
Northwest Science 75 ([supplement]): 166-173. (2001)
NAL Call #: 470-N81;
ISSN: 0029-344X
Descriptors: Reviews/ Disturbance/ Rare species/ Conservation/ Fires/ Roads/ Human impact/ Forest management/ Aves/ Haliaeetus leucocephalus/ Falco peregrinus/ Histrionicus histrionicus/ Bartramia longicauda/ Accipiter gentilis/ Buteo regalis/ Leucosticte atrata/ Pinus ponderosa/ United States, Washington/ United States, Oregon/ Birds/ Bald eagle/ Peregrine falcon/ Harlequin duck/ Upland sandpiper/ Northern goshawk/ Ferruginous hawk/ Black Rosy finch/ Ponderosa Pine/ Management
Abstract: The effects on birds of forest insects, tree diseases, wildfire, and management strategies designed to improve forest health (e.g., thinning, prescribed burns, road removal, and spraying with pesticides or biological microbial agents) are discussed. Those bird species of concern that occur in forested habitats in eastern Oregon and Washington include the bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), harlequin duck (Histrionicus histrionicus), upland sandpiper (Bartramia longicauda), northern goshawk (Accipiter gentilis), ferruginous hawk (Buteo regalis), and black rosy finch (Leucosticte arctoa). In addition, seven species of woodpeckers and nuthatches were considered because of their rare status. Forest disturbances that create dead trees and logs are critical to cavity-nesting birds because the dead trees with their subsequent decay provide nesting and roosting habitat. The insects associated with outbreaks or dead trees provide prey for the woodpeckers and nuthatches. The loss of nest or roost trees as a result of disturbance could be detrimental to bald eagles, goshawks, or ferruginous hawks, while the loss of canopy cover could be detrimental to harlequin ducks and goshawks or to prey of some of the raptors. The more open canopies created by thinning may be beneficial to a species like the black rosy finch, yet detrimental to some woodpeckers due to a decrease in cover. Prescribed burning may be beneficial to those woodpeckers primarily associated with ponderosa pine (Pinus ponderosa) stands and detrimental to other woodpeckers because of the loss of coarse woody debris. Removal of roads is likely to benefit most of these species because of the subsequent decrease in human activity. Recovery plans for bald eagles and peregrine falcons are available for managers to use in managing habitat for these species.

425. **Effects of forest management on soil C and N storage: Meta analysis.**
Johnson, D. W. and Curtis, P. S.
Forest Ecology and Management 140 (2/3): 227-238. (Jan. 2001)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW]
Descriptors: forest management/ forest soils/ carbon/ nitrogen/ soil fertility/ nutrient availability/ data analysis/ carbon cycle/ nitrogen cycle/ logging/ species differences/ logs/ forest fires/ prescribed burning/ wildfires/ charcoal/ organic matter/ vegetation/ nitrogen fixation/ literature reviews
This citation is from AGRICOLA.

426. **Effects of Forest Management on Surface Water Quality in Wetland Forests.**
Shepard, J. P.
Wetlands 14 (1): 18-26. (1994)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: wetlands/ water quality/ forest industry/ fertilizers/ harvesting/ literature reviews/ environmental impact/ United States/ nutrients (mineral)/ sediments/ resource management/ forest management/ literature review/ logging/ environmental effects/ Ecosystems and energetics/ Mechanical and natural changes/ Freshwater pollution/ Effects on water of human nonwater activities/ Environmental degradation
Abstract: A literature review on the effects of silvicultural practices on water quality in wetland forests was conducted. The review summarized results from nine wetland forests in five states (AL, FL, MI, NC, and SC). Silvicultural practices assessed were timber harvesting (including thinning and clearcutting), site preparation, bedding, planting, drainage, and fertilization. Many of the studies reviewed observed increased concentrations of suspended sediment and nutrients following silvicultural operations when compared with undisturbed controls. Water quality criteria were rarely exceeded by silvicultural operations, however, and effects on water quality were transient. Water quality parameters returned to undisturbed levels within a period ranging from months to several years.
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427. **Effects of hay management on grassland songbirds in Saskatchewan.**
Dale, B. C.; Martin, P. A.; and Taylor, P. S.
Wildlife Society Bulletin 25 (3): 616-626 (1997)
NAL Call #: SK357.A1W5
Descriptors: birds/ environmental impact/ agricultural practices
Abstract: Evaluated impacts of hay management on endemic grassland birds.

428. **Effects of land application of waste water from Mexico City on soil fertility and heavy metal accumulation: A bibliographical review.**
Gutierrez Ruiz, M. E.; Siebe, C.; and Sommer, I.
Environmental Review 3 (3/4): 318-330. (1995)
NAL Call #: GE140.E59;
ISSN: 1181-8700
Descriptors: waste water/ irrigation water/ heavy metals/ concentration/ crops/ crop yield/ soil fertility/ nutrient content/ soil salinity/ application to land/ irrigation/ agricultural land/ Mexico
This citation is from AGRICOLA.

429. **Effects of livestock grazing on stand dynamics and soils in upland forests of the interior west.**
Belsky, A Joy and Blumenthal, Dana M
Conservation Biology 11 (2): 315-327. (1997)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
Descriptors: pine (Coniferopsida)/ gymnosperms/ plants/ spermatophytes/ vascular plants/ conservation/ livestock grazing/ mixed conifer forests/ soil erosion/ species composition/ stand dynamics/ upland forests/ Western USA
Abstract: Many ponderosa pine and mixed-conifer forests of the western, interior United States have undergone substantial structural and compositional changes since settlement of the West by Euro-Americans. Historically, these forests consisted of widely spaced, fire-tolerant trees underlain by dense grass swards. Over the last 100 years they have developed into dense stands consisting of more fire-sensitive and disease-susceptible species. These changes, sometimes referred to as a decline in 'forest health,' have been attributed primarily to two factors: active suppression of low-intensity fires (which formerly reduced tree recruitment, especially of fire-sensitive, shade-tolerant species), and selective logging of larger, more fire-tolerant trees. A third factor, livestock grazing, is seldom discussed, although it may be as important as the other two factors. Livestock alter forest dynamics by (1) reducing the biomass and density of understory grasses and sedges, which otherwise outcompete conifer seedlings and prevent dense tree recruitment, and (2) reducing the abundance of fine fuels, which formerly carried low-intensity fires through forests. Grazing by domestic livestock has thereby contributed to increasingly dense western forests and to changes in tree species composition. In addition, exclosure studies have shown that livestock alter ecosystem processes by reducing the cover of herbaceous plants and litter, disturbing and compacting soils, reducing water infiltration rates, and increasing soil erosion.
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430. **Effects of manure amendments on environmental and production problems.**
Moore, P. A. Jr.; Joern, B. C.; Edwards, D. R.; Wood, C. W.; and Daniel, T. C.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

431. **Effects of open marsh water management on selected tidal marsh resources: A review.**
Wolfe, R. J.
Journal of the American Mosquito Control Association 12 (4): 701-712. (Dec. 1996)
NAL Call #: QL536.J686;
ISSN: 8756-971X
Descriptors: pest control/ marshes/ water management/ reviews/ literature reviews/ aquatic insects/ literature review/ mosquito control/ ecological effects/ resources management/ Culicidae/ Diptera/ Diptera/ Medical &

veterinary entomology/ Control/ Species interactions: pests and control/ Ecological impact of water development/ Brackish water
Abstract: Open Marsh Water Management (OMWM) is a method of salt-marsh mosquito control that advocates source reduction and biological control through selective pond creation and ditching in mosquito breeding areas. This method has been used as an alternative to chemical insecticides in coastal wetlands for 30 years. This paper reviews the effects of OMWM on hydrology, topography, vegetation, mosquitoes, invertebrates, fishes, birds, mammals, and water quality. Other source reduction techniques and the economics of OMWM are also discussed.

432. **Effects of pesticides and other organic pollutants in the aquatic environment on immunity of fish: A review.**
Dunier, M. and Siwicki, A. K.
Fish and Shellfish Immunology 3 (6): 423-438. (1993);
ISSN: 1050-4648
Descriptors: pesticides/ organic compounds/ immunology/ disease resistance/ fish culture/ literature reviews/ pollutants/ immunity/ effects on/ aquatic environment/ Pisces/ reviews/ aquatic environments/ organic/ Fish culture/ Effects on organisms/ Reviews/ Reviews/ Freshwater pollution
Abstract: In the present paper the effects of various pollutants from industry or agriculture on the fish immune system are reviewed. The major xenobiotics involved as immunomodulators are pesticides (insecticides, herbicides, fungicides) and other organic pollutants such as polynuclear aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB) and tributyltin (TBT). Immunotoxicology in mammals has become a very active discipline, but there remains a scarcity of information concerning fish immunotoxicology. This review gathers the data available on the effects of certain pollutants in the aquatic environment on the humoral and cellular immunity of fish.

433. **Effects of Pesticides on Soil and Water Microflora and Mesofauna in Wetland Ricefields: A Summary of Current Knowledge and Extrapolation to Temperate Environments.**
Roger, P. A.; Simpson, I.; Oficial, R.; Ardales, S.; and Jimenez, R.
Australian Journal of Experimental Agriculture 34 (7): 1057-1068. (1994)
NAL Call #: 23-Au792;
ISSN: 0816-1089
Descriptors: reviews/ pesticides/ bibliographies/ wetlands/ rice/ temperate zone/ invertebrates/ fertilizers/ agricultural practices/ rice fields/ pollution effects/ microorganisms/ Invertebrata/ literature reviews/ agricultural pollution/ data collections/ biodiversity/ Effects of pollution/ Effects on organisms/ Freshwater pollution
Abstract: This review summarises information on the behaviour of pesticides and their impacts on microorganisms and non-target invertebrates that was collected in, or is applicable to, temperate wetland ricefields. An extensive bibliographic survey shows that current knowledge is fragmentary and partly outdated. Pesticides applied on soil at recommended levels rarely had a detrimental effect on microbial populations or their activities. They had more effect on invertebrate populations, inducing the blooming of individual species of floodwater zooplankton and reducing populations of aquatic oligochaetes in soil. Available information raises concerns regarding the long-term effects of pesticides on (i) microorganisms, primary producers, and invertebrates of importance to soil fertility, (ii) predators of rice pests and vectors, and (iii) microbial metabolism of pesticides.

434. **Effects of Pollutants on Freshwater Organisms.**
Hall, S.; Chamberlain, J.; and Godwin-Sadd, E.
Water Environment Research 67 (4): 713-718. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ water pollution effects/ surface water/ ecosystems/ toxicity/ aquatic environment/ aquatic life/ metals/ pesticides/ Effects of pollution
Abstract: A myriad of "pollutants" enter freshwater from innumerable sources, and their effects on aquatic life are exhibited from the cellular to ecosystem levels. Much research has been published in these areas. This paper views some of the published research on the effects of chemicals on freshwater organisms.

435. **Effects of Pollution on Saltwater Organisms.**
Reish, D. J.; Oshida, P. S.; Mearns, A. J.; and Ginn, T. C.
Water Environment Research 65 (6): 573-585. (1993)
NAL Call #: TD419.R47
Descriptors: Literature review/ Marine fisheries/ Marine life/ Marine pollution/ Oil pollution/ Reviews/ Toxicity/ Water pollution effects/ Bioassay/ Heavy metals/ Monitoring/ Organic compounds/ Organotin compounds/ Pesticides/ Polychlorinated biphenyls/ Shellfish/ Toxicology/ Wastewater disposal/ Effects of pollution
Abstract: The concentrations of metals, other elements, and organic compounds (including pesticides and polychlorinated biphenyls) in marine organisms were tabulated. Marine debris, mostly in the form of plastic, has caused the death of manatees off the Florida coast. Contamination of marine sediments by pollutants has in turn caused an increase in the incidence of tumors in marine fish. Abnormalities in mollusks caused by tributyltin continue to be reported. Culture techniques and early-life-stage (ELS) tests have been developed for the topsmelt, Atherinops affinis. Comparative ELS tests indicate that for 11 toxic chemicals, the topsmelt were equal to or more sensitive than the commonly used east coast inland silversides. A chemical toxicity and teratogenicity protocol was developed using silverside embryos to determine the effects of microbial pest control agents on fish eggs and larvae. Levels of heavy metals were studied in fish near ocean wastewater discharge outfalls. Chlorine, commonly used to disinfect wastewater and powerplant discharges, was toxic to various stages of northern anchovy eggs and larvae at concentrations well below recommended treatment doses. The effects of oil pollution were studied in Antarctic and North Sea fish and in

Norway seal pups. New monitoring and assessment techniques for marine pollution are reviewed. Several surveys of marine life and communities showed the effects of marine sediment pollution and water pollution in different parts of the world. Toxicity studies were also performed in fish, shellfish, and microalgae exposed to such pollutants as pesticides, wastewater sludge, mineral oil-based drilling mud, Hibernia crude oil, arsenate, copper, cadmium, mercury, lead, zinc, DDT, Arochlor 1254, and the water-soluble fraction of diesel fuel. (Geiger-PTT)
35 050508002

436. **Effects of prescribed burning on ecosystem processes and attributes in pine/hardwood forests of the southern Appalachians.**
Vose, J. M.
Proceedings - Hardwood Symposium of the Hardwood Research Council (22): 81-90. (1994)
NAL Call #: SD397.H3H37;
ISSN: 0193-8495.
Notes: Paper presented at the symposium on Opportunities for the Hardwood Industry to Address Environmental Challenges held May 12-15, 1994, Cashiers, North Carolina. Includes references.
Descriptors: mixed forests/ ecosystems/ pinus/ hardwoods/ silvicultural systems/ prescribed burning/ revegetation/ species diversity/ nitrogen cycle/ nitrogen content/ losses from soil/ water erosion/ streams/ water quality/ stand density/ forest litter/ literature reviews/ North Carolina/ Appalachian states of USA/ South Carolina/ fell and burn/ nitrogen pool/ nitrogen loss
This citation is from AGRICOLA.

437. **Effects of Rock Fragments on Soil Erosion by Water at Different Spatial Scales: A Review.**
Poesen, J. W.; Torri, D.; and Bunte, K.
Catena 23 (1-2): 141-166. (1994)
NAL Call #: GB400.C3;
ISSN: 0341-8162.
Notes: Special issue: Rock fragments in soil: Surface dynamics
Descriptors: soil erosion/ rocks/ sediment yield/ soil properties/ rill erosion/ soil conservation/ Erosion and sedimentation
Abstract: This paper reviews the various effects of rock fragments on soil erosion by water. Since these effects are scale dependent, they are investigated at three different nested spatial scales: the microplot (4 x 10 super(-6)-10 super(0) m super(2)), the mesoplot (10 super(-2)-10 super(2) m super(2)) and the macroplot (10 super(1)-10 super(4) m super(2). For each scale the corresponding process mechanisms are discussed. Particular attention is paid to the effects of rock fragment cover on the intensity of soil erosion processes. At the mesoplot scale, i.e. on interrill areas, rock fragments at the soil surface can have negative as well as positive effects on sediment yield. These ambivalent effects are conditioned by the type of fine earth porosity, soil surface slope, vertical position and size of rock fragments and by the occurrence of horseshoe vortex erosion. At the microplot scale, i.e. the soil surface area which is covered by a single rock fragment, and at the macroplot scale, i.e. upland areas where both interrill and rill erosion takes place, rock fragments at the soil surface have a negative effect on sediment yield. In these two scales rock fragments can thus be considered as natural soil surface stabilizers. At the macroplot scale the mean decrease of relative interrill and rill sediment yield with rock fragment cover can be expressed by an exponential decay function. The scatter of the data indicates that a given rock fragment cover can have different efficiencies in reducing interrill and rill sediment yield depending on the varying intensities of the hydrological and erosion subprocesses. These findings have implications for erosion modelling and soil conservation.

438. **Effects of Sedimentation and Turbidity on Lotic Food Webs: A Concise Review for Natural Resource Managers.**
Henley, W. F.; Patterson, M. A.; Neves, R. J.; and Lemly, A. D.
Reviews in Fisheries Science 8 (2): 125-139. (2000);
ISSN: 1064-1262
Descriptors: Sediment load/ Nephelometers/ Trophic levels/ Environmental impact/ Ecosystem disturbance/ Water quality control/ Population dynamics/ Food chains/ Turbidity/ Environment management/ Zooplankton/ Sedimentation/ Mollusks/ Fish/ Insects/ Watersheds/ Suspended Sediments/ Monitoring/ Streams/ Habitat community studies/ Mechanical and natural changes/ Erosion and sedimentation
Abstract: Sedimentation and turbidity are significant contributors to declines in populations of North American aquatic organisms. Impacts to lotic fauna may be expressed through pervasive alterations in local food chains beginning at the primary trophic level. Decreases in primary production are associated with increases in sedimentation and turbidity and produce negative cascading effects through depleted food availability to zooplankton, insects, freshwater mollusks, and fish. Direct effects at each trophic level are mortality, reduced physiological function, and avoidance; however, decreases in available food at trophic levels also result in depressed rates of growth, reproduction, and recruitment. Impacts of turbidity to aquatic organisms often seem inconsistent among watersheds and experiments, but this apparent difference is actually due to the lack of correlation between suspended sediment concentrations (mg/L) and units of measure (Nephelometric Turbidity Units, NTU). The use of NTU as a surrogate measurement of suspended sediment to predict biotic effects within watersheds is dubious. Similar NTU measurements from different watersheds may be correlated with different concentrations of suspended sediment. For monitoring the effects of turbidity within local watersheds, we recommend that the correlation between suspended sediment and NTUs be examined over a range of discharge recordings, and that this be used as a baseline to examine local effects. We recommend that riparian buffer strips and livestock fencing be used to reduce sediment input to streams.

439. **Effects of soil abiotic processes on the bioavailability of anthropogenic organic residues.**
Ruggiero, P.; Pizzigallo, M. D. R.; and Crecchio, C.
In: Ecological significance of the interactions among clay minerals, organic matter and soil biota: 3rd Symposium on Soil Mineral-Organic Matter-Microorganism Interactions and Ecosystem Health. (Held 22 May

2000-26 May 2000 at Naples-Capri, Italy.) Violante, A.; Huang, P. M.; Bollag, J. M.; and Gianfreda, L. (eds.); pp. 95-133; 2002.
ISBN: 0-444-51039-7
This citation is provided courtesy of CAB International/CABI Publishing.

440. **Effects of soil solution on the dynamics of N2O emissions: A review.**
Heincke, M. and Kaupenjohann, M.
Nutrient Cycling in Agroecosystems 55 (2): 133-157. (Oct. 1999)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: soil solution/ nitrous oxide/ emission/ soil air/ solubility/ nitrogen/ nutrient balance/ leaching/ mathematical models/ soil water content/ soil temperature/ movement in soil/ literature reviews
Abstract: In this review, which consists of two parts, major interactions between nitrous oxide (N2O) and soil solution are described. In the first part, as an introduction, concentrations of dissolved N2O in different aqueous systems are summarized. An inventory of data on maximal N2O concentrations in soil solution (up to 9984 micrograms N2O-N l-1 and in soil air up to 8300 ppm) from literature is presented. The peak N2O concentrations represent a N2O supersaturation in the soil solution up to 30000 times with respect to ambient air and a soil air N2O concentration about 25000 times higher than in the atmosphere. The main physicochemical parameters (solubility, diffusion) controlling N2O distribution between soil solution and soil air are outlined. The influences of cultivation practice, nitrogen turnover, water content and temperature on N2O accumulation in soil solution and soil air are reviewed. In the second part some models of N2O dynamics in soils are discussed with emphasis on N2O transport processes. A simple qualitative scheme is developed to categorize the effects of the soil solution on N2O dynamics in soils. In this scheme the temporary, intensive N2O oversaturation of the soil solution is interpreted as a result of gas diffusion inhibition by water (barrier function of soil solution) resulting in an accumulation of N2O. In addition, N2O supersaturation is an indication that transitory much N2O can be stored in the soil solution (storage function of soil solution). Where the soil solution flows up-, down- or sidewards it can act as a relevant transport medium for dissolved N2O (transport function of soil solution). This scheme is applied to examples from the literature.
This citation is from AGRICOLA.

441. **Effects of timber management on the hydrology of wetland forests in the southern United States.**
Sun, G.; Mcnulty, S. G.; Shepard, J. P.; Amatya, D. M.; Riekerk, H.; Comerford, N. B.; Skaggs, W.; and Swift, L. Jr.
Forest Ecology and Management 143 (1/3): 227-236. (Apr. 2001)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW].
Notes: Special issue: The science of managing forests to sustain water resources / edited by R.T. Brooks and N. Lust. Paper presented at a conference held November 8-11, 1998, Sturbridge, Massachusetts. Includes references.
Descriptors: forests/ wetlands/ forest management/ hydrology/ logging/ site preparation/ drainage/ simulation models/ geographical information systems/ water table/ groundwater level/ storms/ runoff/ spatial variation/ temporal variation/ evapotranspiration/ literature reviews/ Alabama/ Georgia/ South Carolina/ Texas/ Virginia/ North Carolina/ Florida
This citation is from AGRICOLA.

442. **The Effects of Uv-B Radiation and Endocrine-Disrupting Chemicals (Edcs) on the Biology of Amphibians.**
Crump, D.
Environmental Reviews 9 (2): 61-80. (2001)
NAL Call #: GE140.E59;
ISSN: 1208-6053
Descriptors: Toxicity / Xenobiotics/ Chemical pollution/ Pollution effects/ Ultraviolet radiation/ Polycyclic aromatic hydrocarbons/ Pesticides/ endocrine disruptors/ population decline/ metamorphosis/ Breeding success/ Survival/ Mortality/ Population dynamics/ Water Pollution Effects/ Ecological Effects/ Animal Populations/ Amphibians/ Growth/ Sexual Reproduction/ Reviews/ Amphibia/ Amphibians/ endocrine disrupting chemicals/ endocrine disrupters/ Freshwater pollution/ Effects on organisms/ Effects of pollution
Abstract: Statistical meta-analysis of large and diverse data sets has indicated that amphibians have been declining worldwide since the 1960s. Exposure to UV-B radiation (280-320 nm) and endocrine-disrupting chemicals (EDCs) have been considered as possible hypotheses to explain the observed declines. Equivocal conclusions have been reached with respect to the effects of UV-B on amphibian populations. Field and laboratory studies employing both ecologically relevant and enhanced UV-B levels have been conducted using a variety of amphibian species and reports differ with respect to the most sensitive developmental stage and the ultimate implications. UV-B radiation has also been shown to interact with other stressors (e.g., pesticides, polycyclic aromatic hydrocarbons, low pH) resulting in decreased survivorship for several amphibian species. Limited evidence of reproductive toxicity of xenobiotics in amphibians exist; however, early exposure to EDCs could cause abnormal development of the amphibian reproductive system, inhibit vital hormone messages that drive metamorphosis, and ultimately contribute to the decline of some amphibian populations. The available evidence suggests that more than one agent is contributing to amphibian population declines and the following review narrows the focus to address the existing data on the effects of UV-B, alone and in combination with other stressors, and EDCs on amphibian survivorship and development.

443. **Effects of windbreaks on airflow, microclimates and crops yields.**
Cleugh, H. A.
Agroforestry Systems 41 (1): 55-84. (1998)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366 [AGSYE6].
Notes: Special issue: Windbreaks in support of agricultural production in Australia / edited by R. Prinsley. Includes references.
Descriptors: shelterbelts/ microclimate/ crop yield/ crops/ air flow/ evaporation/ mathematical models/ turbulence/ permeability/ air temperature/ relative humidity/ heat/ shade/ lodging/ water use efficiency/ literature reviews
This citation is from AGRICOLA.

444. **Efficiency and uniformity of the LEPA and spray sprinkler methods: A review.**
Schneider, A. D.
Transactions of the ASAE 43 (4): 937-944. (July 2000-Aug. 2000)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: sprinkler irrigation/ application methods/ runoff/ evaporation/ drift/ efficiency/ low energy precision application/ uniformity coefficient
Abstract: Application efficiencies and uniformity coefficients reported for the low energy precision application (LEPA) and spray sprinkler irrigation methods are reviewed and summarized. The relative sizes of the water loss pathways for the two sprinkler methods are also summarized. With negligible runoff and deep percolation, reported application efficiencies for LEPA are typically in the 95 to 98% range. Measurements such as chemical tracers, weighing lysimeter catches, and energy balance modeling are believed to be more accurate than small collector measurements for estimating spray application efficiency. Spray application efficiencies based on these other measurements exceed 90% when runoff and deep percolation are negligible. Because of the start and stop nature of mechanical move irrigation systems, uniformity coefficients for LEPA and spray are measured both along the irrigation system mainline and in the direction of travel. Along the mainline, reported uniformity coefficients are generally in the 0.94 to 0.97 range for LEPA and in the 0.75 to 0.85 range for spray. In the direction of travel, the uniformity coefficients are generally in the 0.75 to 0.85 range for LEPA with furrow diking and in the 0.75 to 0.90 range for spray. On start and stop sprinkler systems, basin tillage on a 2 to 4 m spacing is critical for uniform LEPA irrigation because the basins prevent runoff and average the applications during several unequal start and stop times. Runoff is the largest potential water loss pathway for both LEPA and spray irrigation. For the spray method, runoff can exceed either droplet evaporation and drift or non-beneficial canopy evaporation.
This citation is from AGRICOLA.

445. **Efficiency of nutrient utilization and sustaining soil fertility with particular reference to phosphorus.**
Helyar, K. R.
Field Crops Research 56 (1/2): 187-195. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: phosphorus/ nutrition physiology/ soil fertility/ use efficiency/ sustainability/ phosphorus fertilizers/ crop management/ economic analysis/ cultivars/ nutrient availability/ application rates/ runoff/ erosion/ leachates/ crop yield/ roots/ rotations/ surface area/ literature reviews
This citation is from AGRICOLA.

446. **Efficient feed nutrient utilization to reduce pollutants in poultry and swine manure.**
Nahm, K H
Critical Reviews in Environmental Science and Technology 32 (1): 1-16. (2002)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: amino acids: feed additive, synthetic/ ammonia: emissions/ enzymes: feed supplement/ growth promoting substances/ nitrogen: environmental contaminant, nutrient/ phosphorus: environmental contaminant, nutrient/ phytase: feed supplement/ protein: reduced feed content/ chicken (Galliformes): broiler, chick, commercial species, layer, livestock/ pig (Suidae): commercial species, finishing, livestock, piglet/ Animals / Artiodactyls/ Birds/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ diet modification/ efficient feed nutrient utilization/ feed manufacturing technique modification/ highly digestible raw feed materials/ manure dry matter weight [manure DM weight]/ odor/ pollutant reduction/ poultry manure: environmental contaminant/ swine manure: environmental contaminant
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447. **Effluent treatment: Options for treating pig slurry.**
Kilgallen P and O'Shea J.
In: Concepts in pig science 2001: The 3rd annual Turtle Lake Pig Science Conference.
Lyons TP and Cole DJ (eds.)
Nottingham, UK: Nottingham University Press; pp. 97-105; 2001.
This citation is provided courtesy of CAB International/CABI Publishing.

448. **Efforts by industry to improve the environmental safety of pesticides.**
James, J. R.; Tweedy, B. G.; and Newby, L. C.
Annual Review of Phytopathology 31: 423-439. (1993)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]
Descriptors: pesticides/ agricultural chemicals/ environmental impact/ product development/ environmental protection/ toxicology/ safety/ health hazards/ trends/ plant disease control/ literature reviews
This citation is from AGRICOLA.

449. **El Nino as a window of opportunity for the restoration of degraded arid ecosystems.**
Holmgren, Milena and Scheffer, Marten
Ecosystems 4 (2): 151-159. (2001)
NAL Call #: QH540.E3645;
ISSN: 1432-9840
Descriptors: El Nino Southern Oscillation [ENSO]/ agriculture/ alternative stable states/ arid ecosystems: degradation, restoration/ biomass depletion/ climatic oscillation/ desertification/ graphic models/ overexploitation/ overgrazing/ rangelands/ soil erosion/ vegetation shifts/ wood harvesting
Abstract: Most arid ecosystems have suffered from severe overexploitation by excessive wood harvesting, overgrazing, and agriculture, resulting in depletion of vegetation biomass and soil erosion. These changes are often difficult to reverse due to positive feedbacks that tend to stabilize the new situation. In this paper, we briefly review evidence for the idea that different states in these ecosystems might represent alternative equilibria and present a graphic model that summarizes the implications for their response to changing environmental conditions. We show how, in the light of this theoretical framework, climatic oscillations such as El Nino Southern Oscillation (ENSO) could be used in combination with grazer control to restore degraded and ecosystems. We also present evidence that, depending on grazing pressure, ENSO episodes can trigger structural

and long-lasting changes in these ecosystems.

450. **Electrical conductivity methods for measuring and mapping soil salinity.**
Rhoades, J. D.
Advances in Agronomy 49: 201-251. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: soil salinity/ mapping/ measurement/ methodology/ sensors/ site factors/ electrical conductivity/ irrigated soils/ literature reviews/ mathematical models/ soil physical properties
This citation is from AGRICOLA.

451. **Eliminating waste: Strategies for sustainable manure management: Review.**
Richard, T. L. and Choi, H. L.
Asian Australasian Journal of Animal Sciences 12 (7): 1162-1169. (1999)
NAL Call #: SF55.A78A7;
ISSN: 1011-2367
This citation is provided courtesy of CAB International/CABI Publishing.

452. **Emerging Pathogens: Viruses, Protozoa, and Algal Toxins.**
AWWA Research Division Microbiological Contaminants Research Committee
Journal of the American Water Works Association 91 (9): 110-121. (1999);
ISSN: 0003-150X.
Notes: Title: Committee Report
Descriptors: Reviews/ Water borne diseases/ Water supplies/ Drinking water/ Water treatment/ Pathogens/ Protozoa/ Algae/ Toxins/ Viruses/ Water Quality/ Bacteria/ Data Collections/ Calicivirus/ Enterovirus/ Hepatitis D virus/ Norwalk virus/ Cyanophyta/ Microsporidia/ Toxoplasma gondii/ Cyclospora/ viruses/ Epidemiology/ Other water systems/ Protozoa: human/ Water treatment and distribution/ Plants
Abstract: The list of constituents of concern in drinking water now includes viruses, protozoa, and algal toxins as well as more widely known bacteria. Information about these less well known constituents can be difficult to gather, a difficulty this AWWA committee report helps to alleviate. The report reviews six increasingly important viral and protozoan organisms and an algal toxin, all of which are documented in water and have been linked to disease: the caliciviruses, particularly Norwalk virus, enteroviruses, and hepatitis virus; the protozoans Cyclospora, microsporidia, and Toxoplasma gondii; and cyanobacterial toxins. The good news is that none of these constituents is considered of great concern in drinking water treatment. Norwalk virus and other caliciviruses, Cyclospora, microsporidia, and algal toxins are rated as of moderate concern, largely because waterborne outbreaks are documented for most, but little is known about their occurrence or how to control them. This report will serve as a convenient first source of information for water suppliers.

453. **Emission of nitrous oxide from salts used for agriculture.**
Freney, J. R.
Nutrient Cycling in Agroecosystems 49 (1/3): 1-6. (1997)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC].
Notes: Paper presented at the International Symposium on "Soil-Source and Sink of Greenhouse Gases" held September 18-21, 1995, Nanjing, China. Includes references.
Descriptors: agricultural soils/ nitrous oxide/ emission/ losses from soil/ sources/ biomass/ prescribed burning/ nitrification/ denitrification/ nitrogen fertilizers/ nitrogen fixing bacteria/ anaerobiosis/ flooding/ soil management/ nitrogen/ use efficiency/ reviews/ greenhouse gases
Abstract: Nitrous oxide is emitted into the atmosphere as a result of biomass burning, and biological processes in soils. Biomass burning is not only an instantaneous source of nitrous oxide, but it results in a longer term enhancement of the biogenic production of this gas. Measurements of nitrous oxide emissions from soils before and after a controlled burn showed that significantly more nitrous oxide was exhaled after the burn. The current belief is that 90% of the emissions come from soils. Nitrous oxide is formed in soils during the microbiological processes nitrification and denitrification. Because nitrous oxide is a gas it can escape from soil during these transformations. Nitrous oxide production is controlled by temperature, pH, water holding capacity of the soil, irrigation practices, fertilizer rate, tillage practice, soil type, oxygen concentration, availability of carbon, vegetation, land use practices and use of chemicals. Nitrous oxide emissions from agricultural soils are increased by the addition of fertilizer nitrogen and by the growth of legumes to fix atmospheric nitrogen. A recent analysis suggests that emissions of nitrous oxide from fertilized soils are not related to the type of fertilizer nitrogen applied and emissions can be calculated from the amount of nitrogen applied. Legumes also contribute to nitrous oxide emission in a number of ways, viz. atmospheric nitrogen fixed by legumes can be nitrified and denitrified in the same way as fertilizer nitrogen, thus providing a source of nitrous oxide, and symbiotically living Rhizobia in root nodules are able to denitrify and produce nitrous oxide. Conversion of tropical forests to crop production and pasture has a significant effect on the emission of nitrous oxide. Emissions of nitrous oxide increased by about a factor of two when a forest in central Brazil was clear cut, and pasture soils in the same area produced three times as much nitrous oxide as adjacent forest soils. Studies on temperate and tropical rice fields show that less than 0.1% of the applied nitrogen is emitted as nitrous oxide if the soils are flooded for a number of days before fertilizer application. However, if mineral nitrogen is present in the soil before flooding it will serve as a source of nitrous oxide during wetting and drying cycles before permanent flooding. Thus dry seeded rice can be a source of considerable nitrous oxide. There are also indirect contributions to nitrous oxide emission through volatilization of ammonia and emission of nitric oxides into the atmosphere, and their redistribution over the landscape through wet and dry deposition. In general nitrous oxide emissions can be decreased by management practices which optimize the crop's natural ability to compete with processes whereby plant available nitrogen is lost from the soil-plant system. If these options were implemented they would also result in increased productivity and reduced inputs.
This citation is from AGRICOLA.

454. **Emission of pesticides into the air.**
Berg, F. van den; Kubiak, R.; Benjey, W. G.; Majewski, M. S.; Yates, S. R.; Reeves, G. L.; Smelt, J. H.; and Linden, A. M. A. van der.
Water, Air and Soil Pollution 115 (1/4): 195-218. (Oct. 1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979 [WAPLAC].
Notes: Special section: Fate of pesticides in the atmosphere: Implications for environmental risk assessment. Proceedings of a workshop held April 22-24, 1998, Driebergen, The Netherlands. Includes references.
Descriptors: pesticides/ pesticide residues/ emission/ air/ air pollution/ air pollutants/ volatilization/ drift/ agricultural soils/ polluted soils/ greenhouses/ simulation models/ mathematical models/ literature reviews/ regional emissions
This citation is from AGRICOLA.

455. **Emissions of aerial pollutants in livestock buildings in northern Europe: Overview of a multinational project.**
Wathes, C. M.; Phillips, V. R.; Holden, M. R.; Sneath, R. W.; Short, J. L.; White, R. P.; Hartung, J.; Seedorf, J.; Schroder, M.; and Linkert, K. H.
Journal of Agricultural Engineering Research 70 (1): 3-9. (May 1998)
NAL Call #: 58.8-J82;
ISSN: 0021-8634 [JAERA2].
Notes: Special issue: Emissions of aerial pollutants in livestock buildings in Northern Europe / edited by D. White, C. M. Wathes and V. R. Phillips. Includes references.
Descriptors: air pollution/ animal housing/ emission/ research projects/ organization of research/ methodology/ international cooperation/ environmental protection/ England/ Netherlands/ Denmark/ Germany
This citation is from AGRICOLA.

456. **Emissions of N2O and NO associated with nitrogen fertilization in intensive agriculture, and the potential for mitigation.**
Smith, K A; McTaggart, I P; and Tsuruta, H
Soil Use and Management 13 (4 [supplement]): 296-304. (1997)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: nitric oxide: emission, greenhouse gas/ nitrogen: fertilizer/ nitrous oxide: emission, greenhouse gas/ greenhouse gas emission mitigation potential/ intensive agriculture
Abstract: Increases in the atmospheric concentrations of nitrous oxide (N2O) contribute to global warming and to ozone depletion in the stratosphere. Nitric oxide (NO) is a cause of acid rain and tropospheric ozone. The use of N fertilizers in agriculture has direct and indirect effects on the emissions of both these gases, which are the result of microbial nitrification and denitrification in the soil, and which are controlled principally by soil water and mineral N contents, temperature and labile organic matter. The global emission of N2O from cultivated land is now estimated at 3.5 Tg N annually, of which 1.5 Tg has been directly attributed to synthetic N fertilizers, out of a total quantity applied in 1990 of about 77Tg N. This amount was 150% above the 1970 figure. The total fertilizer-induced emissions of NO are somewhere in the range 0.5-5 Tg N. Mineral N fertilizers can also be indirect as well as direct sources of N2O and NO emissions, via deposition of volatilized NH3 on natural ecosystems and denitrification of leached nitrate in subsoils, waters and sediments. IPCC currently assume an N2O emission factor of 1.25 +- 1.0% of fertilizer N applied. No allowance is made for different fertilizer types, on the basis that soil management and cropping systems, and unpredictable rainfall inputs, are more important variables. However, recent results show substantial reductions in emissions from grassland by matching fertilizer type to environmental conditions, and in arable systems by using controlled release fertilizers and nitrification inhibitors. Also, better timing and placement of N, application of the minimum amount of N to achieve satisfactory yield, and optimization of soil physical conditions, particularly avoidance of excessive wetness and compaction, would be expected to reduce the average emission factor for N2O. Some of these adjustments would also reduce NO emissions. However, increasing global fertilizer use is likely to cause an upward trend in total emissions even if these mitigating practices become widely adopted.
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457. **Emissions of organic air toxics from open burning: A comprehensive review.**
Lemieux, P. M.; Lutes, C. C.; and Santoianni, D. A.
Progress in Energy and Combustion Science 30 (1): 1-32. (2004);
ISSN: 0360-1285.
Notes: Number of References: 93; Publisher: Pergamon-Elsevier Science Ltd
Descriptors: Environmental Engineering & Energy/ uncontrolled combustion/ open burning/ HAPS/ air toxics/ emissions/ polycyclic aromatic hydrocarbons/ dibenzo p dioxins/ Kuwaiti oil fires/ molecular tracers/ landfill fires/ aerosols/ waste/ identification/ combustion/ particle
Abstract: Emissions from open burning, on a mass pollutant per mass fuel (emission factor) basis, are greater than those from well-controlled combustion sources. Some types of open burning (e.g. biomass) are large sources on a global scale in comparison to other broad classes of sources (e.g. mobile and industrial sources). A detailed literature search was performed to collect and collate available data reporting emissions of organic air toxics from open burning sources. The sources that were included in this paper are: Accidental Fires, Agricultural Burning of Crop Residue, Agricultural Plastic Film, Animal Carcasses, Automobile Shredder Fluff Fires, Camp Fires, Car-Boat-Train (the vehicle not cargo) Fires, Construction Debris Fires, Copper Wire Reclamation, Crude Oil and Oil Spill Fires, Electronics Waste, Fiberglass, Fireworks, Grain Silo Fires, Household Waste, Land Clearing Debris (biomass), Landfills/Dumps, Prescribed Burning and Savanna/Forest Fires, Structural Fires, Tire Fires, and Yard Waste Fires. Availability of data varied according to the source and the class of air toxics of interest. Volatile organic compound (VOC) and polycyclic aromatic hydrocarbon (PAH) data were available for many of the sources. Non-PAH semi-volatile organic compound (SVOC) data were available for several sources. Carbonyl and polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofuran (PCDD/F) data were available for only a few sources. There were several known sources for which no emissions data were available at all. It is desirable that emissions from those sources be tested so that the relative degree of

hazard they pose can be assessed. Several observations were made including: Biomass open burning sources typically emitted less VOCs than open burning sources with anthropogenic fuels on a mass emitted per mass burned basis, particularly those where polymers were concerned. Biomass open burning sources typically emitted less SVOCs and PAHs than anthropogenic sources on a mass emitted per mass burned basis. Burning pools of crude oil and diesel fuel produced significant amounts of PAHs relative to other types of open burning. PAH emissions were highest when combustion of polymers was taking place. Based on very limited data, biomass open burning sources typically produced higher levels of carbonyls than anthropogenic sources on a mass emitted per mass burned basis, probably due to oxygenated structures resulting from thermal decomposition of cellulose. It must be noted that local bum conditions could significantly change these relative levels. Based on very limited data, PCDD/F and other persistent bioaccumulative toxic (PBT) emissions varied greatly from source to source and exhibited significant variations within source categories. This high degree of variation is likely due to a combination of factors, including fuel composition, fuel heating value, bulk density, oxygen transport, and combustion conditions. This highlights the importance of having acceptable test data for PCDD/F and PBT emissions from open burning so that contributions of sources to the overall PCDD/F and PBT emissions inventory can be better quantified.

458. **Encyclopedia of pest management.**
Pimentel, D.: Marcel Dekker; 903 p. (2002); *ISBN:* 0824708474
Descriptors: disease and pest management/ integrated pest management/ pests/ pest control/ laws and regulations/ semiochemicals/ pesticides/ pesticide application/ human health/ cost analysis

459. **Encyclopedia of soil science.**
Lal, R.: Marcel Dekker; 1450 p. (2002); *ISBN:* 0824708466
Descriptors: soil science/ agriculture/ soil productivity/ sustainable agriculture/ environmental quality

460. **Encyclopedia of water science.**
Stewart, B. A. and Howell, T. A.
New York: Marcel Dekker. (2003); *ISBN:* 0824709489
Descriptors: Agricultural water supply/ Water in agriculture/ Irrigation efficiency

461. **Endangered species and irrigated agriculture: Water resource competition in western river systems.**
Moore, Michael R.; Mulville, Aimee.; Weinberg, Marca.; and United States. Dept. of Agriculture. Economic Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Economic Research Service; iv, 20 p.: ill., maps; Series: Agriculture information bulletin no. 720 (An Economic Research Service report). (1995)
Notes: Cover title. Distributed to depository libraries in microfiche. Shipping list no.: 97-0500-M. "November 1995"--P. [i]. Includes bibliographical references (p. 18-19). SUDOCS: A 1.75:720.
NAL Call #: Fiche--S-133-A-1.75:720-
Descriptors: Endangered species---West---United States/ Water resources development---West---United States/ Irrigation farming---West---United States
This citation is from AGRICOLA.

462. **Engineering systems to enhance irrigation performance.**
Hoffman, G. J. and Martin, D. L.
Irrigation Science 14 (2): 53-63. (1993)
NAL Call #: S612.I756;
ISSN: 0342-7188 [IRSCD2].
Notes: Paper presented at the First Volcani International Symposium on The Limits of Water Use Efficiency in Agriculture, October 1992, Bet Dagan, Israel. Includes references.
Descriptors: irrigation systems/ water use efficiency/ irrigation water/ engineering/ surface irrigation/ sprinkler irrigation/ irrigation scheduling/ performance/ microirrigation
Abstract: The desirable irrigation system applies water at a rate that allows all water to infiltrate and distributes the water in space and time to match crop requirements in each parcel of the field. Various types of irrigation systems and management strategies have been developed in attempts to achieve the "desired" system. Our objective is to review various methods of enhancing irrigation performance. Although the "desired" system has not been attained, considerable improvements have been made based upon selection and management technologies which generate profits within the constraints of environmental prudence. Each irrigation system has inherent opportunities for enhancing irrigation performance. Likewise, each has limitations in achieving maximum crop productivity per unit of applied water. Methods to improve the performance or surface irrigation can be grouped into those that increase the uniformity of water intake, reduce runoff losses, or decrease spatial variability. Two surface irrigation systems that enhance performance are surge-flow and level-basin. The uniformity and efficiency of sprinkler systems can be enhanced by computer-based design procedures and, in some cases, by applying low-energy, precision application concepts. Advantages of microirrigation are less surface area wetted, which minimizes evaporation and weed growth, and improved application uniformity which is specifically designed into the distribution network. An appropriate management strategy is necessary to attain the potential of an irrigation system engineered to match crop water requirements, and soil and environmental conditions. The best irrigation method applies the amount of water desired at the appropriate time while providing for leaching requirements, agronomic operations, and environmental considerations. With enhanced engineering and computer capabilities and improved knowledge of the soil-plant-water continuum, irrigators will adopt "prescription" irrigation. Prescription systems apply precisely the prescribed amounts of water, nutrients. and pesticides to match the production capacity of each parcel of land.
This citation is from AGRICOLA.

463. **Enhancing riparian habitat for fish, wildlife, and timber in managed forests.**
Newton, Michael; Willis, Ruth; Walsh, Jennifer; Cole, Elizabeth; and Chan, Samuel
Weed Technology 10 (2): 429-438. (1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: conifer (Coniferopsida)/ fish (Pisces Unspecified) / Pisces (Pisces Unspecified)/ animals/ chordates/ fish/ gymnosperms/ nonhuman vertebrates/ plants/ spermatophytes/ vascular plants/ vertebrates/ conservation/ forestry/ riparian habitat
Abstract: The productivity of riparian sites in managed forests can be focused to provide productive fish and wildlife habitat while yielding most of its productive capacity for other than amenity values. Establishment of habitat protection goals and measures of achievement permit flexible approaches for meeting them. Once the protection standards are set, intensive management of the woody cover is logically dependent on minimum disturbance methods, in general, for both vegetation management and harvest. Several currently registered chemical products and non-chemical methods are helpful and safe in achieving both yield and protection goals.
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464. **Enhancing the carbon sink in European agricultural soils: Including trace gas fluxes in estimates of carbon mitigation potential.**
Smith, P.; Goulding, K. W.; Smith, K. A.; Powlson, D. S.; Smith, J. U.; Falloon, P.; and Coleman, K.
Nutrient Cycling in Agroecosystems 60 (1/3): 237-252. (2001)
NAL Call #: S631 .F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: agricultural soils/ carbon/ efflux/ climatic change/ methane/ gases/ forestry/ land use/ animal manures/ sewage sludge/ no-tillage/ rotations/ woodlands/ bioenergy/ agricultural land/ ecosystems/ environmental impact/ literature reviews/ Europe
Abstract: The possibility that the carbon sink in agricultural soils can be enhanced has taken on great political significance since the Kyoto Protocol was finalised in December 1997. The Kyoto Protocol allows carbon emissions to be offset by demonstrable removal of carbon from the atmosphere. Thus, forestry activities (Article 3.3) and changes in the use of agricultural soils (Article 3.4) that are shown to reduce atmospheric CO2 levels may be included in the Kyoto emission reduction targets. The European Union is committed to a reduction in CO2 emissions to 92% of baseline (1990) levels during the first commitment period (2008-2012). We have shown recently that there are a number of agricultural land-management changes that show some potential to increase the carbon sink in agricultural soils and others that allow alternative forms of carbon mitigation (i.e. through fossil fuel substitution), but the options differ greatly in their potential for carbon mitigation. The changes examined were, (a) switching all animal manure use to arable land, (b) applying all sewage sludge to arable land, (c) incorporating all surplus cereal straw, (d) conversion to no-till agriculture, (e) use of surplus arable land to de-intensify 1/3 of current intensive crop production (through use of 1/3 grass/arable rotations), (f) use of surplus arable land to allow natural woodland regeneration, and (g) use of surplus arable land for bioenergy crop production. In this paper, we attempt for the first time to assess other (non-CO2) effects of these land-management changes on (a) the emission of the other important agricultural greenhouse gases, methane and nitrous oxide, and (b) other aspects of the ecology of the agroecosystems. We find that the relative importance of trace gas fluxes varies enormously among the scenarios. In some such as the sewage sludge, woodland regeneration and bioenergy production scenarios, the inclusion of trace gases makes only a small (<10%) difference to the CO2-C mitigation potential. In other cases, for example the no-till, animal manure and agricultural de-intensification scenarios, trace gases have a large impact, sometimes halving or more than doubling the CO2-C mitigation potential. The scenarios showing the greatest increase when including trace gases are those in which manure management changes significantly. In the one scenario (no-till) where the carbon mitigation potential was reduced greatly, a small increase in methane oxidation was outweighed by a sharp increase in N2O emissions. When these land-management options are combined to examine the whole agricultural land area of Europe, most of the changes in mitigation potential are small, but depending upon assumptions for the animal manure scenario, the total mitigation potential either increases by about 20% or decreases by about 10%, shifting the mitigation potential of the scenario from just above the EU's 8% Kyoto emission reduction target (98.9 Tg C y(-1)) to just below it. Our results suggest that (a) trace gas fluxes may change the mitigation potential of a land management option significantly and should always be considered alongside CO2-C mitigation potentials and (b) agricultural management options show considerable potential for carbon mitigation even after accounting for trace gas fluxes.
This citation is from AGRICOLA.

465. **Enhancing water use efficiency in irrigated agriculture.**
Howell, T. A.
Agronomy Journal 93 (2): 281-289. (Mar. 2001-Apr. 2001)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT].
Notes: Paper presented at the symposium "Improving crop water use efficiency and yield: Management influences" held November 2, 1999, Salt Lake City, Utah.
Includes references.
Descriptors: agriculture/ water use efficiency/ irrigation/ irrigation systems/ trends/ rain/ surface water/ environmental degradation/ crops/ literature reviews/ sustainability
Abstract: Irrigated agriculture is a vital component of total agriculture and supplies many of the fruits, vegetables, and cereal foods consumed by humans; the grains fed to animals that are used as human food; and the feed to sustain animals for work in many parts of the world. Irrigation worldwide was practiced on about 263 Mha in 1996, and about 49% of the world's irrigation occurred in India, China, and the USA. The objectives of this paper are to (i) review irrigation worldwide in its ability to meet our growing needs for food production, (ii) review irrigation trends in the USA, (iii) discuss various concepts that define water use efficiency (WUE) in irrigated agriculture from both engineering and agronomic viewpoints, and (iv)

discuss the impacts of enhanced WUE on water conservation. Scarcely one-third of our rainfall, surface water, or ground water is used to produce plants that are useful to mankind. Without appropriate management, irrigated agriculture can be detrimental to the environment and endanger sustainability. Irrigated agriculture is facing growing competition for low-cost, high-quality water. In irrigated agriculture, WUE is broader in scope than most agronomic applications and must be considered on a watershed, basin, irrigation district, or catchment scale. The main pathways for enhancing WUE in irrigated agriculture are to increase the output per unit of water (engineering and agronomic management aspects), reduce losses of water to unusable sinks, reduce water degradation (environmental aspects), and reallocate water to higher priority uses (societal aspects). This citation is from AGRICOLA.

466. **Entomology and nature conservation.**
New, T. R.
European Journal of Entomology 96 (1): 11-17. (1999);
ISSN: 1210-5759
This citation is provided courtesy of CAB International/CABI Publishing.

467. **Environment-friendly swine feed formulation to reduce nitrogen and phosphorus excretion.**
Honeyman MS
American Journal of Alternative Agriculture 8 (3): 128-132; 28 ref. (1993)
NAL Call #: S605.5.A43
This citation is provided courtesy of CAB International/CABI Publishing.

468. **Environmental activation of pesticides.**
Wolfe, Martha F and Seiber, James N
Occupational Medicine 8 (3): 561-574. (1993);
ISSN: 0885-114X
Descriptors: Hominidae (Hominidae)/ animals/ chordates/ humans/ mammals/ primates/ vertebrates/ human exposure
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469. **Environmental analysis of volatile organic compounds in water and sediment by gas chromatography.**
Kuran, P and Sojak, L
Journal of Chromatography A 733 (1-2): 119-141. (1996)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: analytical method/ environmental surveillance
Abstract: Considerable attention is still devoted to the analysis of volatile organic compounds (VOCs) owing to their occurrence in various fields and also harmful effects on health. The techniques used for their analysis are also manifold. The use of headspace techniques in the analysis of VOCs in various matrices has been well reviewed several times, but other techniques have been discussed only very briefly. The aim of this review is to give a brief survey of all techniques used in the environmental analysis of volatiles in water and sediment with emphasis on new trends and the applicability of these techniques in the analysis of water and sediment samples.
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470. **Environmental and Economic Costs of Soil Erosion and Conservation Benefits.**
Pimentel, David; Harvey, C; Resosudarmo, P; Sinclair, K; Kurz, D; Ncnair, M; Crist, S; Shpritz, L; Fitton, L; Saffouri, R; and Blair, R
Science 267 (5201): 1117-1123. (1995)
NAL Call #: 470 Sci2;
ISSN: 0036-8075
Descriptors: agriculture sustainability/ cropland/ food productivity/ pasture
Abstract: Soil erosion is a major environmental threat to the sustainability and productive capacity of agriculture. During the last 40 years, nearly one-third of the world's arable land has been lost by erosion and continues to be lost at a rate of more than 10 million hectares per year. With the addition of a quarter of a million people each day, the world population's food demand is increasing at a time when per capita food productivity is beginning to decline.
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471. **Environmental behavior and analysis of veterinary and human drugs in soils, sediments and sludge.**
Diaz Cruz, M Silvia; Lopez de Alda, Maria J; and Barcelo, Damia
Trends in Analytical Chemistry 22 (6): 340-351. (2003)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: human drugs: detection, environmental fate, extraction, pharmaceutical, pollutant, sediment content, sludge content, soil content, soil pollutant/ veterinary drugs: detection, environmental fate, extraction, pharmaceutical, pollutant, sediment content, sludge content, soil content, soil pollutant/ environmental contamination
Abstract: Human and veterinary drugs are continually being released in the environment mainly as a result of manufacturing processes, disposal of unused or expired products, and excreta. Because of their physical and chemical properties, many of these substances or their bioactive metabolites end up in soils and sediments, where they can accumulate and induce adverse effects in terrestrial or aquatic organisms. Among these effects, bacterial resistance is increasingly observed and is caused by the extensive use of antibiotics in animal and fish farming and the growing practice of adding manure and sewage sludge to agricultural fields, which is of particular concern. Literature on the environmental analysis and occurrence of drugs has addressed a very small percentage of these compounds, so very little information is available about the fate and the potential effects of drugs in the environment. This article presents an overview of recent developments in the determination of veterinary and human drugs in solid environmental matrices, including soil, sediment and sludge. The analysis of pharmaceuticals in the such samples has always been carried out by high-performance liquid chromatography coupled to ultraviolet detection, and, to a lesser extent, to mass spectrometry and fluorescence detection. In most cases, sample pretreatment includes extraction of the solid sample and further purification of the extract by solid phase extraction with C18 sorbents. In addition to analytical articles, this overview includes papers concerning usage of drugs, as well as sources,

fate, persistence, and effects of pharmaceuticals in solid environmental matrices.

472. **The environmental benefits and costs of conservation tillage.**
Uri, N D; Atwood, J D; and Sanabria, J
Environmental Geology 38 (2): 111-140. (1999)
NAL Call #: QE1.E5;
ISSN: 0943-0105
Descriptors: conservation tillage/ environmental benefits
Abstract: Every production practice, including conservation tillage, has positive or negative environmental consequences that may involve air, land, water, and/or the health and ecological status of wildlife. The negative impacts associated with agricultural production, and the use of conventional tillage systems in particular, include soil erosion, energy use, leaching and runoff of agricultural chemicals, and carbon emissions. Several of these impacts are quantified. The conclusions suggest that the use of conservation tillage does result in less of an adverse impact on the environment from agricultural production than does conventional tillage by reducing surface water runoff and wind erosion. Additionally, wildlife habitat will be enhanced to some extent with the adoption of conservation tillage and the benefits to be gained from carbon sequestration will depend on the soil remaining undisturbed. Finally, further expansion of conservation tillage on highly erodible land will unquestionably result in an increase in social benefits, but the expected gains will be modest.

473. **Environmental benefits of genetically modified crops: Global and European perspectives on their ability to reduce pesticide use.**
Phipps, R H and Park, J R
Journal of Animal and Feed Sciences 11 (1): 1-18. (2002); *ISSN:* 1230-1388
Descriptors: carbon dioxide/ pesticide/ cotton (Malvaceae): fiber crop/ maize (Gramineae): grain crop/ oil seed rape (Cruciferae): oil crop/ soyabean (Leguminosae): oil crop/ sugar beet (Chenopodiaceae): sugar crop/ Angiosperms/ Dicots/ Monocots/ Plants/ Spermatophytes/ Vascular Plants/ European Union/ Green Revolution/ diesel/ environment/ genetically modified crops/ public health
Abstract: The Green Revolution, which brought together improved varieties, increased use of fertilizer, irrigation and synthetic pesticides, is credited with helping to feed the current global population of 6 billion. While this paper recognizes the ability of pesticides to reduce crop losses, it also discusses their potential negative effects on public health, with particular emphasis in developing countries, and the environment. The response of the agricultural industry in bringing forward new technology such as reduced application rates of targeted pesticides with lower toxicity and persistency is noted. However, with increasing world population, a slowing of the rate of crop improvement through conventional breeding and a declining area of land available for food production there is a need for new technologies to produce more food of improved nutritional value in an environmentally acceptable and sustainable manner. Whilst the authors recognize that the introduction of genetically modified (GM) crops is controversial, the benefits of these crops, including their effect on pesticide use is only now beginning to be documented. Published data are used to estimate what effect GM crops have had on pesticide use first on a global basis, and then to predict what effect they would have if widely grown in the European Union (EU). On a global basis GM technology has reduced pesticide use, with the size of the reduction varying between crops and the introduced trait. It is estimated that the use of GM soyabean, oil seed rape, cotton and maize varieties modified for herbicide tolerance and insect protected GM varieties of cotton reduced pesticide use by a total of 22.3 million kg of formulated product in the year 2000. Estimates indicate that if 50% of the maize, oil seed rape, sugar beet, and cotton grown in the EU were GM varieties, pesticide used in the EU/annum would decrease by 14.5 million kg of formulated product (4.4 million kg active ingredient). In addition there would be a reduction of 7.5 million ha sprayed which would save 20.5 million litres of diesel and result in a reduction of approximately 73,000 t of carbon dioxide being released into the atmosphere. The paper also points to areas where GM technology may make further marked reductions in global pesticide use.

474. **Environmental consequences of alternative practices for intensifying crop production.**
Gregory, P. J.; Ingram, J. S. I.; Andersson, R.; Betts, R. A.; Brovkin, V.; Chase, T. N.; Grace, P. R.; Gray, A. J.; Hamilton, N.; and Hardy, T. B.
Agriculture, Ecosystems and Environment 88 (3): 279-290. (Mar. 2002)
NAL Call #: S601 .A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: crop production/ intensive farming/ intensification/ environmental impact/ crop yield/ seasonal variation/ site preparation/ germplasm/ irrigation/ fertilizers/ pest control/ efficiency/ farm inputs/ climatic change/ water quality/ soil/ genetic engineering/ literature reviews
Abstract: Summary: The increasing global demand for food will be met chiefly by increased intensification of production. For crops, this will be achieved largely by increased yields per area with a smaller contribution from an increased number of crops grown in a seasonal cycle. Production systems show a spectrum of intensification practices characterised by varying methods of site preparation and pest control, and inputs of germplasm, nutrients and water. This paper highlights three main types of intensification (based largely on the quantity and efficiency of use of external inputs) and examines both the on- and off-site environmental consequences of each for soils, water quantity and quality, and climate forcing and regional climate change. The use of low amounts of external inputs is generally regarded as being the most environmentally-benign although this advantage over systems with higher inputs may disappear if the consequences are expressed per unit of product rather than per unit area. The adverse effects of production systems with high external inputs, especially losses of nutrients from fertilisers and manures to water courses and contributions of gases to climate forcing, have been quantified. Future intensification, including the use of improved germplasm via genetic modification, will seek to increase the efficiency of use of added inputs while minimising adverse effects on the environment.

However, reducing the loss of nutrients from fertilisers and manures, and increasing the efficiency of water utilisation in crop production, remain considerable challenges.
This citation is from AGRICOLA.

475. **Environmental consequences of increasing production: Some current perspectives.**
Bennett, A. J.
Agriculture, Ecosystems and Environment 82 (1/3): 89-95. (Dec. 2000)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Food and forestry: Global change and global challenges / edited by P.J. Gregory and J.S.I. Ingram. Paper presented at a conference held September 1999, Reading, UK. Includes references.
Descriptors: food production/ environmental impact/ prediction/ environmental degradation/ climatic change/ population growth/ demand/ supply balance/ land use/ soil/ water availability/ literature reviews
Abstract: Thomas Malthus, in his 'Essay on Population' in 1798, argued that food production would not be able to keep pace with our capacity to produce. Contrary to this prediction there seems to be no evidence that our ability to produce food has been a lasting break on population growth. There are, however, several major areas of concern regarding environmental degradation associated with production having kept pace with demand. This paper examines some of the current drivers of development and environmental change. It identifies some of the impacts of growth and development on land use, soils, water availability and the possible consequences of climate change. Finally the paper returns to the question--will Malthus be proved right.
This citation is from AGRICOLA.

476. **Environmental consequences of soil sodicity.**
Fitzpatrick, R W; Boucher, S C; Naidu, R; and Fritsch, E
Australian Journal of Soil Research 32 (5): 1069-1093. (1994)
NAL Call #: 56.8 Au7;
ISSN: 0004-9573
Descriptors: agricultural productivity/ dryland salinity/ management strategies/ water erosion/ water quality/ waterlogging
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477. **Environmental conservation and locust control: Possible conflicts and solutions.**
Peveling, R.
Journal of Orthoptera Research 10 (2): 171-187. (2001);
ISSN: 1082-6467.
Notes: Publisher: Orthopterists' Society
Descriptors: Pest control/ Insecticides/ Habitat preferences/ Acrididae/ Orthoptera/ Grasshoppers/ Agricultural & general applied entomology
Abstract: In contrast to pests developing in close association with a particular host crop, locusts and grasshoppers are often controlled in natural or semi-natural landscapes, exposing structurally and functionally diverse communities to agrochemicals, chemicals to which they are not adapted. This suggests that insecticide-induced perturbations may be severe. On the other hand, with acridids being highly mobile, exposure of non-target biota at any one location tends to be rare, and insecticides might be seen as yet another component in a canon of stochastic and deterministic, natural or human-induced environmental catastrophes and selective forces, shaping communities and ecosystems. Moreover, habitat loss is by far the most important single threat to biodiversity, so why should doubt be cast on the potential and resilience of populations to recover from occasional insecticide stress? This paper reviews the environmental impact, as well as ecological and conceptual characteristics of acridid pest control. It concludes that ecologically significant risks may arise, in particular in ecosystems exposed to multiple stressors. Four priorities in ecological risk assessment and acridid pest management are proposed: 1) delimitation and characterization of sensitive areas within locust and grasshopper habitats, 2) ecosystem-specific, long-term field studies and operational monitoring, 3) real-time stewardship of control campaigns, with adequate participation of stakeholders, and 4) incorporation of the precautionary principle into decision-making and risk management.
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478. **Environmental control of dormancy in weed seed banks in soil.**
Benech Arnold, R. L.; Sanchez, R. A.; Forcella, F.; Kruk, B. C.; and Ghersa, C. M.
Field Crops Research 67 (2): 105-122. (2000)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Plant phenology and the management of crop-weed interactions / edited by C.M. Ghersa. Paper presented at a workshop held October 13-15, 1997, Buenos Aires, Argentina. Includes references.
Descriptors: weeds/ seed banks/ weed biology/ seed dormancy/ seedling emergence/ dormancy breaking/ prediction / soil temperature/ soil water content/ light/ nitrate/ nutrient availability/ seed germination/ carbon dioxide/ ethylene/ tillage/ flooding/ crop residues/ prescribed burning/ fertilizers/ application rates/ literature reviews
This citation is from AGRICOLA.

479. **The environmental effects of genetically modified crops resistant to insects.**
Fontes, E. M. G.; Pires, C. S. S.; Sujii, E. R.; and Panizzi, A. R.
Neotropical Entomology 31 (4): 497-513. (Oct. 2002-Dec. 2002)
NAL Call #: QL461-.S64;
ISSN: 1519-566X [NEENDV]
Descriptors: environmental impact/ transgenic plants/ crops/ pest resistance/ insect pests/ cultivars/ risk/ risk assessment/ ecology/ commercial hybrids/ biosafety/ agricultural adjustment/ pest management/ world markets/ insecticide resistance/ transgenics/ plant protection/ bacterial toxins/ endotoxins/ bacillus thuringiensis/ nontarget organisms/ gene flow/ insecticide residues/ weeds/ wild plants/ ecosystems/ literature reviews/ insecticidal action/ gene expression/ enzyme inhibitors/ proteinase inhibitors/ amylases/ transgenic crops
Abstract: Transgenic crops are currently being cultivated on a commercial scale in many countries. The area devoted to transgenic pest resistant varieties worldwide reached 13 million hectares in 2001. These varieties offer valuable benefits but also pose potential risks. Assessments of their impact on the environment are conducted before they are approved for commercial use, as required by the regulatory

biosafety frameworks. In this review, we discuss the potential ecological consequences of the commercial use in agriculture of genetically modified insect resistant crops. We also discuss the impacts caused by the change in agricultural practices, and attempt to identify gaps and possible opportunities for research, considering this new technological tool. We based our analysis and comments on the current knowledge of the risks and benefits of these genetically modified insect resistant crops, within the context of traditional insect management strategies.
This citation is from AGRICOLA.

480. **The environmental fate of phthalate esters: A literature review.**
Staples, Charles A; Peterson, Dennis R; Parkerton, Thomas F; and Adams, William J
Chemosphere 35 (4): 667-749. (1997)
NAL Call #: TD172.C54;
ISSN: 0045-6535
Descriptors: abiotic transformations/ aquatic foodchain/ bioaccumulation processes/ biotic transformations/ partitioning behavior/ phthalate esters/ physicochemical properties/ pollution/ sediment/ soil/ surface waters/ terrestrial foodchain/ toxicology
Abstract: A comprehensive and critical review was performed on the environmental fate of eighteen commercial phthalate esters with alkyl chains ranging from 1 to 13 carbons. A synthesis of the extensive literature data on physicochemical properties, partitioning behavior, abiotic and biotic transformations and bioaccumulation processes of these chemicals is presented. This chemical class exhibits an eight order of magnitude increase in octanol-water partition coefficients (K-ow) and a four order of magnitude decrease in vapor pressure (VP) as alkyl chain length increases from 1 to 13 carbons. A critical review of water solubility measurements for higher molecular weight phthalate esters (i.e. alkyl chains gtoreq 6 carbons) reveals that most published values exceed true water solubilities due to experimental difficulties associated with solubility determinations for these hydrophobic organic liquids. Laboratory and field studies show that partitioning to suspended solids, soils, sediments and aerosols increase as K-ow increases and VP decreases. Photodegradation via free radical attack is expected to be the dominant degradation pathway in the atmosphere with predicted half-lives of ca. 1 day for most of the phthalate esters investigated. Numerous studies indicate that phthalate esters are degraded by a wide range of bacteria and actinomycetes under both aerobic and anaerobic conditions. Standardized aerobic biodegradation tests with sewage sludge inocula show that phthalate esters undergo gtoreq 50% ultimate degradation within 28 days. Biodegradation is expected to be the dominant loss mechanism in surface soils and sediments. Primary degradation half-lives in surface and marine waters range from lt 1 day to 2 weeks and in soils from lt 1 week to several months. Longer half-lives may occur in anaerobic, oligotrophic, or cold environments. Numerous experiments have shown that the bioaccumulation of phthalate esters in the aquatic and terrestrial food-chain is limited by biotransformation, which increases with increasing trophic level. Consequently, models that ignore biotransformation grossly exaggerate bioaccumulation potential of higher molecular weight phthalate esters. This review provides the logical first step in elucidating multimedia exposure to phthalate esters.
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481. **Environmental impact assessment of conventional and organic milk production.**
Boer, I. J. M. de
Livestock Production Science 80 (1/2): 69-77. (2003)
NAL Call #: SF1.L5;
ISSN: 0301-6226
This citation is provided courtesy of CAB International/CABI Publishing.

482. **Environmental impact assessment of irrigation and drainage projects.**
Dougherty, T. C.; Hall, A. W.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; x, 74 p.: ill.; Series: FAO irrigation and drainage paper 0254-5284 53. (1995)
Notes: "M-56"--T.p. verso. Includes bibliographical references (p. 68-71).
NAL Call #: S612.I754--no.53;
ISBN: 9251037310
Descriptors: Irrigation farming---Environmental aspects---Developing countries/ Drainage---Environmental aspects---Developing countries/ Environmental impact analysis---Developing countries/ Agriculture---Environmental aspects---Developing countries
This citation is from AGRICOLA.

483. **Environmental impact of fertilizing soils by using sewage and animal wastes.**
Benckiser, G. and Simarmata, T.
Fertilizer Research 37 (1): 1-22. (1994)
NAL Call #: S631.F422;
ISSN: 0167-1731 [FRESDF]
Descriptors: organic wastes/ sewage sludge/ animal wastes/ animal manures/ slurries/ application to land/ environmental impact/ macronutrients/ carbon/ nitrogen/ phosphorus/ cycling/ heavy metals/ soil pollution/ pathogens/ contamination/ soil flora/ biological activity in soil/ Germany
Abstract: The European Community is producing annually about 300 X 10(6) tons of sewage sludges as well as about 150, 950, 160 and 200 tons of domestic, agricultural, industrial and other wastes (street litter, dead leaves etc.). About 20-25% of the German sewage sludges, which contain in average about 3.8,1.6, 0.4, 0.6, 5.3% DM-1 N, P, K, Mg and Ca, 202, 5, 131, 349, 53, 3 and 1446 mg kg-1 DM Pb, Cd, Cr, Cu, Ni, Hg, Zn as well as ca. 37 and 5 mg kg-1 Dm polychlorinated hydrocarbons and biphenyls, are recycled annually as fertilizer. In addition environmental impacts on the arable land of Germany may derive from 76, 19.2, 64.7, 33.6, 7.8 and 0.1 kg ha-1 a-1 of N, P, K, Ca, Mg and Cu added as animal manures. Besides heavy metals and hazardous organics pathogens are disseminated with organic wastes. Crop production and soil fertility generally profit from the considerable amounts of plant nutrients and carbon in sewage sludges, animal slurries and manures, but the physicochemical soil properties, the composition of microbial, faunal and plant communities as well as the metabolic processes in the soil-, rhizo- and phyllosphere are changed by organic manuring. Consequences for the soil carbon-, nitrogen and phosphorus-cycle are discussed. Impacts of heavy metals and hazardous organics on the soil biomass and its habitat as well as on transport mechanisms and survival times of disseminated pathogens in soils are reviewed with emphasis on

the German situation. A proposal for future strategies (landscape recycling) is made.
This citation is from AGRICOLA.

484. **Environmental impacts of forest monocultures: Water use, acidification, wildlife conservation, and carbon storage.**
Cannell, M. G. R.
New Forests 17/18 (1/3/1): 239-262. (1999)
NAL Call #: SD409.N48;
ISSN: 0169-4286.
Notes: Special issue: Planted forests: Contributions to the quest for sustainable societies / edited by J. R. Boyle, J. Winjum, K. Kavanagh and E. Jensen. Paper presented at a symposium held June 1995, Portland, Oregon. Includes references.
Descriptors: forest plantations/ monoculture/ sustainability/ water use/ species diversity/ wildlife/ habitats/ wildlife conservation/ carbon/ carbon cycle/ evapotranspiration/ plant height/ pollutants/ surface water/ water pollution/ forest management/ volume/ yields/ plant succession/ botanical composition/ stand structure/ literature reviews
Abstract: A broad assessment is given of the contentions that plantation forests are high consumers of water, increase acidification, sustain a low diversity of wildlife, and store more carbon than do unmanaged forests. The following conclusions are drawn: (1) Evapotranspiration from planted forest monocultures is greater than from short vegetation, as a result of greater interception loss. Water loss from conifer forests is usually greater than from deciduous hardwoods, but evapotranspiration from Eucalyptus in the dry tropics is often no greater than from native hardwoods. (2) Compared to short vegetation, forests can significantly increase the transfer of acidifying pollutants from the air to the soil and surface waters, and conifers are more likely to enhance acidification than are hardwoods. (3) There are normally sufficient plantation management options available to make most plantation landscapes the homes of a rich diversity of flora and fauna. (4) An area covered with a plantation managed for maximum volume yield will normally contain substantially less carbon than the same area of unmanaged forest.
This citation is from AGRICOLA.

485. **Environmental impacts of livestock on U.S. grazing lands.**
Krueger, W. C. and Sanderson, M. A.
Council for Agricultural Science and Technology (CAST); Issue Paper Number 22, 2002. 16 p.
http://cast-science.org/cast-science.lh/pubs/grazinglands_ip.pdf
Descriptors: land management/ range management/ grazing/ soil quality/ water quality/ riparian areas/ invasive species

486. **Environmental impacts of nitrogen and phosphorus cycling in grassland systems.**
Watson CJ and Foy RH
Outlook on Agriculture 30 (2): 117-127; 61 ref. (2001)
NAL Call #: 10 Ou8
This citation is provided courtesy of CAB International/CABI Publishing.

487. **Environmental implications of excessive selenium: A review.**
Lemly, A Dennis
Biomedical and Environmental Sciences 10 (4): 415-435. (1997);
ISSN: 0895-3988
Descriptors: selenium: trace metals/ agricultural irrigation/ fossil fuel waste disposal/ human activities/ land management/ public health/ water management
Abstract: Selenium is a naturally occurring trace element that is nutritionally required in small amounts but it can become toxic at concentrations only twice those required. The narrow margin between beneficial and harmful levels has important implications for human activities that increase the amount of selenium in the environment. Two of these activities, disposal of fossil fuel wastes and agricultural irrigation of arid, seleniferous soils, have poisoned fish and wildlife, and threatened public health at several locations in the United States. Research studies of these episodes have generated a data base that clearly illustrates the environmental hazard of excessive selenium, It is strongly bioaccumulated by aquatic organisms and even slight increases in waterborne concentrations can quickly result in toxic effects such as deformed embryos and reproductive failure in wildlife. The selenium data base has been very beneficial in developing hazard assessment procedures and establishing environmentally sound water quality criteria. The two faces of selenium, required nutrient and potent toxin, make it a particularly important trace element in the health of both animals and man. Because of this paradox, environmental selenium in relation to agriculture, fisheries, and wildlife will continue to raise important land and water-management issues for decades to come. If these issues are dealt with using prudence and the available environmental selenium data base, adverse impacts to natural resources and public health can be avoided.
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488. **Environmental implications of wood production in intensively managed plantations.**
Bowyer, J. L.
Wood and Fiber Science 33 (3): 318-333. (July 2001)
NAL Call #: TA419.W6;
ISSN: 0735-6161 [WFSCD4]
Descriptors: forest plantations/ forest management/ intensive silviculture/ environmental impact/ environmental protection/ forest trees/ biomass production/ forests/ literature reviews
This citation is from AGRICOLA.

489. **Environmental indicators of pesticide leaching and runoff from farm fields.**
Kellogg, Robert L. and United States. Natural Resources Conservation Service.
Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service. (2000)
Notes: Title from web page. "February 2000." "Presented at a Conference on "Agricultural Productivity: Data, Methods, and Measures," Description based on content viewed May 15, 2003. Includes bibliographical references.
NAL Call #: aTD196.P38-E48-2000
http://www.nrcs.usda.gov/technical/land/pubs/eip_pap.html
Descriptors: Pesticides---Environmental aspects---United States---Measurement/ Pesticides---Risk assessment---United States/ Pesticides degradation---United States/ Runoff---United States/ Indicators---Biology---United States
This citation is from AGRICOLA.

490. **Environmental management best practice guidelines for the nursery industry.**
South Perth, WA: Dept. of Agriculture, Water and Rivers Commission, Government of Western Australia; ii,

44 p.: ill.; Series: Miscellaneous publication (Western Australia. Dept. of Agriculture) 2002/2. (2002)
Notes: "April 2002"--Cover. Includes bibliographical references (p. 39).
NAL Call #: S397-.M57-no.-2002/2
This citation is from AGRICOLA.

491. **Environmental performance reviews: United States.**
Organisation for Economic Co-operation and Development.
Paris: Organisation for Economic Co-operation and Development; 274 p.: col. ill., maps. (1996)
Notes: OECD environmental performance reviews; Includes bibliographical references.
NAL Call #: GE180.E586--1996;
ISBN: 9264147713
Descriptors: Ecology---United States/ Environmental policy---United States/ Environmental protection---United States/ Environmental monitoring---United States
This citation is from AGRICOLA.

492. **An Environmental Planning Model for the Design of Buffer Zones.**
Cacho, M.; Radke, J. D.; and Kondolf, G. M.
In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 2 Aug 1930-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 31-32; 1996.
Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: planning / zones/ model studies/ decision making/ environmental policy/ information systems/ design criteria/ literature review/ buffer zones/ Water quality control/ Techniques of planning
Abstract: Even after an exhaustive review of the scientific literature on buffer zones (with compilation and annotation of over 230 publications on the topic) we must still conclude that the design of buffer zones is difficult and its implementation conflictive. The difficulty of buffer zone design lies in its own nature, one dominated by variability. This variability stems from its natural composition, its geomorphic and geographic locations, and its functions. We identify the main problem in the designing of the buffer zones in the lack of a sound planning model which integrates its principal components: science, decision makers and land ownership. An environmental planning model is proposed for the design of buffer zones. This model is intended to be used by decision makers (e.g. watershed managers). It provides the decision makers with the framework to design the buffer zone under different conditions, for specific problems and objectives. This model systematically integrates existing (historical) and current research of buffer zones within a decision making process. It provides a feedback mechanism which sustains the application of specific formulas and models for the calculation of the buffer zone. It has two components: 1. A conceptual component which defines an environmental planning approach where a framework is established to integrate science into the planning process not as the solution to the problem but as a component of the problem resolution. It brings together scientific work done in the field and establishes a framework where future work can be incorporated. 2. An operative component which establishes a Geographic Information System (GIS), a Library and a Graphic User Interface (GUI). This component helps the decision maker to build the necessary infrastructure to accommodate the planning process.
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493. **Environmental policy: The other global pollutant: Nitrogen proves tough to curb.**
Kaiser, J.
Science 294 (5545): 1268-1269. (2001)
NAL Call #: 470 Sci2;
ISSN: 0036-8075.
Notes: Publisher: American Association for the Advancement of Science
Descriptors: Reviews/ Nitrogen/ Air pollution/ Environmental policy / International cooperation/ Ozone/ Greenhouse gases/ Chlorofluorocarbons/ Nitrogen cycle/ Fertilizers/ Environmental impact / Ecosystem disturbance/ Pollution effects/ Pollution control/ Air pollution control/ Human Population Atmosphere Interactions/ Mechanical and natural changes/ Environmental action/ General Environmental Engineering
Abstract: Experts call for international cooperation to slash nitrogen pollution, which they say ranks with greenhouse gases as an environmental threat. Nitrogen is an essential element for the crops that feed the world's 6 billion people. But a surfeit of nitrogen, from fertilizers and the burning of fossil fuels, is harming ecosystems and threatening public health. Although the disruption of the nitrogen cycle has largely failed to attract the sweeping public attention accorded to other global pollutants, such as chlorofluorocarbons that fray the Antarctic ozone layer and carbon dioxide that spurs global warming, ecologists say that nitrogen's impacts are at least as great.
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494. **Environmental properties and effects of nonionic surfactant adjuvants in pesticides: A review.**
Krogh, K. A.; Halling-Soerensen, B.; Mogensen, B. B.; and Vejrup, K. V.
Chemosphere 50 (7): 871-901. (2003)
NAL Call #: TD172.C54;
ISSN: 0045-6535
Descriptors: Surfactants/ Pesticides/ Agricultural pollution/ Fate/ Leaching/ Agricultural runoff/ Degradation/ Pollution dispersion/ Chemical pollutants/ Pollution effects/ Aquatic environment/ Reviews/ Chemical pollution/ adjuvants/ Characteristics, behavior and fate/ Pollution Environment/ Freshwater pollution/ Water Pollution: Monitoring, Control & Remediation
Abstract: Little is known about the environmental fate of adjuvants after application on the agricultural land. Adjuvants constitute a broad range of substances, of which solvents and surfactants are the major types. Nonionic surfactants such as alcohol ethoxylates (AEOs) and alkylamine ethoxylates (ANEOs) are typically examples of pesticide adjuvants. In view of their chemical structure this paper outlines present knowledge on occurrence, fate and effect on the aquatic and terrestrial environment of the two adjuvants: AEOs and ANEOs. Both AEOs and ANEOs are used as technical mixtures. This implies that they are not one single compound but a whole range of compounds present in different ratios. Structurally both groups of substances have a mutual core with side chains of varying lengths. Each of these compounds besides having the overall ability to distribute between different phases also possesses some single compound behaviour. This is reflected

in the parameters describing the fate e.g. distribution coefficient, leaching, run-off, adsorption to soil, degradation and effects of these substances. The adsorption behaviour of ANEOs in contrast to AEOs is particularly variable and matrix dependent due to the ability of the compound to ionise at environmentally relevant pH. Probably because the compounds exceeds high soil adsorption and are easily degradable which is reflected in the low environmental concentrations generally found in monitoring studies. The compounds generally possess low potency to both terrestrial and aquatic organisms. The major environmental problem related to these compounds is the ability to enhance the mobility of other pollutants in the soil column.

495. **The Environmental Protection Agency's white paper on Bacillus thuringiensis plant-pesticide resistance management.**
United States. Environmental Protection Agency. Prevention, Pesticides and Toxic Substances.
Washington, DC: U.S. Environmental Protection Agency, Prevention, Pesticides and Toxic Substances; ii, 86 p.: ill. (1998)
Notes: Cover title. "May 1998." "EPA 739-S-98-001." "PB98-153133." Includes bibliographical references (p. 82-86).
NAL Call #: SB976.M55-E58-1998
Descriptors: Microbial pesticides/ Bacillus thuringiensis/ Plant parasites---Control
This citation is from AGRICOLA.

496. **Environmental regulations and technology: Control of pathogens and vector attraction in sewage sludge.**
Center for Environmental Research Information (U.S.) and United States. Environmental Protection Agency. Office of Research and Development.
Washington, DC: U.S. Environmental Protection Agency, Office of Research Development. (1999)
Notes: Original title: Environmental regulations and technology: Control of pathogens and vector attraction in sewage sludge (including domestic septage) under 40 CFR part 503. Rev. Oct. 1999: Control of pathogens and vector attraction in sewage sludge. "EPA/625/R-92/013." Includes bibliographical references.
NAL Call #: TD768-.E57-1999
http://www.epa.gov/ORD/NRMRL/Pubs/1992/625R92013.pdf
Descriptors: Sewage sludge---Disinfection---United States/ Sewage disposal---United States/ Waste management
This citation is from AGRICOLA.

497. **Environmental science in the coastal zone: Issues for further research.**
National Research Council. Commission on Geosciences, Environment and Resources
Washington DC: National Academies Press; 184 p. (1994);
ISBN: 0-309-04980-6
http://www.nap.edu/books/0309049806/html/
Descriptors: coastal plains/ ecosystem management/ wetlands/ pollution/ waste management

498. **Environmental significance of ice to streamflow in cold regions.**
Prowse, T D
Freshwater Biology 32 (2): 241-259. (1994)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: arctic nival/ ice effects/ moisture source/ proglacial/ runoff pathway/ spring fed/ subarctic nival/ wetland
Abstract: 1. The five major hydrologic regimes of cold regions are typically classified as proglacial, wetland, spring-fed, arctic nival and subarctic nival. Each has a distinctive hydrograph determined by the source and timing of runoff. 2. The hydrologic response of streams in cold regions is influenced significantly by the source and pathways of moisture from the landscape to the stream channel. Snow and ice masses, such as snow cover, permafrost and icings, play principal and unique roles as major moisture sources, and in affecting runoff pathways. 3. Once flow has been routed from the landscape into a channel system, the effects of floating ice begin to control the flow system. Notably, many of the most significant hydrologic events in cold regions, such as floods and low flows, are more the result of in-channel ice effects than of landscape runoff processes. This has not been adequately recognized in general assessments of cold-regions water resources. 4. Only recently have the broader environmental effects of river ice been addressed in any concerted fashion. This paper reviews the various stages of ice formation, growth and break-up, and summarizes the major hydrologic and ecological effects associated with each. Priority research topics are also identified.

499. **Environmental soil testing for phosphorus.**
Sims, J T
Journal of Production Agriculture 6 (4): 501-507. (1993)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
Descriptors: phosphorus/ agriculture/ fertilizers/ management/ manure/ nonpoint source pollution potential/ surface waters
Abstract: Many soils in the USA have extremely high soil test P levels from long-term fertilization and manuring. Sediment-bound and soluble P in runoff from these soils may contribute to eutrophication of surface waters. A field rating system, the 'P index,' has been developed to assess the potential for soil P to contribute to nonpoint source pollution. A critical component in this index is soil test P. The primary objective of this paper is to discuss the roles soil testing programs can play in the development of nutrient management strategies, such as the P index, that are needed to minimize nonpoint source pollution by soil P. A survey of soil testing labs participating in four regional soil testing committees (North Central, Northeast, Mid-Atlantic, Southeast) was conducted in 1991-1992 to determine current approaches to soil P testing, the percentage of soils testing in the high or excessive range, and major concerns with high P soils. Results indicated a need for more consistency in defining and identifying soils that are excessive in P, from an environmental standpoint, and that P management in animal waste-amended soils was the major environmental issue for most states. Soil P testing for environmental purposes will require a careful re-evaluation of the sampling, analytical, interpretive, and educational roles of soil testing programs. Alternatives considered in this paper include integration of soil testing databases with land-use planning information via geographic information systems, the use of special soil tests for biologically available P, or to estimate P sorption/desorption, and expanded

educational efforts focused not only on farmers, but on advisory and regulatory agencies and the general public.

500. **Environmental threats and environmental future of estuaries.**
Kennish, M. J.
Environmental Conservation 29 (1): 78-107. (2002)
NAL Call #: QH540.E55;
ISSN: 0376-8929
This citation is provided courtesy of CAB International/CABI Publishing.

501. **Environmentally degradable polymeric materials (EDPM) in agricultural applications: An overview.**
Chiellini, E. M. O.; Cinelli, Patrizia; D'Antone, Salvatore; and Ilieva, Vassilka Ivanova
Polimery / Polymers 47 (7-8): 538-544. (2002);
ISSN: 0032-2725.
Notes: Published: Warszawa (Warsaw, Poland), Instytut Tworzyw Sztucznych
Descriptors: Glass/ Waste disposal/ Packaging/ Biodegradation/ Recycling/ Environmental impact/ Environmentally degradable polymeric materials (EDPM)/ Plastics Products/ Glass/ Industrial Wastes Treatment/ Packaging/ Biotechnology/ Biochemistry
Abstract: Owing to their low production cost, good physical properties and lightweight, plastic objects have slowly substituted glass, paper and metals in several fields of application including agriculture. At the same time, the current huge global production of plastics (200 million tons/year) has generated an enormous environmental concerns, mainly related to the waste generation by plastic packaging, which are responsible for 35-40% share of annual plastics consumption. Where recovery of plastics is not economically feasible, viable, controllable or attractive, plastics often remain as litter. This is the case in most of agricultural applications of polymeric materials. The market for biodegradable polymers is at this moment focusing on products in which biodegradability provides beneficial effects (e.g. waste-disposal, recycling) and a number of biodegradable materials are already being marketed or are close to market introduction and customer acceptance. This overview is meant to provide an outline on the history and recent developments in biodegradable polymeric materials applied in agricultural practices with particular reference to the mulching segment. Special attention has been devoted to material based on renewable resources or utilization of waste products from the agroindustrial sector, thus suggesting cost-effective and environmentally sound solutions to specific social needs.

502. **The environmentally-sound management of agricultural phosphorus.**
Sharpley, Andrew N and Withers, Paul J A
Fertilizer Research 39 (2): 133-146. (1994)
NAL Call #: S631.F422;
ISSN: 0167-1731
Descriptors: phosphorus/ plant (Plantae Unspecified)/ Angiospermae (Angiospermae)/ angiosperms/ plants/ spermatophytes/ vascular plants/ agriculture/ fertilizer use/ manure/ runoff/ water pollution
Abstract: Freshwater eutrophication is often accelerated by increased phosphorus (P) inputs, a greater share of which now come from agricultural nonpoint sources than two decades ago. Maintenance of soil P at levels sufficient for crop needs is an essential part of sustainable agriculture. However, in areas of intensive crop and livestock production in Europe and the U.S.A., P has accumulated in soils to levels that are a long-term eutrophication rather than agronomic concern. Also, changes in land management in Europe and the U.S.A. have increased the potential for P loss in surface runoff and drainage. There is, thus, a need for information on how these factors influence the loss of P in agricultural runoff. The processes controlling the build-up of P in soil, its transport in surface and subsurface drainage in dissolved and particulate forms, and their biological availability in freshwater systems, are discussed in terms of environmentally sound P management. Such management will involve identifying P sources within watersheds; targeting cost-effective remedial measures to minimize P losses; and accounting for different water quality objectives within watersheds. The means by which this can be achieved are identified and include developing soil tests to determine the relative potential for P enrichment of agricultural runoff to occur; establishing threshold soil P levels which are of environmental concern; finding alternative uses for animal manures to decrease land area limitations for application; and adopting management systems integrating measures to reduce P sources as well as runoff and erosion potential.

503. **Envisioning the agenda for water resources research in the twenty-first century.**
National Research Council
Washington DC: National Academy Press; 61 p. (2001)
Notes: Biblipgraphy: p. 50;
ISBN: 0309075661
http://www.nap.edu/books/0309075661/html/
Descriptors: water supply/ water quality/ hydrologic data/ water use/ laws and regulations

504. **Epistemology of environmental microbiology.**
Madsen, Eugene L
Environmental Science and Technology 32 (4): 429-439. (1998)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: human (Hominidae)/ microorganisms (Microorganisms)/ Animals/ Chordates/ Humans/ Mammals/ Microorganisms/ Primates/ Vertebrates/ environmental microbiology/ epistemology/ molecular biology/ sediments/ soils
Abstract: Despite critical geochemical roles of microorganisms in biosphere maintenance, knowledge of microorganisms as they function in soils, sediments, and waters is limited. Constraints on knowledge are caused largely by methodologies that do not contend well with the complexity of field sites, with the scale differential between microorganisms and humans, and with artifacts that may arise in characterizing microorganisms using laboratory-based physiological, biochemical, genetic, and molecular biological assays. A paradigm describing how knowledge is obtained in environmental microbiology suggests that the constraints on knowledge will yield to relationships developing

between methodological innovations and their iterative application to naturally occurring microorganisms in field sites.

505. **Equipment technologies for precision agriculture.**
Stombaugh, T. S. and Shearer, S.
Journal of Soil and Water Conservation 55 (1): 6-11. (2000)
NAL Call #: 56.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

506. **Eradication and pest management.**
Myers, J. H.; Savoie, A.; and Randen, E. van
Annual Review of Entomology 43: 471-491. (1998);
ISSN: 0066-4170
Descriptors: Eradication/ Pest control/ Insecta/ Agricultural & general applied entomology
Abstract: Eradication is the elimination of every single individual of a species from an area to which recolonization is unlikely to occur. Cost-benefit analyses of eradication programs involve biases that tend to underestimate the costs and overestimate the benefits. In this review, we (a) highlight limitations of current cost-benefit analyses, (b) assess eradication strategies from biological and sociological perspectives by discussing particular cases of successful and failed eradication efforts, and (c) briefly contrast eradication and ongoing area-wide control as pest management strategies. Two successful eradication programs involve the screwworm and cattle ticks. Gypsy moth and medfly eradication programs have not been successful, and subsequent captures of insects recur in eradication areas. In situations where heterogeneity of land use patterns make it difficult to prevent reinvasion of the pest, education and area-wide suppression are probably more realistic goals than eradication.

507. **Erosion and sedimentation as multiscale, fractal processes: Implications for models, experiments and the real world.**
Noordwijk, M. van; Roode, M. van; McCallie, E. L.; and Lusiana, B.
In: Soil erosion at multiple scales: Principles and methods for assessing causes and impacts/ Penning de Vries, F. W. T.; Agus, F.; and Kerr, J. Wallingford, UK: CAB International, 1998; pp. 223-253.
ISBN: 0-85199-290-0
This citation is provided courtesy of CAB International/CABI Publishing.

508. **Erosion and sedimentation processes on irrigated fields.**
Trout, T. J. and Neibling, W. H.
Journal of Irrigation and Drainage Engineering 119 (6): 947-963. (1993)
NAL Call #: 290.9 AM3Ps (IR);
ISSN: 0733-9437
This citation is provided courtesy of CAB International/CABI Publishing.

509. **Erosion control research update.**
Biocycle 43 (4): 78-79. (2002)
NAL Call #: 57.8-C734;
ISSN: 0276-5055
This citation is provided courtesy of CAB International/CABI Publishing.

510. **Erosion models: Quality of spatial predictions.**
Jetten, V.; Govers, G.; and Hessel, R.
Hydrological Processes 17 (5): 887-900. (2003)
NAL Call #: GB651.H93;
ISSN: 0885-6087.
Notes: Issue editors: Ritchie, J. C.; Walling, D. E.; Peters, N. E.
This citation is provided courtesy of CAB International/CABI Publishing.

511. **Esterases as Markers of Exposure to Organophosphates and Carbamates.**
Thompson, H. M.
Ecotoxicology 8 (5): 369-384. (1999)
NAL Call #: RA565.A1 E27;
ISSN: 0963-9292.
Notes: Special Issue: Biomarkers
Descriptors: Organophosphates/ Carbamate compounds/ Agrochemicals/ Bioindicators/ Enzymes/ Esters/ Wildlife/ Toxicity/ Biochemistry/ Pesticides (carbamates)/ Pesticides (organophosphorus) / Reviews/ Pollution indicators/ Chemical pollution/ esterase/ Literature reviews/ Pesticides/ Biomarkers/ Pollution effects/ Biological sampling/ Sample storage/ Analytical techniques/ Agricultural pollution/ wildlife/ esterases/ Toxicology and health/ Analytical procedures/ Methods and instruments
Abstract: Esterases have been widely used over the last 20 years initially to assess the exposure of spray operators and then wildlife to organophosphorus and carbamate agricultural pesticides. They have also been used to determine whether these chemicals have been the cause of wildlife casualties. Given the correct assay techniques and control data a significant amount of information can be derived from inhibition of esterase activity. This chapter aims to provide detailed guidance on the collection of samples, storage, assay (including reactivation techniques) and the problems associated with the interpretation of collected data together with a brief review of how esterases have been used in assessing the exposure of wildlife to agricultural insecticides.

512. **Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates.**
Reed, D. H.; O'Grady, J. J.; Brook, B. W.; Ballou, J. D.; and Frankham, R.
Biological Conservation 113 (1): 23-34. (2003)
NAL Call #: S900.B5;
ISSN: 0006-3207.
Notes: Number of References: 92; Publisher: Elsevier Sci Ltd
Descriptors: Environment/ Ecology/ demographic stochasticity/ endangered species/ extinction/ minimum viable population size/ population variability/ population viability analysis/ spatial pva models/ inbreeding depression/ density dependence/ conservation biology/ viability analysis/ extinction risk/ butterfly metapopulation/ orb spiders/ variability/ dynamics
Abstract: Population size is a major determinant of extinction risk. However, controversy remains as to how large populations need to be to ensure persistence. It is generally believed that minimum viable population sizes (MVPs) would be highly specific, depending on the environmental and life history characteristics of the species. We used population viability analysis to estimate MVPs for 102 species. We define a minimum viable population size as one with a 99% probability of persistence for 40 generations. The models are comprehensive and include age-structure, catastrophes, demographic stochasticity, environmental stochasticity, and

inbreeding depression. The mean and median estimates of MVP were 7316 and 5816 adults, respectively. This is slightly larger than, but in general agreement with, previous estimates of MVP. MVPs did not differ significantly among major taxa, or with latitude or trophic level, but were negatively correlated with population growth rate and positively correlated with the length of the study used to parameterize the model. A doubling of study duration increased the estimated MVP by approximately 67%. The increase in extinction risk is associated with greater temporal variation in population size for models built from longer data sets. Short-term studies consistently underestimate the true variances for demographic parameters in populations. Thus, the lack of long-term studies for endangered species leads to widespread underestimation of extinction risk. The results of our simulations suggest that conservation programs, for wild populations, need to be designed to conserve habitat capable of supporting approximately 7000 adult vertebrates in order to ensure long-term persistence. (C) 2003 Elsevier Science Ltd. All rights reserved.
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513. **European perspective of compost co-utilization for horticulture.**
Szmidt, Robin
In: Beneficial co-utilization of agricultural, municipal and industrial by-products/ Brown, S.; Angle, J. S.; and Jacobs, L.
Norwell, MA: Kluwer Academic, 1998; pp. 55-68.
ISBN: 0792351894; Proceedings of the Beltsville Symposium XXII, Beltsville, Maryland, USA, May 4-8, 1997; Conference Sponsors: Beltsville Agricultural Research Center, Agricultural Research Service, US Dept. of Agriculture with the cooperation of Friends of Agriculture Research - Beltsville (FAR-B)
NAL Call #: TD796.5.B45 1998
Descriptors: Horticulture (Agriculture)/ Waste Management (Sanitation)/ compost co-utilization/ waste treatment methods
© Thomson

514. **Evaluating Extension-Based Water Resource Outreach Programs: Are We Meeting the Challenge?**
Shepard, R.
Journal of Extension [Also available as: *Journal of Extension*, February 2002, Volume 40 Number 1; ISSN 1077-5315], 2002 (text/html)
NAL Call #: LC45.4 J682
http://www.joe.org/joe/2002february/a3.html
Descriptors: program evaluation/ program planning/ water quality/ water resources/ watershed management/ surveys/ agricultural education/ extension education/ United States
This citation is from AGRICOLA.

515. **Evaluation and demonstration of deads composting as an option for dead animal management in Saskatchewan.**
University of Saskatchewan. Agriculture and Bioresource Engineering. Saskatchewan. Agriculture Development Fund.
Saskatchewan: Saskatchewan Agriculture Development Fund; 1 v. (various pagings): ill. (2001)
Notes: "March 2001." "101-05424"--Mounted on label. Includes bibliographical references. ADF Project 98000245.
NAL Call #: QL87.5-.E92-2001
Descriptors: Dead animals---Saskatchewan/ Dead animal disposal---Saskatchewan/ Compost---Saskatchewan
This citation is from AGRICOLA.

516. **Evaluation of seven sampling techniques for wireworms (Coleoptera : Elateridae).**
Simmons, C. L.; Pedigo, L. P.; and Rice, M. E.
Environmental Entomology 27 (5): 1062-1068. (Oct. 1998)
NAL Call #: QL461.E532;
ISSN: 0046-225X [EVETBX]
Descriptors: elateridae/ sampling/ population density/ conservation areas/ costs/ Iowa/ Conservation Reserve Program
Abstract: During 1995 and 1996, 7 sampling techniques were examined to develop a farmer or consultant-oriented system of sampling for wireworms (Coleoptera: Elateridae) to determine field populations. In an intensive sampling program, the soil core (absolute) sampling technique was compared with 6 relative sampling techniques [corn (Zea mays L.)/wheat (Triticum aestivum L.) bait, melon (Cucumis melo L.) bait, potato (Solanum tuberosum L.) bait, wire-mesh bait, pheromone trap, and pitfall trap]. In an extensive sampling program, the corn/wheat bait was examined for its utility in Conservation Reserve Program habitats. Each relative method was evaluated for its precision and accuracy in determining populations of Elateridae. The corn/wheat bait showed the highest level of precision and accuracy in the intensive sampling program. Acceptable levels of precision for the corn/wheat baits were also found in the extensive sampling program. In terms of cost, the corn/wheat bait was a cost-effective method for a sampling program. When examining relative net precision, the corn/wheat bait was the most efficient and effective sampling technique for determining wireworm populations in agricultural habitats and in conservation land returning to production.
This citation is from AGRICOLA.

517. **Evaluation of soil organic carbon under forests, cool-season and warm-season grasses in the northeastern US.**
Corre, M. D.; Schnabel, R. R.; and Shaffer, J. A.
Soil Biology and Biochemistry 31 (11): 1531-1539. (Oct. 1999);
ISSN: 0038-0717
Descriptors: Organic matter/ Soil nutrients/ Forests/ Grasslands/ Northeast/ soil organic carbon/ Soil/ Temperate grasslands/ Temperate forests/ United States
Abstract: There is insufficient information on whether or not soil organic carbon (SOC) under forest and grass vegetation differs, and such information is needed by conservation programs targeted for C sequestration. When these contrasting types of vegetation are used for restoration of degraded riparian areas, evaluation of water-extractable and bioavailable dissolved organic carbon (WEOC and BDOC, respectively) is also important for assessing their potential in supplying available SOC for microbial degradation of nonpoint-source pollutants (e.g. nitrate removal by denitrification). Our objective was to compare the total SOC, WEOC and BDOC under forests, cool-season (C sub(3)) and warm-season (C sub(4)) grasses in the northeastern U S. Six locations were selected which had mature stands of forests, C sub(3)

and C sub(4) grasses. The total SOC, WEOC and BDOC were measured to a depth of 1 m. Analysis based on pooled data from all locations showed no difference in total SOC under forest (averages between 17-48 Mg C ha super(-1) at 0-5 cm depth), C sub(3) (19-35 mg C ha super(-1)) and C sub(4) grasses (13-39 mg C ha super(-1)). However, analysis conducted at each location indicated that total SOC was, in part, influenced by vegetation age. When vegetation age is the same, temperature was also implicated to influence changes in SOC. Neither forests nor C sub(3) and C sub(4) grasses consistently supported the highest amounts of WEOC, BDOC and the proportion of BDOC to WEOC (%BDOC) across locations. The %BDOC ranged from 2 to 84% and averages were 47% under forest, 49% under C sub(3) grass, 39% under C sub(4) grass, 41% above 60 cm depth, 47% below 60 cm depth. The uniform %BDOC with depth suggested similar amounts of available C resource for denitrifiers under these vegetation types. Conversion of C sub(3) grass to C sub(4) grass resulted to a loss of SOC during the early years of C sub(4) grass establishment. It took 16 to 18 y after planting for the total SOC under C sub(4) grass to approach that under the original C sub(3) grass. Under 16-y and 18-y C sub(4) grasses, the contribution of C sub(4)-derived SOC ranged from 53% to 72% of the total SOC under the original C sub(3) grass. The slow accumulation of C sub(4)-derived SOC is an important consideration for its use in restoring riparian and conservation areas in the northeastern US.

518. **Evaluation of the environmental impact of agriculture at the farm level: A comparison and analysis of 12 indicator-based methods.**
Werf, H. M. G. van der. and Petit, J.
Agriculture, Ecosystems and Environment 93 (1/3): 131-145. (Dec. 2002)
NAL Call #: S601 .A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: farms/ agriculture/ environmental impact/ estimation/ techniques/ evaluation/ indicators/ guidelines/ erosion/ water quality/ farm management/ data collection
Abstract: An increasing variety of evaluation methods is being proposed to address the question of the environmental impacts of agriculture. This paper compares and analyses 12 indicator-based approaches to assessing environmental impact at the farm level, in order to propose a set of guidelines for the evaluation or development of such methods. These methods take into account a number of environmental objectives (e.g. soil erosion, water quality). A set of indicators is used to quantify the degree to which these objectives are attained. A total of 26 objectives were taken into account by one or several of the methods. A great diversity in breadth of analysis exists: the number of objectives considered per method varies from 2 to 13. Indicator-based methods for environmental evaluation at the farm level should take into account a range of objectives covering both local and global effects. Indicators based on the environmental effects of farmer practices are preferable to indicators based on farmer practices as the link with the objective is direct and the choice of means is left to the farmer. Indicators based on farmer practices cost less in data collection but do not allow an actual evaluation of environmental impact. Indicators allowing expression of impacts both per unit surface and per unit product are preferable. Indicators producing output in the form of values are preferred to indicators producing scores. If possible, science-based threshold values should be defined for indicators. The method should be validated with respect to (a) the appropriateness of its set of objectives relative to its purpose and (b) its indicators.
This citation is from AGRICOLA.

519. **Evaluation of the RUSLE soil erosion model.**
Yoder, D. C.; Foster, G. R.; Weesies, G. A.; Renard, K. G.; McCool, D. K.; and Lown, J. B.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); 9 p.; 1998.
Notes: ASAE Paper no. 982197
This citation is provided courtesy of CAB International/CABI Publishing.

520. **An evaluation of vernal pool creation projects in New England: Project documentation from 1991-2000.**
Lichko, L. E. and Calhoun, AJK.
Environmental Management 32 (1): 141-151. (2003)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X.
Notes: Number of References: 55; Publisher: Springer-Verlag
Descriptors: Environment/ Ecology/ vernal pool/ wetland creation/ compensatory mitigation/ wetland monitoring/ reference wetlands/ New England/ metapopulation dynamics/ amphibian conservation/ temporary wetlands/ self design/ mitigation/ landscape/ declines/ biodiversity/ populations/ hydroperiod
Abstract: Vernal pools are vulnerable to loss through development and agricultural and forestry practices owing to their isolation from open water bodies and their small size. Some vernal pool-dependent species are already listed in New England as Endangered, Threatened, or Species of Special Concern. Vernal pool creation is becoming more common in compensatory mitigation as open water ponds, in general, may be easier to create than wooded wetlands. However, research on vernal pool creation is limited, A recent National Research Council study (2001) cites vernal pools as "challenging to recreate." We reviewed documentation on 15 vernal pool creation projects in New England that were required by federal regulatory action. Our purpose was to determine whether vernal pool creation for compensatory mitigation in New England replaced key vernal pool functions by assessing project goals and documentation (including mitigation plans, pool design criteria, monitoring protocols, and performance standards). Our results indicate that creation attempts often fail to replicate lost pool functions. Pool design specifications are often based on conjecture rather than on reference wetlands or created pools that function successfully. Project monitoring lacks consistency and reliability, and record keeping by regulatory agencies is inadequate. Strengthening of protection of isolated wetlands in general, and standardization across all aspects of vernal pool creation, is needed to

ensure success and to promote conservation of the long-term landscape functions of vernal pools.

521. **Evaluation of water quality projects in the Lake Tahoe basin.**
Schuster, S. and Grismer, M. E.
Environmental Monitoring and Assessment 90 (1-3): 225-242. (2004)
NAL Call #: TD194.E5;
ISSN: 0167-6369.
Notes: Number of References: 61; Publisher: Kluwer Academic Publ
Descriptors: Environment/ Ecology/ best management practices/ erosion/ eutrophication/ nutrient loadings/ water quality/ California Nevada/ detention ponds/ constructed wetlands/ nutrient transport/ surface runoff/ Sierra Nevada/ removal/ improvement/ enrichment/ Washington
Abstract: Lake Tahoe is a large sub alpine lake located in the Sierra Nevada Range in the states of California and Nevada. The Lake Tahoe watershed is relatively small (800 km(2)) and is made up of soils with a very low nutrient content and when combined with the Lake's enormous volume (156 km(3)) produces water of unparalleled clarity. However, urbanization around the Lake during the past 50 yr has greatly increased nutrient flux into the Lake resulting in increased algae production and rapidly declining water clarity. Lake transition from nitrogen limiting to phosphorous limiting during the last 30 yr suggests the onset of cultural eutrophication of Lake Tahoe. Protecting Lake Tahoe's water quality has become a major public concern and much time, effort, and money has been, and will be, spent on this undertaking. The effectiveness of remedial actions is the subject of some debate. Local regulatory agencies have mandated implementation of best management practices (BMPs) to mitigate the effects of development, sometimes at great additional expense for developers and homeowners who question their effectiveness. Conclusive studies on the BMP effectiveness are also expensive and can be difficult to accomplish such that very few such studies have been completed. However, several project evaluations have been completed and more are underway. Such study usually demonstrates support of the project's effectiveness in decreasing nutrient flux to Lake Tahoe. Here, we review the existing state of knowledge of nutrient loading to the Lake and to highlight the need for further evaluative investigations of BMPs in order to improve their performance in present and future regulatory actions.

522. **Evapotranspiration parameters for variably-sized wetlands.**
Allen, R. G.; Hill, R. W.; and Srikanth, V.
In: 1994 International Summer Meeting sponsored by the American Society of Agricultural Engineers. (Held 19 Jun 1994-22 Jun 1994 at Kansas City, Missouri.)
St. Joseph, Mich.: American Society of Agricultural Engineers; 24 p.; 1994.
Notes: Paper numbers: 94-2120/94-2155;
ISSN: 0149-9890
NAL Call #: 290.9-Am32P
Descriptors: wetlands / evapotranspiration/ arid regions/ water use/ vegetation/ plant height/ plant density/ open water/ algorithms/ equations/ literature reviews
This citation is from AGRICOLA.

523. **Evapotranspiration responses of plants and crops to carbon dioxide and temperature.**
Allen, L. H. Jr.
Journal of Crop Production 2 (2): 37-70. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Water use in crop production / edited by M.B. Kirkham. Includes references.
Descriptors: plants/ crops/ evapotranspiration/ carbon dioxide/ environmental temperature/ carbon dioxide enrichment/ climatic change/ prediction/ air temperature/ water use efficiency/ leaf conductance/ stomatal resistance/ water vapor/ temperature/ leaves/ leaf area/ crop yield/ seed output/ biomass production/ mathematical models/ glycine max/ zea mays/ irrigation/ precipitation/ water use/ literature reviews/ leaf temperature
This citation is from AGRICOLA.

524. **Examination of the wetland hydrologic criterion and its application in the determination of wetland hydrologic status.**
Hunt, W. F.; Water Resources Research Institute of the University of North Carolina; Geological Survey (U.S.); and North Carolina Agricultural Research Service
Raleigh, NC: Water Resources Research Institute of the University of North Carolina; Series: Report (Water Resources Research Institute of the University of North Carolina) no. 333; xxii, 119 p.: ill., map. (2001)
Notes: "June 2001." "UNC-WRRI-2001-333." "The research on which this report is based was supported in part by the United States Department of the Interior, Geological Survey, the Water Resources Research Institute of the University of North Carolina and by the North Carolina Agricultural Research Service." Includes bibliographical references (p. 61-63). Water Resources Research Institute. Number 70137.
NAL Call #: TD201-.N6-no.-333
Descriptors: Wetland hydrology/ Water quality---Standards
This citation is from AGRICOLA.

525. **Expected Climate Change Impacts on Soil Erosion Rates: A Review.**
Nearing, M. A.; Pruski, F. F.; and O'Neal, M. R.
Journal of Soil and Water Conservation 59 (1): 43-50. (Jan. 2004-Feb. 2004)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: Climate Change/ Runoff/ Sediment/ Soil Erosion/ Soil Loss/ Midwestern United States/ Greenhouse Gas/ Model/ Precipitation/ Simulation/ Circulation/ Variability/ Yields
Abstract: Global warming is expected to lead to a more vigorous hydrological cycle, including more total rainfall and more frequent high intensity rainfall events. Rainfall amounts and intensities increased on average in the United States during the 20th century, and according to climate change models they are expected to continue to increase during the 21st century. These rainfall changes, along with expected changes in temperature, solar radiation, and atmospheric CO2 concentrations, will have significant impacts on soil erosion rates. The processes involved in the impact of climate change on soil erosion by water are complex, involving changes in rainfall amounts and intensities, number of days of precipitation, ratio of rain to snow, plant biomass production, plant residue decomposition rates, soil microbial

activity, evapo-transpiration rates, and shifts in land use necessary to accommodate a new climatic regime. This paper reviews several recent studies conducted by the authors that address the potential effects of climate change on soil erosion rates. The results show cause for concern. Rainfall erosivity levels may be on the rise across much of the United States. Where rainfall amounts increase, erosion and runoff will increase at an even greater rate: the ratio of erosion increase to annual rainfall increase is on the order of 1.7. Even in cases where annual rainfall would decrease, system feedbacks related to decreased biomass production could lead to greater susceptibility of the soil to erode. Results also show how farmers' response to climate change can potentially exacerbate, or ameliorate, the changes in erosion rates expected.
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526. **Experimental basin studies: An international and historical perspective of forest impacts.**
Whitehead, P. G. and Robinson, M.
Journal of Hydrology 145 (3/4): 217-230. (May 1993)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA].
Notes: Special Issue: The Balquhidder Catchment and Process Studies / edited by P.G. Whitehead and I.R. Calder. Literature review. Includes references.
Descriptors: watersheds/ forests/ catchment hydrology/ forest influences/ stream flow/ precipitation/ site factors/ land use/ forestry practices/ research/ literature reviews
Abstract: The long tradition of catchment studies in hydrology results from the need to understand the water balance operating in basins, the processes controlling water movements and the impacts of land-use change on water quantity and quality. The interactions between physical, chemical and biological behaviour have become an increasingly dominant theme in recent years, and this has been boosted by global environmental problems such as acid rain and climatic change. After a historical summary of catchment studies, a brief review is given of some of the most influential experiments and their underlying objectives and results, concentrating on those concerned with one land-use change in particular--to/from forestry. In interpreting the effects of a change in forest cover, it is necessary also to consider impacts of the associated site disturbance, including possible soil compaction and road construction as a result of logging and any artificial drainage before tree planting. The recent tendency to link basin studies into networks is discussed, with examples of currently active networks.
This citation is from AGRICOLA.

527. **Experimental evidence of transport of pesticides through field soils: A review.**
Flury, M.
Journal of Environmental Quality 25 (1): 24-45. (Jan. 1996-Feb. 1996)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Abstract: Much information is available in the literature about pesticide transport through soils at the field scale. The purpose of this study is to review the literature with a focus on pesticide leaching to groundwater. The literature was compiled and discussed with respect to different factors that influence pesticide leaching. Pesticide leaching below the root zone has been demonstrated in sandy as well as in loamy soils. Particularly in loamy soils, there is evidence that even strongly adsorbing chemicals can move along preferential flow pathways and that the travel times of pesticides are comparable to those of conservative solutes. The amounts of pesticides leached below the root zone by worst case rainfall events depend on the chemical properties and can reach up to 5% of the applied mass. When there is no heavy rainfall shortly following application of chemicals, the mass annually leached below the root zone is in the range of < 0.1 to 1%, occasionally it can reach up to 4%. Although a direct comparison cannot be made, the mass lost by leaching seems generally to be smaller than that lost by runoff, depending of course on the slope of the fields. Several factors that affect pesticide leaching, such as surface preparation, soil structure, soil water content, type of irrigation, pesticide formulation, time of application and rainfall events, are discussed with support of experimental evidence. While some factors showed inconsistent effects, others show promise in controlling leaching mechanisms. These latter factors include initial water content, surface preparation, and time of pesticide application. Based on the reviewed literature, recommendations were made for future research activities.
This citation is from AGRICOLA.

528. **Expert system applications in irrigation management: An overview.**
Mohan, S and Arumugam, N
Computers and Electronics in Agriculture 17 (3): 263-280. (1997)
NAL Call #: S494.5.D3C652;
ISSN: 0168-1699
Descriptors: bioprocess engineering/ computer language/ computerized technique/ expert system applications/ irrigation management/ reservoir operation/ soil science/ user interface
Abstract: Due to the complexity of irrigation management problems, reliance on experience and experts is necessary for effective decision-making in this domain. Expert systems (ES) are efficient means for providing decision support to tasks that primarily require experience based knowledge. This paper reviews the adoptability and suitability of ES applications in the domain of irrigation management. Core concepts of ES are briefly discussed. A detailed review of the existing applications of ES is presented under three classes of ES applications: (a) expert systems proper, (b) intelligent front-ends, and (c) hybrid systems. This review of literature shows that the ES approach is applied more recently to broader domain areas in contrast to the earlier systems that were focused on narrower domain problems. Additional research on ES application to domains such as real-time irrigation scheduling, reservoir operation involving stochastic nature of inflows and evapotranspiration demand, and integrated operation of irrigation system components is needed to evolve guidelines for optimal water use. The problem of handling multiple experts to evolve decisions that are less biased than an individual expert needs to be addressed. A methodology that. takes into account the uncertainty of the ES decisions is also warranted. Further, there is a need for practical evaluation of the quality of recommendations made by the ES which would result in the successful implementation of the ES.
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529. **Exploitation of composting management for either reclamation of organic wastes or solid-phase treatment of contaminated environmental matrices.**
Vallini, Giovanni; Di Gregorio, Simona; Pera, Antonio; Queda, A; and Cunha, Cristina F
Environmental Reviews 10 (4): 195-207. (2002)
NAL Call #: GE140.E59;
ISSN: 1181-8700
Descriptors: bioremediation/ contaminated sediments/ contaminated soils

530. **Exploring the opportunities for agroforestry in changing rural landscapes: Selected papers from the 5th Biennial Conference on Agroforestry in North America, August 3-6, 1997.**
Lassoie, J. P. and Buck, L. E.
Agroforestry Systems 44 (2/3): 106-357. (1999)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366.
Notes: Special issue.
This citation is provided courtesy of CAB International/CABI Publishing.

531. **Extraction and purification of microbial DNA from soil and sediment samples.**
Roose, Amsaleg C L; Garnier, Sillam E; and Harry, M
Applied Soil Ecology 18 (1): 47-60. (2001)
NAL Call #: QH541.5.S6A67;
ISSN: 0929-1393
Descriptors: microbial DNA: extraction, purification, sediment, soil/ microbes (Microorganisms): diversity/ Microorganisms/ cell fragment removal/ contaminant extraction/ extraction/ purification efficiency: environmental sample dependent
Abstract: Knowledge of the microbial diversity in natural ecosystems has long been limited because only a minority of naturally occurring microbes can be cultured using standard techniques. Several protocols for the extraction of nucleic acids directly from the environmental matrix have been recently developed to circumvent this problem and this review covers the major extraction procedures currently used to obtain microbial DNA from environmental samples. DNA extraction procedures can involve cell extraction or direct lysis, depending on whether or not the microbial cells are isolated from their matrix. An extraction protocol generally comprises three steps: cell lysis that can be chemical, mechanical and enzymatic, removal of cell fragments and nucleic acid precipitation and purification. Direct lysis methods are more often used than cell extraction ones because they are less time consuming and give a better recovery, resulting in an extracted DNA more representative of the whole microbial community present in the sample. However, with direct lysis, contaminants are also extracted which interfere with the DNA extract. As a consequence, a more extensive purification step is required. At least four types of purification are commonly used: cesium chloride density gradient ultracentrifugation, chromatography, electrophoresis and dialysis and filtration. To remove all contaminants, it could be recommended that several purification procedures be combined, depending on the environmental matrix. The efficiency of extraction/purification depends on the properties of the environmental sample, and each step of the extraction procedure must be adjusted for each sample. Moreover, each step of the procedure suffers from shortcomings, and each additional step inevitably induces a DNA loss. Thus, the choice of a protocol must be a compromise between the recovery of DNA that will be the most representative of the microbial community and the quality of the DNA obtained that is imposed by the objectives of the work, such as detection of specific organisms or assessment of the total microbial community structure. Nevertheless, molecular techniques, that could be used in combination with cultivation techniques, are powerful methods for surveying the microbial diversity in environmental samples, although investigators must be aware that such techniques are not exempt of methodological biases.

532. **Factors affecting the performance of stormwater treatment wetlands.**
Carleton, J N; Grizzard, T J; Godrej, A N; and Post, H E
Water Research 35 (6): 1552-1562. (2001)
NAL Call #: TD420.W3;
ISSN: 0043-1354
Descriptors: ammonia: pollutant/ nitrate: pollutant/ phosphorus: pollutant/ hydraulic loading rate/ pollutant input/ pollutant removal/ stormwater runoff/ stormwater treatment wetlands/ wastewater treatment
Abstract: Data from 35 studies on 49 wetland systems used to treat stormwater runoff or runoff-impacted surface waters were examined and compared in order to identify any obvious trends that may aid future stormwater treatment wetland design efforts. Despite the intermittent nature of hydrologic and pollutant inputs from stormwater runoff, our analysis demonstrates that steady-state first-order plug-flow models commonly used to analyze wastewater treatment wetlands can be adapted for use with stormwater wetlands. Long-term pollutant removals are analyzed as functions of long-term mean hydraulic loading rate and nominal detention time. First-order removal rate constants for total phosphorus, ammonia, and nitrate generated in this fashion are demonstrated to be similar to values reported in the literature for wastewater treatment wetlands. Constituent removals are also demonstrated via regression analyses to be functions of the ratio of wetland area to watershed area. Resulting equations between these variables can be used as preliminary design tools in the absence of more site-specific details, with the understanding that they should be employed cautiously.

533. **Factors determining the effects of pesticides upon butterflies inhabiting arable farmland.**
Longley, M. and Sotherton, N. W.
Agriculture, Ecosystems and Environment 61 (1): 1-12. (Jan. 1997)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agricultural land/ pesticides/ exposure/ nontarget effects/ lepidoptera/ sublethal effects/ mortality/ fecundity/ longevity/ toxicity/ environmental factors/ farm management/ reviews
This citation is from AGRICOLA.

534. **Factors of variation of the fate of nitrogen from cattle ejections on forage surfaces.**
Simon JC; Decau ML; and Morvan T.
In: Cinquiemes rencontres autour des recherches sur les ruminants:

Rencontres-Recherches-Ruminants. (Held 2 Dec 1998-3 Dec 1998 at Paris, France.); Vol. 5.; pp. 193-200; 1998.
This citation is provided courtesy of CAB International/CABI Publishing.

535. **Farm scale composting: Biocycle.**
Emmaus, Pa.: JG Press; 80 p.: ill. (some col.). (1995)
Notes: Cover title. "A Biocycle publication."
NAL Call #: S661.F37--1995
Descriptors: Compost---Management/ Compost---Economic aspects
This citation is from AGRICOLA.

536. **Farming for a better environment: A white paper.**
Soil and Water Conservation Society (U.S.).
Ankeny, Iowa: Soil and Water Conservation Society; vii, 67 p. (1995)
NAL Call #: S604.F28--1995;
ISBN: 0935734376
Descriptors: Conservation tillage/ Soil conservation/ Soil erosion
This citation is from AGRICOLA.

537. **Farming systems and conservation needs in the Northwest Wheat Region.**
Papendick, R. I.
American Journal of Alternative Agriculture 11 (2/3): 52-57. (1996)
NAL Call #: S605.5.A43;
ISSN: 0889-1893
This citation is provided courtesy of CAB International/CABI Publishing.

538. **Farmland biodiversity: Is habitat heterogeneity the key?**
Benton, T. G.; Vickery, J. A.; and Wilson, J. D.
Trends in Ecology and Evolution 18 (4): 182-188. (2003)
NAL Call #: QH540.T742;
ISSN: 0169-5347
This citation is provided courtesy of CAB International/CABI Publishing.

539. **Faster, better data for burned watersheds needing emergency rehab.**
Lachowski, H.; Hardwick, P.; Griffith, R.; Parsons, A.; and Warbington, R.
Journal of Forestry 95 (6): 4-8. (1997);
ISSN: 0022-1201
This citation is provided courtesy of CAB International/CABI Publishing.

540. **The fate and transport of phosphorus in agricultural systems.**
Hansen, N. C.; Daniel, T. C.; Sharpley, A. N.; and Lemunyon, J. L.
Journal of Soil and Water Conservation 57 (6): 408-417. (Nov. 2002-Dec. 2002)
NAL Call #: 56.8 J822;
ISSN: 0022-4561 [JSWCA3]
Descriptors: nitrogen / losses from soil/ nitrogen fertilizers/ animal manures/ nitrogen cycle/ soil flora/ biological activity in soil/ nitrous oxide/ emission/ nitrate/ leaching/ simulation models/ use efficiency/ water pollution/ soil biology/ water erosion
This citation is from AGRICOLA.

541. **Fate and transport of surface water pathogens in watersheds.**
Ferguson, C.; Husman, A. M. de R.; Altavilla, N.; Deere, D.; and Ashbolt, N.
Critical Reviews in Environmental Science and Technology 33 (3): 299-361. (2003)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
This citation is provided courtesy of CAB International/CABI Publishing.

542. **Fate, Dissipation and Environmental Effects of Pesticides in Southern Forests: A Review of a Decade of Research Progress.**
Neary, D. G.; Bush, P. B.; and Michael, J. L.
Environmental Toxicology and Chemistry 12 (3): 411-428. (1993)
NAL Call #: QH545.A1E58 [ETOCDK]
Descriptors: Descriptors: Dissipation/ Fate of pollutants/ Leaching/ Literature review/ Path of pollutants/ Pesticides/ CREAMS Model/ Carbofuran/ Environmental effects/ Fenvalerate/ GLEAMS Model/ Hexazinone/ Infiltration/ Lindane/ Malathion/ Model studies/ Nitrates/ PRZM Model/ Picloram/ Sediment yield/ Sulfometuron methyl/ Surface runoff/ Triclopyr/ Water pollution effects/ Sources and fate of pollution/ Ultimate disposal of wastes
Abstract: Ten years of watershed-scale research has been conducted on the fate of forestry-use pesticides in forested catchments under mainly operational conditions throughout the southern U.S. Studies have evaluated chemicals such as hexazinone, picloram, sulfometuron methyl, met-sulfuron methyl, azinphosmethyl, triclopyr, carbofuran, lindane, malathion, fenvalerate, copper-chromium-arsenic, and pentachlorophenol. Model verifications of pesticide fate and dissipation and risk analyses have been conducted using simulation models such as GLEAMS, CREAMS, and PRZM. Field study data indicate that movement is controlled by the main hydrologic pathways (e.g., surface runoff, infiltration, interflow, and leaching below the root zone). Peak residue concentrations tend to be low (<500 microgm/L), except where direct applications are made to perennial streams or to ephemeral channels, and where buffer strips are not used and do not persist for extended periods of time. Indirect effects noted from the use of pesticides in forested watersheds include temporarily increased nitrate nitrogen losses, reduced sediment yields, temporal changes in terrestrial invertebrate abundance, reduced plant diversity, and changes in particulate organic matter transport in streams. Analyses conducted in regional environmental impact statements indicate that the low concentrations and short persistence of forestry pesticides in surface water and groundwater do not post a significant risk to water quality, aquatic biota, or human health. (Author's abstract)

543. **Fate of Applied Fertilizer Nitrogen in Rainfed and Irrigated Rice Soils Under Green Manuring Condition: A Review.**
Mohanty, S. and Mandal, S. R.
Environment and Ecology 17 (1): 157-163. (1999);
ISSN: 0970-0420
Descriptors: Fertilizers/ Nitrogen/ Rice/ Irrigation/ Hydrology/ Fate of Pollutants/ Sources and fate of pollution
Abstract: Basic studies to quantify the fate of added fertilizer nitrogen in rice soil previously enriched with green manures under irrigated and rainfed condition has summarily been presented here. Results suggest that with similar N-use efficiency, green manure-N is less prone to loss mechanisms that mineral-N fertilizers and may therefore contribute to long term residual effects on productivity. The various channels through which applied fertilizer nitrogen gets

distributed after application under different hydrologic conditions and subsequently the effect of green manuring modifying the trends have been elucidated.

544. **Fate of Environmental Pollutants.**
Davis, J. F. and Kratzer, T. W.
Water Environment Research 69 (4): 861-869. (June 1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ fate of pollutants/ surface water/ surveys/ contamination/ water pollution sources/ kinetics/ ecosystems/ acidification/ metals/ nutrients/ pathogens/ organic compounds/ literature reviews/ pollution dispersion/ chemical kinetics/ literature review/ Sources and fate of pollution/ Behavior and fate characteristics/ Freshwater pollution
Abstract: This review covers studies related to the fate of pollutants in natural surface waters including surveys of contamination, assessment of pollutant sources, measurement of reaction kinetics, and modeling and analysis of aquatic ecosystems. Sections are provided on acidification and humic substances, metals, nutrients, pathogens, and xenobiotic organics.

545. **Fate of poultry manure estrogens in soils: A review.**
Hanselman, T. A.; Graetz, D. A.; and Wilkie, A. C.
Soil and Crop Science Society of Florida: Proceedings 62: 8-12. (2003)
NAL Call #: 56.9 So32;
ISSN: 0096-4522
Descriptors: Agriculture/ Agronomy/ pka values/ 17 beta estradiol / estrone/ litter/ estradiol/ hormones/ runoff/ testosterone/ persistence/ exposure
Abstract: Agricultural drainage waters may become contaminated with natural steroidal estrogen hormones, i.e. estradiol and estrone, when poultry wastes are land-applied at agronomic rates. Estrogen contamination of waterways is a concern because low concentrations (ng L-1) of these chemicals in water can adversely affect the reproductive biology of aquatic vertebrates (fish, turtles, frogs, etc.) by disrupting the normal function of their endocrine systems. This review provides some information about the physicochemical properties of estradiol and estrone and summarizes current knowledge of estrogen fate and transport in soils. Estradiol and estrone are nonionic (pKa 10.3 to 10.8), slightly hydrophobic (log K-ow 3.1 to 4.0) compounds that have low solubility in water (0.8 to 13.0 mg L-1). The fate of manure-borne estrogens in soils is not well-established. Laboratory studies suggest that estrogens should be rapidly dissipated in soils due to sorption and transformation, but field studies have demonstrated that estrogens are sufficiently mobile and persistent to impact surface and ground water quality. More information is needed about the types and amounts of estrogens that occur in various poultry wastes, e.g. broiler litter vs. layer manure. More information is also needed about the sorption, biodegradation, and leaching potential of estradiol and estrone in soils.

546. **Feasibility of prescription pesticide use in the United States.**
Coble, Harold D.
Ames, IA: Council for Agricultural Science and Technology; Series: CAST issue paper no. 9. (1998)
Notes: Caption title. "August 1998."
NAL Call #: S441-.I87-no.-9
Descriptors: Pesticides---Government policy---United States/ Pesticide regulations
This citation is from AGRICOLA.

547. **Feeding and management system to reduce environmental pollution in swine production.**
Han IK; Lee JH; Piao XS; Li DeFa; and Li DF
Asian Australasian Journal of Animal Sciences 14 (3): 432-444; 81 ref. (2001)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

548. **Fertilizer and Manure Application Equipment.**
Bartok, J. W.
Ithaca, NY: Natural Resource, Agriculture, and Engineering Service NRAES-57; 22 p. (1994)
Descriptors: animal manures/ fertilizer application/ application equipment/ manure storage
Abstract: This publication discusses types of fertilizer and manure nutrient values and provides guidance on equipment selection. Procedures for calibrating fertilizer and manure application equipment are reviewed. The publication includes over thirty illustrations, six tables, a plan for a fertilizer storage shed, and a glossary of terms.

549. **Fertilizer recommendations for intensively managed grassland.**
Unwin RJ and Vellinga TH.
In: Grassland and society: Proceedings of the 15th General Meeting of the European Grassland Federation. (Held 6 Jun 1994-9 Jun 1994 at Wageningen, The Netherlands.) Mannetje, L. and Frame, J. (eds.)
Wageningen, The Netherlands: Wageningen Pers; pp. 590-602; 1994.
This citation is provided courtesy of CAB International/CABI Publishing.

550. **Fertilizers and manures.**
Hall, Daniel and Smith, A. M.
Delhi: Biotech Books; xvii, 333 p.: ill. (2002)
Notes: 5th ed. (Rev.); Includes bibliographical references and index.
NAL Call #: S654-.H362-2002;
ISBN: 8176220663
Descriptors: Fertilizers/ Manures
This citation is from AGRICOLA.

551. **Fertilizers and the environment.**
Ayoub, A. T.
Nutrient Cycling in Agroecosystems 55 (2): 117-121. (Oct. 1999)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: fertilizers/ soil fertility/ soil degradation/ cultivation/ deforestation/ land clearance/ erosion/ ecosystems/ pollutants/ socioeconomics/ technology transfer/ sustainability/ eutrophication/ global warming/ ozone/ acid rain/ algae/ environmental impact/ literature reviews/ water pollution
Abstract: Soil fertility decline is occurring over large parts of the world, particularly the developing world. It occurs mainly through intensive cultivation and the inadequate application of replacement nutrients, and through deforestation and clearance of vegetation on sandy soils. Large amounts of soil nutrients are also lost to the terrestrial ecosystems through wind and water

erosion. Low soil fertility is considered as one of the most important constraints on improved agricultural production. To sustain the future world population more fertilizers are required, which may become an environmental hazard, unless adequate technical and socio-economic measures are taken. It is estimated that, by the year 2020 at a global level, 70% of plant nutrients will have to come from fertilizers. Fertilizers are thus indispensable for sustained food production, but excessive use of mineral fertilizers has roused environmental concerns. Chief among these concerns are eutrophication of fresh water bodies, global warming and stratospheric ozone depletion, proliferation of algal blooms in coastal waters and contribution towards acid rain.
This citation is from AGRICOLA.

552. **Fertilizers in agroforestry systems.**
Szott, L T and Kass, D C L
Agroforestry Systems 23 (2-3): 157-176. (1993)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
Descriptors: plant (Plantae Unspecified)/ tree (Spermatophyta)/ Plantae (Plantae Unspecified)/ plants/ spermatophytes/ vascular plants/ agriculture/ alley cropping/ ecology/ forestry/ home gardens/ nutrient cycling/ organic fertilizer/ shaded perennial
Abstract: This review encompasses results of fertilization experiments on several agroforestry systems - alley cropping, perennial shade systems, home gardens - in which fertilizer use is a likely management alternative. Fertilizer response was found to be most common in alley cropping, variable in perennial shade systems, and rarely reported in home gardens. Level of nutrient removal in harvested products is probably the overriding factor in determining fertilizer response; greater accumulation of organic residues, slower growth under shade, and longer periods of nutrient uptake probably also contribute to the relatively smaller fertilizer response of the perennial shade systems and home gardens. Considerable knowledge gaps exist regarding the breakdown of organic residues, and interactions between mineral and organic amendments. Systems based on annual crops (e.g., alley cropping) are likely to be less nutrient-efficient and sustainable than systems based on perennial crops, due to reduced fixation and transfer of N to the crops, the tendency of the trees to compete for and sequester nutrients, relatively high P requirements of the crops, and the high labor cost of tree management. The possible benefits of fertilization of specific components in home gardens, and relative advantages of including low-value tree legumes, high-value shade trees, and fertilization in shaded perennial systems are only beginning to receive research attention.
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553. **Field effects of simazine at lower trophic levels: A review.**
Strandberg, Morten T and Scott Fordsmand, Janeck J
Science of the Total Environment 296 (1-3): 117-137. (2002)
NAL Call #: RA565.S365;
ISSN: 0048-9697
Descriptors: simazine: aerial fallout rain concentrations, application rate, bioaccumulation, disappearance time, dissipation, fate, field effects, fresh water concentrations, herbicide, lower trophic level effects, phytotoxicity, pollutant, sediment decomposition, toxicity/ algae (Algae)/ aquatic invertebrate (Invertebrata)/ bacteria (Bacteria)/ fungi (Fungi)/ plant (Plantae)/ terrestrial invertebrate (Invertebrata)/ Algae/ Animals/ Bacteria/ Eubacteria/ Fungi/ Invertebrates/ Microorganisms/ Nonvascular Plants/ Plants/ dissipation pathways/ drought/ field studies/ laboratory studies/ low temperatures
Abstract: Simazine is a triazine herbicide used in agriculture, pot-plant and tree production. The total concentrations (dissolved + adsorbed) in soil depend on the application rate, for example an application rate of 1500 g simazine/ha will result in approximately 4 mg simazine/kg in the top 1 cm. It may be spread to adjacent areas due to drift, runoff or evaporation. In fresh water concentrations approximately 4 mug simazine/l has been recorded. In aerial fallout-rain-concentrations of 0.680 mug simazine/l has been recorded. In both soil and water, degradation studies have in most cases shown DT50 times that vary between a few days and 150 days, indicating that total or near total disappearance time may be at least three times longer. Low temperatures and drought may prolong the dissipation time by a factor of two or more. Laboratory studies indicate that the primary site of decomposition in the aquatic environment is the sediment. Field studies showed deleterious effects of simazine on terrestrial invertebrates at application rates below 2 kg simazine/ha. The direct toxicity was not confirmed by laboratory results, however, these were sparse and did not cover a broad range of soil organisms. No field studies were found dealing with invertebrates, but laboratory studies have shown deleterious effects of simazine on aquatic invertebrates at concentrations above 20 mug simazine/l. Simazine is phytotoxic to many non-target species at rates below the recommended rate. At least under some environmental conditions, simazine can remain for a long time in the active layer and still be toxic to sensitive plants 1 year after application. Despite its phytotoxicity many plant species become more and more tolerant in cases of repeated use for many years and some have become resistant. Simazine is not highly toxic to soil microflora and algae, although some species definitely are affected both in an inhibitory and a stimulatory way. Most investigations predict no long-term consequences to soil and aquatic microflora in association with recommended and appropriate use giving rise to maximum expected environmental concentrations of 5 mg simazine/kg in soil and 4 mug simazine/l in water.
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554. **A field guide for the assessment of erosion, sediment transport, and deposition in incised channels of the southwestern United States.**
Parker, John T. C.; United States. Bureau of Indian Affairs; and Geological Survey (U.S.).
Tucson, Ariz.: U.S. Dept. of the Interior, U.S. Geological Survey; vi, 34 p.: col. ill.; Series: Water-resources investigations report 99-4227. (2000)
Notes: Shipping list no.: 2000-0371-P. Includes bibliographical references (p 34).
NAL Call #: GB701 .W375 no. 99-4227
Descriptors: Erosion---Southwestern States/ Sedimentation and deposition---Southwestern States/ Sediment

transport---Southwestern States/ River channels---Southwestern States
This citation is from AGRICOLA.

555. **Field guide to coastal wetland plants of the southeastern United States.**
Tiner, Ralph W.
Amherst: University of Massachusetts Press; xiii, 328 p.: ill. (1993)
Notes: Includes bibliographical references (p. 311-313) and index.
NAL Call #: QK125.T55--1993;
ISBN: 0870238329 (cloth: alk. paper); 0870238337 (pbk.: alk. paper)
Descriptors: Wetland plants---Southern States---Identification/ Coastal plants---Southern States---Identification/ Wetland plants---Southern States---Pictorial works/ Coastal plants---Southern States---Pictorial works
This citation is from AGRICOLA.

556. **Field guide to compost use.**
Composting Council.
Alexandria, Va.: Composting Council; 128 p.: col. ill. (1996)
Notes: Cover title. Includes bibliographical references (p. 124).
NAL Call #: S661-.F54-1996
Descriptors: Compost
This citation is from AGRICOLA.

557. **Field guide to on-farm composting.**
Dougherty, Mark and Natural Resource, Agriculture and Engineering Service. Cooperative Extension.
Ithaca, N.Y.: Natural Resource, Agriculture, and Engineering Service, Cooperative Extension; x, 118 p.: ill. (some col.); Series: NRAES 114. (1999)
Notes: Includes bibliographical references (p. 115-118).
NAL Call #: S675-.N72-no.-114;
ISBN: 0935817395 (pbk.)
Descriptors: Compost---Handbooks, manuals, etc
Abstract: Topics discussed in the book include: operations and equipment; raw materials and recipe making; process control and evaluation; site considerations, environmental management, and safety; composting livestock and poultry mortalities; and compost utilization on the farm. Highlights of the guide include an equipment identification table, diagrams showing windrow formation and shapes, examples and equations for recipe making and compost use estimation, a troubleshooting guide, and 24 full-color photos.
© Natural Resource, Agriculture and Engineering Service (NRAES)

558. **Field measurement of soil surface hydraulic properties by disc and ring infiltrometers a review and recent developments.**
Angulo-Jaramillo, R.; Vandervaere, J. P.; Roulier, S.; Thony, J. L.; Gaudet, J. P.; and Vauclin, M.
Soil and Tillage Research 55 (1/2): 1-29. (2000)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

559. **Field methods for measurement of fluvial sediment.**
Edwards, Thomas K.; Glysson, G. Douglas.; and Geological Survey (U.S.).
Reston, Va.: U.S. Geological Survey: Denver, Co.: Information Services; viii, 89 p.: ill.; Series: Techniques of water-resources investigations of the United States Geological Survey. Book 3, Applications of hydraulics, ch. C2. (1999)
Notes: Revised edition; "U.S. Department of the Interior, U.S. Geological Survey"--Verso t.p. Includes bibliographical references (p. 87-89).
NAL Call #: TC409 .U5 Book 3, ch. C2; *ISBN:* 0607897384
Descriptors: Alluvium---Measurement/ Sediment transport---Measurement
This citation is from AGRICOLA.

560. **Field studies on pesticides and birds: Unexpected and unique relations.**
Blus, Lawrence J and Henny, Charles J
Ecological Applications 7 (4): 1125-1132. (1997)
NAL Call #: QH540.E23;
ISSN: 1051-0761
Descriptors: dicofol: pesticide/ famphur: pesticide/ pesticide/ DDE: pesticide/ DDT: pesticide/ bird (Aves)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Vertebrates/ eggshell thickness/ population stability/ productivity/ reproductive success/ survival/ trophic level bioaccumulation
Abstract: We review the advantages and disadvantages of experimental and field studies for determining effects of pesticides on birds. Important problems or principles initially discovered in the field include effects of DDT (through its metabolite DDE) on eggshell thickness, reproductive success, and population stability; trophic-level bioaccumulation of the lipid-soluble organochlorine pesticides; indirect effects on productivity and survival through reductions in the food supply and cover by herbicides and insecticides; unexpected toxic effects and routes of exposure of organophosphorus compounds such as famphur and dimethoate; effects related to simultaneous application at full strength of several pesticides of different classes; and others. Also, potentially serious bird problems with dicofol, based on laboratory studies, later proved negligible in the field. In refining field tests of pesticides, the selection of a species or group of species to study is important, because exposure routes may vary greatly, and 10-fold interspecific differences in sensitivity to pesticides are relatively common. Although there are limitations with field investigations, particularly uncontrollable variables that must be addressed, the value of a well-designed field study far outweighs its shortcomings.
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561. **Fields of change: A new crop of American farmers finds alternatives to pesticides.**
Curtis, Jennifer. and Natural Resources Defense Council.
New York, NY: Natural Resources Defense Council; ix, 230 p.: ill., map. (1998)
Notes: "July, 1998." Includes bibliographical references (p. 223-228).
NAL Call #: S494.5.A65-C78-1998
Descriptors: Alternative agriculture---United States/ Agricultural chemicals---Environmental aspects---United States/ Pesticides---Environmental aspects---United States
This citation is from AGRICOLA.

562. **Fifty years of crop evapotranspiration studies in Puerto Rico.**
Harmsen, E. W.
Journal of Soil and Water Conservation 58 (4): 214-223. (2003)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: crops/ water use/ evapotranspiration/ water resources/ Puerto Rico

563. **Fifty years of entomological research in orchard and vegetable crops in British Columbia.**
Vernon, R. S.
Journal of the Entomological Society of British Columbia 98: 143-151. (2001)
NAL Call #: 420-B77;
ISSN: 0071-0733 [JEBCA4]
Descriptors: tree fruits/ vegetables/ arthropod pests/ insect pests/ mites/ aphidoidea/ pest management/ pesticides/ entomology/ research/ literature reviews/ British Columbia/ root maggots/ flea beetles
This citation is from AGRICOLA.

564. **Final report of the Riparian Forest Buffer Panel.**
Riparian Forest Buffer Panel. Chesapeake Bay Program (U.S.) and Chesapeake Executive Council.
Philadelphia, Pa.: U.S. Environmental Protection Agency, Region III; 8 p.; Series: CBP/TRS 96/158. (1996)
Notes: "October 1996." "Printed by the U.S. Environmental Protection Agency for the Chesapeake Bay Program"--P. [2] of cover. "EPA 903-R-96-015."
NAL Call #: QH541.5.R52-R58-1996
Descriptors: Riparian forests---Chesapeake Bay---Md and Va/ Water quality management---Chesapeake Bay Watershed---Md and Va/ Natural resources---Chesapeake Bay Watershed---Md and Va/ Chesapeake Bay Watershed---Md and Va
This citation is from AGRICOLA.

565. **Fire and Aquatic Ecosystems in Forested Biomes of North America.**
Gresswell, R. E.
Transactions of the American Fisheries Society 2: 193-221. (1999); *ISSN:* 0002-8487.
Notes: Publisher: American Fisheries Society
Descriptors: Aquatic ecosystems/ Forests/ Fires/ Vegetation patterns/ North America/ Ecosystem disturbance/ Fire/ Environmental protection/ Freshwater fish/ Ecosystem resilience/ Zoobenthos/ Nature conservation/ Aquatic communities/ Forest Fires/ Ecosystems/ Watersheds/ Fish/ Benthos/ Literature Review/ Habitats/ Aquatic environment/ Vegetation/ Weather/ Habitat/ Biota/ Wildlife/ Pisces/ Bacillariophyceae/ Invertebrata/ North America/ Freshwater/ Habitat community studies/ Mechanical and natural changes/ Watershed protection/ Environmental action
Abstract: Synthesis of the literature suggests that physical, chemical, and biological elements of a watershed interact with long-term climate to influence fire regime, and that these factors, in concordance with the postfire vegetation mosaic, combine with local-scale weather to govern the trajectory and magnitude of change following a fire event. Perturbation associated with hydrological processes is probably the primary factor influencing postfire persistence of fishes, benthic macroinvertebrates, and diatoms in fluvial systems. It is apparent that salmonids have evolved strategies to survive perturbations occurring at the frequency of wildland fires (100-102 years), but local populations of a species may be more ephemeral. Habitat alteration probably has the greatest impact on individual organisms and local populations that are the least mobile, and reinvasion will be most rapid by aquatic organisms with high mobility. It is becoming increasingly apparent that during the past century fire suppression has altered fire regimes in some vegetation types, and consequently, the probability of large stand-replacing fires has increased in those areas. Current evidence suggests, however, that even in the case of extensive high-severity fires, local extirpation of fishes is patchy, and recolonization is rapid. Lasting detrimental effects on fish populations have been limited to areas where native populations have declined and become increasingly isolated because of anthropogenic activities. A strategy of protecting robust aquatic communities and restoring aquatic habitat structure and life history complexity in degraded areas may be the most effective means for insuring the persistence of native biota where the probability of large-scale fires has increased.

566. **Fish and land-inland water ecotones: Overview and synthesis.**
Zalewski, M.; Schiemer, F.; and Thorpe, J.
International journal of ecohydrology and hydrobiology 1 (1-2): 261-266. (2001)
NAL Call #: QH541.15.E19 I58;
ISSN: 1642-3593.
Notes: Special Issue: Catchment Processes Land/Water Ecotones and Fish Communities
Descriptors: Freshwater fish/ Riparian environments/ Species diversity/ Population number/ Water quality/ Fishery management/ Stock assessment and management/ Conservation, wildlife management and recreation
Abstract: The dramatic depletion of diversity and standing crop of freshwater fish has been due mostly to degradation of their habitats and water quality. To halt and reverse this negative trend, a new approach is needed urgently toward sustainability of fish resources. The UNESCO MAB programme on the role of land-water ecotones has opened a new perspective towards solving problems in landscape management and conservation. Land-water ecotones, if restored and managed in a sustainable way, can buffer and filter impacts on aquatic ecosystems due to catchment development, by moderating hydrological processes, improving water quality, and increasing spatial complexity of habitats. This way, fish resources can be safeguarded, restored and sustained. The programme of the "Fish and Land-Inland Water Ecotones" (FLIWE) team has shown strong links between fish life histories and structures and processes in land-water ecotones. To be able to sustain freshwater fish populations a good understanding is needed of the biological linkages and pathways through land-water ecotones; of biogeochemistry; of modern techniques for habitat inventories; and of methods of habitat evaluation, planning and assessment of socio-economic feedback.

567. **Flood control and drainage engineering.**
Ghosh, S. N.
Rotterdam; Brookfield, VT: A.A. Balkema; xiv, 299 p.: ill. (1997)
Notes: 2nd ed.; Includes bibliographical references and index.
NAL Call #: TC530.G56--1997;
ISBN: 9061914817
Descriptors: Flood control/ Drainage
This citation is from AGRICOLA.

568. **Flood pulsing in wetlands: Restoring the natural hydrological balance.**
Middleton, Beth.
New York: Wiley, c2002. xii, 308 p.: ill., maps. (2002)
NAL Call #: QH541.5.V3-F46-2002;
ISBN: 0471418072 (alk. paper)
Descriptors: Floodplain ecology---North America/ Wetland restoration---North America
This citation is from AGRICOLA.

569. **Flow Duration Curves 2: A Review of Applications in Water Resources Planning.**
Vogel, R. M. and Fennessey, N. M.
Water Resources Bulletin 31 (6): 1029-1039. (1995);
ISSN: 0043-1370
Descriptors: water resources/ hydrology/ stream flow rate/ river engineering/ flood control/ water resources planning/ streamflow/ hydraulics/ engineering/ flow duration/ hydroelectric plants/ river regulation/ water allocation/ instream flow/ Dynamics of lakes and rivers/ Techniques of planning
Abstract: A streamflow duration curve illustrates the relationship between the frequency and magnitude of streamflow. Flow duration curves have a long history in the field of water-resource engineering and have been used to solve problems in water-quality management, hydropower, instream flow methodologies, water-use planning, flood control, and river and reservoir sedimentation, and for scientific comparisons of streamflow characteristics across watersheds. This paper reviews traditional applications and provides extensions to some new applications, including water allocation, wasteload allocation, river and wetland inundation mapping, and the economic selection of a water-resource project.
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570. **Fluorimetric analysis of pesticides: Methods, recent developments and applications.**
Coly, Atanasse and
Aaron, Jean Jacques
Talanta 46 (5): 815-843. (1998);
ISSN: 0039-9140
Descriptors: pesticides: analysis/ photochemical reactivity/ photodegradation pathway
Abstract: The fluorimetric analysis of pesticides is reviewed with emphasis on the description of direct and indirect fluorimetric methods, including chemical derivatization, fluorogenic labelling, and photochemically-induced fluorescence. The use of fluorescence detection in TLC, HPLC and FIA as well as applications to environmental samples are discussed in detail.
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571. **Fluorimetric determination of nitrate and nitrite.**
Viriot, M L; Mahieuxe, B; Carre, M C; and Andre, J C
Analusis 23 (7): 312-319. (1995)
NAL Call #: QD71.A52;
ISSN: 0365-4877
Descriptors: nitrate/ nitrite/ analytical method/ environmental chemistry/ fertilizer
© Thomson

572. **Forage based farming, manure handling and farm composting.**
Koepf, Herbert H.
East Troy, Wis.: Michael Fields Agricultural Institute; 48 p.: ill.; Series: Michael Fields Agricultural Institute bulletin no. 4. (1993)
Notes: "This is a compilation of the proceedings of a one day conference held on Thursday, March 18, 1993, at Michael Fields Agricultural Institute, Inc., in East Troy, Wisconsin." Includes bibliographical references.
NAL Call #: S494.5.S86M53--no.4
Descriptors: Forage plants---Congresses/ Manure handling---Congresses/ Sustainable agriculture---Congresses
This citation is from AGRICOLA.

573. **Forest ecosystem recovery in the southeast US: Soil ecology as an essential component of ecosystem management.**
Johnston, J. M. and
Crossley, D. A. Jr.
Forest Ecology and Management 155 (1/3): 187-203. (2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

574. **Forest harvesting and riparian management guidelines: A review.**
Boothroyd, Ian.; Langer, E. R.; and National Institute of Water and Atmospheric Research (N.Z.).
Wellington: NIWA; 53, 5 p.: ill.; Series: NIWA technical report 1174-2631 (56). (1999)
Notes: Includes bibliographical references (p. 48-53).
NAL Call #: SD391-.B66-1999;
ISBN: 0478084773
Descriptors: Forests and forestry/ Riparian areas---Management
This citation is from AGRICOLA.

575. **Forest health monitoring in the United States: First four years.**
Alexander, S. A. and Palmer, C. J.
Environmental Monitoring and Assessment 55 (2): 267-277. (1999)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: Federal programs/ Government programs/ Environmental monitoring/ Forests/ Research programs/ EPA/ United States/ Land pollution/ Management
Abstract: To address the need for more effective methods for evaluating and assessing forest ecosystem health, the USDA-Forest Service and the US Environmental Protection Agency through its Environmental Monitoring and Assessment Program developed the Forest Health Monitoring program. The program was initiated in 1990 and by 1994 was present in the major areas of the United States. This paper presents an overview of the program, the indicators and methods developed for the program, and some of the results after four years of monitoring and research.
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576. **Forest management and wildlife in forested wetlands of the southern Appalachians.**
Wigley, T Bently and
Roberts, Thomas H
Water Air and Soil Pollution 77 (3-4): 445-456. (1994)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: animal (Animalia Unspecified)/ plant (Plantae Unspecified)/ Animalia (Animalia Unspecified)/ Plantae (Plantae Unspecified)/ animals/ plants/ biodiversity/ ecology/ environmental protection/ forestry/ habitat/ resource management
Abstract: The southern Appalachian region contains a variety of forested wetland types. Among the more prevalent types are riparian and bottomland hardwood forests. In this paper we discuss the temporal and spatial changes in wildlife diversity and abundance often associated with forest management practices within bottomland and riparian forests.

Common silvicultural practices within the southern Appalachians are diameter-limit cutting, clearcutting, single-tree selection, and group selection. These practices alter forest composition, structure, and spatial heterogeneity, thereby changing the composition, abundance, and diversity of wildlife communities. They also can impact special habitat features such as snags, den trees, and dead and down woody material. The value of wetland forests as habitat also is affected by characteristics of adjacent habitats. More research is needed to fully understand the impacts of forest management in wetlands of the southern Appalachians.

577. **Forest & Riparian Buffer Conservation: Local Case Studies From the Chesapeake Bay Program.**
Stabenfeldt, L.; Chesapeake Bay Program, Forestry Workgroup of the Nutrient Subcommittee.
Chesapeake Bay Program, 1996 (application/pdf)
NAL Call #: aQH104.5.C45 S73 1996
http://www.chesapeakebay.net/pubs/158.pdf
Descriptors: riparian areas/ riparian buffers/ riparian forests/ forest ecology/ conservation buffers/ ecological restoration/ watershed management/ citizen participation/ local government/ urban areas/ wildlife habitats/ public finance/ case studies/ Delaware/ District of Columbia/ Maryland/ Pennsylvania/ Virginia/ West Virginia/ Chesapeake Bay/ GIS
Abstract: A collection of case-studies that highlight accomplishments of local governments and citizen organizations to recognize the importance of forests to their communities and to take action to retain and restore those forests.
This citation is from AGRICOLA.

578. **Forested wetlands: Functions, benefits and the use of best management practices.**
Welsch, David J. and United States. State and Private Forestry. Northeastern Area.
Radnor, PA: U.S. Dept. of Agriculture, Forest Service, Natural Resources Conservation Service; S.l.: U.S. Army Corps of Engineers: U.S. Environmental Protection Agency: U.S. Dept. of the Interior, Fish and Wildlife Service; 62 p.: col. ill., col maps. (1995)
Notes: Cover title. Authors: David J. Welsch ... [et al.]. "NA-PR-01-95." Includes bibliographical references.
NAL Call #: aQH541.5.M3F67--1995
Descriptors: Forest ecology---United States/ Wetland ecology---United States
This citation is from AGRICOLA.

579. **Forests planted for ecosystem restoration or conservation.**
Harrington, C. A.
New Forests 17/18 (1/3/1): 175-190. (1999)
NAL Call #: SD409.N48;
ISSN: 0169-4286.
Notes: Special issue: Planted forests: Contributions to the quest for sustainable societies / edited by J. R. Boyle, J. Winjum, K. Kavanagh and E. Jensen. Paper presented at a symposium held June 1995, Portland, Oregon. Includes references.
Descriptors: forest plantations/ ecosystems/ forest ecology/ nature conservation/ sustainability/ afforestation/ disturbed land/ planting/ land management/ stand establishment/ forest management/ fertilizers/ placement/ liming/ cultivation/ site preparation/ herbivores/ browsing/ vegetation management/ plant competition/ abiotic injuries/ wind/ sun/ species differences/ growth/ nurse trees/ literature reviews
Abstract: Although the phrase, "planting for ecosystem restoration," is of recent origin, many of the earliest large-scale tree plantings were made for what we now refer to as "restoration" or "conservation" goals. Forest restoration activities may be needed when ecosystems are disturbed by either natural or anthropogenic forces. Disturbances can impact (1) basic components of the system (e.g., plant and animal composition, soil pools, and atmospheric pools), (2) ecosystem processes, i.e., interactions among basic components, or (3) both components and processes. Early efforts at restoration or site rehabilitation focused primarily on reducing off-site impacts, such as sediment introduced into streams from ecosystems that had been severely disturbed. More recent restoration programs include ecosystems in which only some of the components are missing or some of the processes have been impacted. Restoration activities can begin immediately after the disturbance has ended. Although forest restoration projects can include many activities, planting is almost always a key component. When planning an ecosystem restoration project, land managers need to be aware that commonly used plant establishment and management procedures may need to be altered to meet project objectives. Some systems may have been so severely impacted that ameliorative activities, e.g., fertilization, liming, land contouring, and microsite preparation, will be necessary, prior to planting. Managers may also need to take special measures to reduce herbivory, control competing vegetation, or reduce physical damage from wind or sun. Choice of species needs careful consideration. Desired species may not grow well on degraded sites, may need a nurse species to become established, or may not provide an opportunity to harvest a short-term crop to reduce restoration costs. New methods may need to be developed for projects that require underplanting or interplanting. The end result of restoration should be an ecosystem with the same level of heterogeneity inherent in an undisturbed system; thus, managers should consider how pre- and postplanting activities will affect system variability. As our understanding of ecosystems has increased, so has our expectation that restored ecosystems have the same components and function in the same manner as do undisturbed systems. These expectations require that land managers have more sophisticated information than was considered necessary previously. In the absence of more pertinent information, we can prescribe restoration activities based on results from related ecosystems or on theoretical considerations. Additional research, careful monitoring, and adaptive management are critical to our long-term success.
This citation is from AGRICOLA.

580. **The Fourth no-till Q&A book: Practical down-to-earth answers to 184 of the most commonly asked questions about all aspects of no-till farming.**
Lessiter, Frank.
Brookfield, WI: Lessiter Publications; 48 p.: ill. (1993)
Notes: 4th ed.

NAL Call #: S604.N675--1993
Descriptors: No tillage---United States/ Conservation tillage---United States
This citation is from AGRICOLA.

581. **Fractionation studies of trace elements in contaminated soils and sediments: A review of sequential extraction procedures.**
Gleyzes, Christine; Tellier, Sylvaine; and Astruc, Michel
Trends in Analytical Chemistry 21 (6-7): 451-467. (2002)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: aluminum hydrous oxides/ anionic species/ hydrogen peroxide/ hydroxylamine/ iron hydrous oxides / manganese hydrous oxides/ metals: solid phase forms/ oxalate/ oxalic acid buffered solution/ sodium dithionite/ sodium hydroxide/ sodium hypochlorite/ sodium pyrophosphate/ trace elements/ agricultural soils/ contaminated sediments/ contaminated soils
Abstract: Sequential selective extraction techniques are commonly used to fractionate the solid-phase forms of metals in soils. Many sequential extraction procedures have been developed, particularly for sediments or agricultural soils, and, despite numerous criticisms, they remain very useful. This article reviews the reagents used in the various schemes, with their advantages and disadvantages. The particular case of elements giving anionic species is also developed. Finally, there is discussion of the limits of sequential extraction procedures.
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582. **A framework for evaluating BMP effects on N discharges from watersheds.**
Shukla S and Mostaghimi S.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); 21 p.; 1998.
Notes: ASAE Paper no. 982008
NAL Call #: S671.3 .A54
This citation is provided courtesy of CAB International/CABI Publishing.

583. **Framework for wetland systems management: Earth resources perspective: Final report.**
Warne, Andrew G.; Smith, Lawson M.; United States. Army. Corps of Engineers; U.S. Army Engineer Waterways Experiment Station; and Wetlands Research Program (U.S.).
Vickburg, Miss: U.S. Army Engineer Waterways Experiment Station; viii, 143 p.: ill. maps; Series: Wetlands Research Program technical report WRP-SM-12. (1995)
Notes: "October 1995." Includes bibliographical references (p. 131-143).
NAL Call #: QH541.5.M3W37--1995
Descriptors: Wetland ecology---United States---Management/ Wetlands---United States---Management/ Ecosystems management---United States
This citation is from AGRICOLA.

584. **Fremont cottonwood-Goodding willow riparian forests: A review of their ecology, threats, and recovery potential.**
Stromberg, J. C.
Journal of the Arizona-Nevada Academy of Science 27 (1): 97-110. (1993)
NAL Call #: 500-Ar44;
ISSN: 0193-8509 [JAASDM]
Descriptors: populus fremontii/ salix/ forest ecology/ riparian forests/ endangered species/ forest resources/ literature reviews/ nature conservation/ Arizona/ California/ Utah/ salix gooddingii
This citation is from AGRICOLA.

585. **Freshwater liming.**
Henrikson, L; Hindar, A; and Thornelof, E
Water Air and Soil Pollution 85 (1): 131-142. (1995)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: calcium carbonate/ aluminum/ acid deposition/ air pollution/ aluminum/ calcium carbonate/ cost benefit analyses/ environmental contamination/ lake/ neutralization/ organic matter/ stream/ water pollution/ wetlands
Abstract: Operational liming of surface waters is part of Sweden and Norway's strategy to counteract freshwater acidification caused by air pollutants. Smaller scale liming efforts are performed as research or experimental programs in other countries. Yearly, approx. 300,000 tons of fine-grained limestone (CaCO-3) is spread in lakes and streams and on wetlands to raise the Ph in surface water at a cost of approximately 40-50 million US. The chemical target is set by the biological goals and objectives. A total of over 11,000 lakes and streams are treated on a continuing basis. Dose calculations consider pH, inorganic monomeric Al, dissolved organic matter and the necessary buffering. Lake liming, limedosers at streams and terrestrial liming are used. A mix of different liming techniques is often preferred to get an optimal result. The vast majority of changes are desirable and expected. Undesirable effects may appear and damaged wetlands are probably the most serious ones. Cost-benefit analysis show that liming may be profitable for the society. Recovery of the systems can take up to 10-20 years. Liming will in the long run restore the ecosystems but will not make them identical to what may be the original ones. In some cases, complementary measures, e.g. facilitation of recolonization, are necessary to enhance recovery. Reduced emissions of acidifying pollutants according to signed protocols will decrease the need for liming, but still liming is needed for several decades in large regions to preserve biodiversity.
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586. **Freshwater sediment toxicity tests: Technical evaluations and responses with receiving water sediments.**
Haley, Richard K. and National Council of the Paper Industry for Air and Stream Improvement (U.S.).
Research Triangle Park, NC: National Council of the Paper Industry for Air and Stream Improvement; iii, 69, 6 p.: ill.; Series: Technical bulletin (National Council of the Paper Industry for Air and Stream Improvement (U.S.): 1981) no. 719. (1996)
Notes: Cover title. Prepared by Richard K. Haley. "July 1996." Includes bibliographical references (p. 67-69).
NAL Call #: TD899.P3N34--no.719
Descriptors: Toxicity testing---Methodology/ Sediments---Geology---Toxicology---United States/ Water quality biological assessment---United States/ Effluent quality---United States
This citation is from AGRICOLA.

587. **From laboratory to field: Uses and limitations of pesticide behaviour models for the soil/plant system.**
Boesten, J. J. T. I.
Weed Research 40 (1): 123-138. (Feb. 2000)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: pesticides/ soil/ mathematical models/ simulation models/ pollution/ contamination/ movement in soil/ volatilization/ surfaces/ rain/ plants/ persistence/ groundwater/ groundwater pollution/ simulation/ leaching/ water quality/ validity/ literature reviews/ pesticide residues
This citation is from AGRICOLA.

588. **A functional classification of wetland plants.**
Boutin, C. and Keddy, P. A.
Journal of Vegetation Science 4 (5): 591-600. (1993)
NAL Call #: QK900.J67;
ISSN: 1100-9233
Descriptors: bog plants/ community ecology/ plant ecology/ wetlands/ literature reviews/ pot experimentation/ North America/ eastern North America
This citation is from AGRICOLA.

589. **Functional ecology of vesicular arbuscular mycorrhizas as influenced by phosphate fertilization and tillage in an agricultural ecosystem.**
Miller, M. H.; McGonigle, T. P.; and Addy, H. D.
Critical Reviews in Biotechnology 15 (3/4): 241-255. (1995)
NAL Call #: TP248.13.C74;
ISSN: 0738-8551
This citation is provided courtesy of CAB International/CABI Publishing.

590. **Fungicide resistance. Lessons for herbicide resistance management?**
Peever, Tobin L and Milgroom, Michael G
Weed Technology 9 (4): 840-849. (1995)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: cross resistance/ fitness/ pathogen populations
© Thomson

591. **Future benefits from biological nitrogen fixation: An ecological approach to agriculture.**
Giller KE and Cadisch G
Plant and Soil 174 (1-2): 255-277. (1995)
NAL Call #: 450 P696.
Notes: Number of References: 105; Extended versions of papers presented at Management of biological nitrogen fixation for the development of more productive and sustainable agricultural systems: Symposium on biological nitrogen fixation for sustainable agriculture at the 15th Congress of Soil Science / Acapulco, Mexico, 1994
This citation is provided courtesy of CAB International/CABI Publishing.

592. **Future directions for biodiversity conservation in managed forests: Indicator species, impact studies and monitoring programs.**
Lindenmayer, D. B.
Forest Ecology and Management 115 (2/3): 277-287. (1999)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

593. **The future of herbicides in weed control systems of the Great Plains.**
Lyon, D. J.; Miller, S. D.; and Wicks, G. A.
Journal of Production Agriculture 9 (2): 209-215. (1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
This citation is provided courtesy of CAB International/CABI Publishing.

594. **Future of irrigated agriculture.**
Vaux, H.
Ames, IA: Council for Agricultural Science and Technology, 1996. 76 p.
Notes: "August 1996."
Descriptors: agriculture/ irrigation/ Western United States/ agricultural policy/ groundwater/ water supply
This citation is from AGRICOLA.

595. **The future role of biotechnology in integrated pest management.**
Osir, E O and Gould, F
Insect Science and its Application 15 (6): 621-631. (1994)
NAL Call #: QL461.I57;
ISSN: 0191-9040
Descriptors: animal (Animalia Unspecified)/ Animalia (Animalia Unspecified)/ animals/ agriculture/ biological control/ biotechnology/ crop loss/ integrated pest management/ pest/ pest management/ population dynamics
Abstract: Crop losses caused by pests are a major problem in both developed and developing countries. Increasing awareness of the environmental consequences of indiscriminate use of chemical pesticides has provided new impetus for the search for alternative ways of managing pests. Particular emphasis has been placed on strategies that cause less pollution to the environment and those that are affordable, especially for the less developed countries. One concept that has received a lot of attention is integrated pest management (IPM), which seeks to manage pests and minimise crop losses by using methods that are economically viable and less harmful to the environment. At least three distinct classes of new biotechnologies can have impacts on integrated pest management. These include microbial biotechnologies, plant molecular biology and genetics, and insect molecular biology and genetics. For example, recent advances in molecular biology have enabled scientists to overcome species barriers and to genetically alter plants, animals and microorganisms in ways that were not possible before. Already, several genetically altered plants which express genes that confer protection against pests have been produced. The techniques of biotechnology have also played important roles in elucidating pest populations and in studying the population dynamics of biological control agents and other types of organisms that live in association with crop plants. This article examines some of the major developments in the areas of molecular biology, genetics and biotechnology and the potential impacts that they could have on integrated pest management worldwide.
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596. **The future role of pesticides in US agriculture.**
National Research Council (U.S.). Committee on the Future Role of Pesticides in US Agriculture and National Research Council (U.S.). Board on Environmental Studies and Toxicology.

Washington, D.C.: National Academy Press; xx, 301 p.: ill. (2000)
NAL Call #: SB950.2.A1-F88-2000;
ISBN: 0309065267 (case bound)
http://www.nap.edu/books/0309065267/html/
Descriptors: Pesticides---
United States
This citation is from AGRICOLA.

597. **Fuzzy environmental decision-making: Applications to air pollution.**
Fisher, Bernard
Atmospheric Environment 37 (14): 1865-1877. (2003)
NAL Call #: TD881.A822;
ISSN: 1352-2310
Descriptors: air pollution/ air quality management/ environmental decision making/ fuzzy set theory/ human health assessment/ integrated pollution prevention/ uncertainty/ urban air quality
Abstract: This paper illustrates ways in which concepts from fuzzy set theory may be applied to decision-making in the environmental sciences. Examples of its application to uncertainty, particularly in air pollution, are illustrated. No one of a number of methods for dealing with uncertainty is advocated, but rather a choice from a range of techniques should be made, appropriate to the application. Use of fuzzy sets formalises the underlying assumptions regarding uncertainty and therefore leads to better decision-making. This paper illustrates the flexibility of the approach, taking examples from air quality management, integrated pollution prevention and control, and human health assessment.
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598. **The General Ecology of Beavers (Castor Spp.), As Related to Their Influence on Stream Ecosystems and Riparian Habitats, and the Subsequent Effects on Fish: A Review.**
Collen, P and Gibson, RJ
Reviews in Fish Biology and Fisheries 10 (4): 439-461. (2000);
ISSN: 0960-3166
Descriptors: Aquatic mammals/ Freshwater ecology/ Habitat selection/ Environmental impact/ Interspecific relationships/ Sedimentation/ Nature conservation/ Environmental protection/ Habitat changes/ Water temperature/ Hydrology/ Dams/ Reviews/ Streams/ Riparian environments / Aquatic ecosystems/ Castor/ Salmonidae/ Castor canadensis/ Castor fiber/ Beavers/ Salmonids/ American Beaver/ European Beaver/ Species interactions: general/ Mammals
Abstract: The Eurasian and North American beavers are similar in their ecological requirements, and require water deep enough to cover the entrance to their lodge or burrow. A food cache is often built next to the lodge or burrow, except in some southern areas. On small streams (up to fourth order) dams are frequently built to create an impoundment, generally on low gradient streams, although at high population densities dams may be built on steeper gradient streams. On large rivers or in lakes, simply a lodge with its food cache may be built. The beaver is a keystone riparian species in that the landscape can be considerably altered by its activities and a new ecosystem created. The stream above a dam changes from lotic to lentic conditions. There are hydrological, temperature and chemical changes, depending on types of dams and locations. Although the invertebrates may be fewer per unit area, total number of organisms increases, and diversity increases as the pond ages. In cool, small order streams, the impoundments provide better habitat for large trout, possibly creating angling opportunities. However, at sites where water temperatures rise above their optimum preferenda, salmonids may be replaced by other species, such as cyprinids, catostomids, percids or centrarchids. As the habitat is altered, interactions amongst co-habiting species may change. For example, brown trout or brook trout (charr) may become dominant over Atlantic salmon. In warm water streams there may be a shift from faster water dwellers to pond dwellers. Larger bodied fish, such as centrarchids and esocids may displace smaller bodied fish such as cyprinids, providing better angling. Refugia from high or low water flows, low oxygen or high temperatures, may be provided in adverse conditions in winter or summer. However, in some cases dams are obstructions to upstream migration, and sediment may be deposited in former spawning areas. The practicality and benefits of introducing or restoring beaver populations will vary according to location, and should be considered in conjunction with a management plan to control their densities.
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599. **Genetically modified crops and the environment.**
Barton, J. E. and Dracup, M.
Agronomy Journal 92 (4): 797-803. (July 2000-Aug. 2000)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT]
Descriptors: crops/ genetic engineering/ environmental protection/ nature conservation/ crop management/ risk assessment/ gene flow/ ecosystems/ environmental impact/ temporal variation/ spatial variation/ decision making/ monitoring/ sustainability/ literature reviews/ transgenic plants
This citation is from AGRICOLA.

600. **Geochemical processes and nutrient uptake by plants in hydric soils.**
McKee, W. H. Jr. and McKevlin, M. R.
Environmental Toxicology and Chemistry 12 (12): 2197-2207. (Dec. 1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268 [ETOCDK].
Notes: Annual Review Issue: Wetland Ecotoxicology and Chemistry. Includes references.
Descriptors: wetland soils/ flooding/ biological production/ plant water relations/ plant nutrition/ metabolism/ mineral nutrition/ nutrient uptake/ soil physical properties/ reduction
This citation is from AGRICOLA.

601. **Geographically isolated wetlands: A preliminary assessment of their characteristics and status in selected areas of the United States.**
Tiner, Ralph W. and U.S. Fish and Wildlife Service. Region 5.
Hadley, Mass.: U.S. Fish and Wildlife Service, Northeast Region. (2002)
Notes: Title from web page. "June 2002." Description based on content viewed July 3, 2003. Includes bibliographical references.

NAL Call #: QH87.3-.G64-2002
http://wetlands.fws.gov/Pubs%5FReports/isolated/report.htm
Descriptors: Wetlands---United States/ Wetland ecology---United States
This citation is from AGRICOLA.

602. **Geology, climate, land, and water quality.**
Fox, D. G.; Jemison, R.; Potter, D. U.; Valett, H. M.; and Watts, R.
In: Ecology, diversity, and sustainability of the Middle Rio Grande Basin; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 1995. pp. 52-79.
NAL Call #: aSD11.A42-no.268
Descriptors: pollutants/ geology/ climate/ water quality/ rivers/ ecosystems/ topography/ hydrology/ river valleys/ drainage/ watersheds/ history/ human activity/ dams/ contamination/ water pollution/ organic compounds/ biocides/ radionuclides/ heavy metals/ nutrients/ water availability/ water resources/ carbon cycle/ sediment/ literature reviews/ New Mexico
This citation is from AGRICOLA.

603. **Geomorphic thresholds in riverine landscapes.**
Church, Michael
Freshwater Biology 47 (4): 541-557. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: alluvial deposits/ drainage basins/ flow regimes/ fluvial competence/ fluvial geomorphology/ geomorphic thresholds/ habitat types/ human activity/ river channels: form, processes/ river organization/ riverine landscapes/ sediment caliber/ sediment quality/ sediment transport/ topography
Abstract: 1. Rivers are subject to thresholds of several types that define significant changes in processes and morphology and delimit distinctive riverine landscapes and habitats. Thresholds are set by the conditions that govern river channel process and form, amongst which the most important are the flow regime, the quantity and calibre of sediment delivered to the channel, and the topographic setting (which determines the gradient of the channel). These factors determine the sediment transport regime and the character of alluvial deposits along the channel. 2. Changes occur systematically along the drainage system as flow, gradient and sediment character change, so a characteristic sequence of morphological and habitat types - hence of riverine landscapes - can be described from uplands to distal channels. The sequence is closely associated with stream competence to move sediment and with bank stability. 3. The paper proposes a first order classification of river channel and landscape types based on these factors. The riverine landscape is affected seasonally by flow thresholds, and further seasonal thresholds in northern rivers are conditioned by the ice regime. 4. It is important to understand geomorphic thresholds in rivers not only for the way they determine morphology and habitat, but because human activity can precipitate threshold crossings which change these features significantly, through either planned or inadvertent actions. Hence, human actions frequently dictate the character of the riverine landscape.
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604. **Global estimates of potential mitigation of greenhouse gas emissions by agriculture.**
Cole, C. V.; Duxbury, J.; Freney, J.; Heinemeyer, O.; Minami, K.; Mosier, A.; Paustian, K.; Rosenberg, N.; Sampson, N.; Sauerbeck, D.; and Zhao, Q.
Nutrient Cycling in Agroecosystems 49 (1/3): 221-228. (1997)
NAL Call #: S631 .F422
This citation is provided courtesy of CAB International/CABI Publishing.

605. **Global patterns of dissolved N, P and Si in large rivers.**
Turner, R. E.; Rabalais, N. N.; Justic, D.; and Dortch, Q.
Biogeochemistry 64 (3): 297-317. (2003)
NAL Call #: QH345.B564;
ISSN: 0168-2563
Descriptors: Environment/ Ecology/ coastal waters/ estuaries/ large rivers/ limnology/ nitrogen/ nutrient ratios/ phosphate/ silicate/ stoichiometry/ Mississippi River/ coastal eutrophication/ Brest, France/ food webs/ nitrogen/ silicate/ phytoplankton/ nutrient/ waters/ ocean
Abstract: The concentration of dissolved inorganic nitrogen (DIN), dissolved nitrate-N, Total-N (TN), dissolved inorganic phosphate (DIP), total phosphorus (TP), dissolved silicate-Si (DSi) and their ratios in the world's largest rivers are examined using a global data base that includes 37% of the earth's watershed area and half its population. These data were compared to water quality in 42 subbasins of the relatively well-monitored Mississippi River basin (MRB) and of 82 small watersheds of the United States. The average total nitrogen concentration varies over three orders of magnitude among both world river watersheds and the MRB, and is primarily dependent on variations in dissolved nitrate concentration, rather than particulate or dissolved organic matter or ammonium. There is also a direct relationship between the DIN: DIP ratio and nitrate concentration. When nitrate-N exceeds 100 mug-at l(-1), the DIN: DIP ratio is generally above the Redfield ratio (16:1), which implies phosphorus limitation of phytoplankton growth. Compared to nitrate, the among river variation in the DSi concentration is relatively small so that the DSi loading (mass/area/time) is largely controlled by runoff volume. The well-documented influence of human activities on dissolved inorganic nitrogen loading thus exceeds the influences arising from the great variability in soil types, climate and geography among these watersheds. The DSi: nitrate-N ratio is controlled primarily by nitrogen loading and is shown to be inversely correlated with an index of landscape development- the "City Lights" nighttime imagery. Increased nitrogen loading is thus driving the world's largest rivers towards a higher DIN: DIP ratio and a lower DSi: DIN ratio. About 7.3 and 21% of the world's population lives in watersheds with a DSi: nitrate-N ratio near a 1:1 and 2:1 ratio, respectively. The empirical evidence is that this percentage will increase with further economic development. When the DSi: nitrate-N atomic ratio is near 1:1, aquatic food webs leading from diatoms (which require silicate) to fish may be compromised and the frequency or size of harmful or noxious algal blooms may increase. Used together, the DSi: nitrate-N ratio and nitrate-N concentration are useful and robust comparative indicators of eutrophication in large rivers. Finally, we estimate the riverine loading to the ocean for nitrate-N, TN, DIP, TP and DSi to be 16.2, 21, 2.6, 3.7 to 5.6, and 194 Tg yr(-1), respectively.
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606. **Glyphosate-resistant soybean as a weed management tool: Opportunities and challenges.**
Reddy, K. N.
Weed Biology and Management 1 (4): 193-202. (2001)
NAL Call #: SB610-.W447;
ISSN: 1444-6162
Descriptors: glycine max/ glyphosate/ herbicide resistance/ weed control/ transgenic plants/ weeds/ costs/ innovation adoption/ integrated pest management/ literature reviews
This citation is from AGRICOLA.

607. **Grass roots range management education with a high-tech twist.**
Surber, G. and Porter, S.
In: People and rangelands: Building the future: Proceedings of the VI International Rangeland Congress. (Held 19 Jul 1999-23 Jul 1999 at Townsville, Queensland, Australia.) Eldridge, D. and Freudenberger, D. (eds.); Vol. 1-2.
Aitkenvale, Australia: International Rangeland Congress; pp. 358-362; 1999. *ISBN:* 0-9577394-0-0
This citation is provided courtesy of CAB International/CABI Publishing.

608. **Grass versus trees: Managing riparian areas to benefit streams of central North America.**
Lyons, J.; Trimble, S. W.; and Paine, L. K.
Journal of the American Water Resources Association 36 (4): 919-930. (Aug. 2000)
NAL Call #: GB651.W315;
ISSN: 1093-474X [JWRAF5]
Abstract: Forestation of riparian areas has long been promoted to restore stream ecosystems degraded by agriculture in central North America. Although trees and shrubs in the riparian zone can provide many benefits to streams, grassy or herbaceous riparian vegetation can also provide benefits and may be more appropriate in some situations. Here we review some of the positive and negative implications of grassy versus wooded riparian zones and discuss potential management outcomes. Compared to wooded areas, grassy riparian areas result in stream reaches with different patterns of bank stability, erosion, channel morphology, cover for fish, terrestrial runoff, hydrology, water temperature, organic matter inputs, primary production, aquatic macroinvertebrates, and fish. Of particular relevance in agricultural regions, grassy riparian areas may be more effective in reducing bank erosion and trapping suspended sediments than wooded areas. Maintenance of grassy riparian vegetation usually requires active management (e.g., mowing, burning, herbicide treatments, and grazing), as successional processes will tend ultimately to favor woody vegetation. Riparian agricultural practices that promote a dense, healthy, grassy turf, such as certain types of intensively managed livestock grazing, have potential to restore degraded stream ecosystems.
This citation is from AGRICOLA.

609. **Grazing animals as weed control agents.**
Popay, I. and Field, R.
Weed Technology 10 (1): 217-231. (Mar. 1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: weed control/ grazing/ reviews/ cattle/ goats/ sheep/ Control
Abstract: Literature on the effectiveness of grazing animals (especially cattle, goats, and sheep) in controlling weeds is reviewed. Availability of animals and the ability to fence them onto or off weed infestations are essential. Weeds of pastures are the most suitable subjects for control, although weeds of arable crops, forestry, and waste places are sometimes amenable to control by grazing animals. Although grazing animals themselves often cause weed problems in pasture, adjusting grazing timing or intensity or both can sometimes redress the balance. Increasing sheep or cattle stocking rates prevents animals from grazing selectively and can help control some weeds. Adjusting grazing pressure can also improve the growth of desirable pasture species so that these are more competitive and able to resist invasion of annual or biennial weeds. Introducing a different class of stock, like sheep into a cattle system or goats into a sheep system can control many weeds. Goats are capable of browsing on and controlling spiny or poisonous brush weeds, including gorse and poison ivy, without suffering adverse effects. Examples are given of the use of grazing animals for weed control in crops and forestry.
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610. **Grazing management for riparian wetland areas.**
Leonard, S. G.; National Applied Resource Sciences Center (U.S.); and United States. Forest Service.
Denver, CO: U.S. Dept. of the Interior, Bureau of Land Management, National Applied Resource Sciences Center; viii, 63 p.: ill.; Series: Riparian area management. Technical reference (United States. Bureau of Land Management) 1737-14. (1997)
Notes: "U.S. Department of Agriculture, Forest Service"--Cover. Shipping list no.: 98-0126-P. "BLM/RS/ST-97/002+1737"--P. [2] of cover. Includes bibliographical references (p. 57-63). SUDOCS: I 53.35:1737-14.
NAL Call #: SF85.3.G75--1997
Descriptors: Range management---United States/ Grazing---Environmental aspects---United States/ Riparian ecology---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

611. **Green-Ampt runoff model: A review.**
Manivannan, S. and Raman, S. S.
Indian Journal of Soil Conservation 31 (2): 105-113. (2003)
NAL Call #: S625.I47S6;
ISSN: 0970-3349
This citation is provided courtesy of CAB International/CABI Publishing.

612. **Green revolution: Preparing for the 21st century.**
Khush, G. S.
Genome 42 (4): 646-655. (Aug. 1999)
NAL Call #: QH431.G452;
ISSN: 0831-2796 [GENOE3].
Notes: Genetic resources, biotechnology and world food supply: A special symposium held June 20-21, 1997, London, Ontario, Canada. Includes references.
Descriptors: green revolution/ genetic improvement/ food security/ sustainability/ agriculture/ maximum yield/ high yielding varieties/ yield increases/ food production/ population growth/ triticum aestivum/ oryza sativa/ fertilizers/ lodging/ resistance/ disease resistance/ pest resistance/ genetic resistance/ irrigation/ government policy/ literature reviews
Abstract: In the 1960s there were large-scale concerns about the world's ability to feed itself. However, widespread adoption of "green revolution" technology led to major increases in food-grain production.

Between 1966 and 1990, the population of the densely populated low-income countries grew by 80%, but food production more than doubled. The technological advance that led to the dramatic achievements in world food production over the last 30 years was the development of high-yielding varieties of wheat and rice. These varieties are responsive to fertilizer inputs, are lodging resistant, and their yield potential is 2-3 times that of varieties available prior to the green revolution. In addition, these varieties have multiple resistance to diseases and insects and thus have yield stability. The development of irrigation facilities, the availability of inorganic fertilizers, and benign government policies have all facilitated the adoption of green-revolution technology. In the 1990s, the rate of growth in food-grain production has been lower than the rate of growth in population. If this trend is not reversed, serious food shortages will occur in the next century. To meet the challenge of feeding 8 billion people by 2020, we have to prepare now and develop the technology for raising farm productivity. We have to develop cereal cultivars with higher yield potential and greater yield stability. We must also develop strategies for integrated nutrient management, integrated pest management, and efficient utilization of water and soil resources.
This citation is from AGRICOLA.

613. **The green technology of selenium phytoremediation.**
Banuelos, G S
Biofactors 14 (1-4): 255-260. (2001);
ISSN: 0951-6433
Descriptors: selenium: pollutant, toxin/ selenoprotein/ Brassica sp. (Cruciferae)/ canola (Cruciferae)/ microorganism (Microorganisms)/ Angiosperms/ Dicots/ Microorganisms/ Plants/ Spermatophytes/ Vascular Plants/ agricultural effluent/ contaminated sediments/ selenium laden soil
Abstract: Selenium toxicity is encountered in arid and semi-arid regions of the world with alkaline, seleniferous soils derived from marine sediments. Once present in soils and waters at high concentrations, Se is very complicated and highly expensive to remove with conventional physical and chemical techniques. Phytoremediation is a plant-based technology that is being considered for managing Se in central California soils. The technology involves the use of plants in conjunction with microbial activity associated with the plants to extract, accumulate, and volatilize Se. Once absorbed by plant roots, Se is translocated to the shoot where it may be harvested and removed from the site. Therefore, plant species used for phytoremediation of Se-laden soils may by plant uptake and volatilization minimize the Se load eventually entering agricultural effluent and the harvested crop can be carefully blended with animal forage and fed to animals in Se-deficient areas.
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614. **Greenhouse gas emissions from farmed organic soils: A review.**
Kasimir, Klemedtsson A; Klemedtsson, L; Berglund, K; Martikainen, P; Silvola, J; and Oenema, O
Soil Use and Management 13 (4 [supplement]): 245-250. (1997)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: carbon dioxide: greenhouse gas/ methane: greenhouse gas/ nitrous oxide: greenhouse gas/ agriculture/ climate change/ farmed organic soil/ greenhouse gas emission/ soil management
Abstract: The large boreal peatland ecosystems sequester carbon and nitrogen from the atmosphere due to a low oxygen pressure in waterlogged peat. Consequently they are sinks for CO2 and strong emitters of CH4. Drainage and cultivation of peatlands allows oxygen to enter the soil, which initiates decomposition of the stored organic material, and in turn CO2 and N2O emissions increase while CH4 emissions decrease. Compared to undrained peat, draining of organic soils for agricultural purposes increases the emissions of greenhouse gases (CO2, CH4 and N2O) by roughly 1 t CO2 equivalents/ha per year. Although farmed organic soils in most European countries represent a minor part of the total agricultural area, these soils contribute significantly to national greenhouse gas budgets. Consequently, farmed organic soils are potential targets for policy makers in search of socially acceptable and economically cost-efficient measures to mitigate climate gas emissions from agriculture. Despite a scarcity of knowledge about greenhouse gas emissions from these soils, this paper addresses the emissions and possible control of the three greenhouse gases by different managements of organic soils. More precise information is needed regarding the present trace gas fluxes from these soils, as well as predictions of future emissions under alternative management regimes, before any definite policies can be devised.
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615. **A greenhouse without pesticides: Fact or fantasy.**
Lenteren, J. C. van.
Crop Protection 19 (6): 375-384. (July 2000)
NAL Call #: SB599.C8;
ISSN: 0261-2194 [CRPTD6]
Descriptors: greenhouse culture/ plant protection/ crops/ integrated pest management/ plant disease control/ biological control/ natural enemies/ literature reviews
This citation is from AGRICOLA.

616. **Ground water contaminants and their sources-a review of state reports.**
Canter, L. W. and Maness, K.
International Journal of Environmental Studies 47 (1): 1-17. (1995);
ISSN: 0020-7233
This citation is provided courtesy of CAB International/CABI Publishing.

617. **Groundwater as a Geologic Agent: An Overview of the Causes, Processes, and Manifestations.**
Toth, J.
Hydrogeology Journal 7 (1): 1-14. (1999);
ISSN: 1431-2174.
Notes: DOI: 10.1007/s100400050176
Descriptors: Groundwater/ Geology/ Porous Media/ Geohydrologic Units/ Hydraulics/ Geochemistry/ Soil Mechanics/ Rock Mechanics/ Geomorphology/ Groundwater
Abstract: The objective of the present paper is to show that groundwater is a general geologic agent. This perception could not, and did not, evolve until the system nature of basinal groundwater flow and its properties, geometries, and controlling factors became recognized and understood through the 1960s and 1970s. The two fundamental causes for groundwater's active role in nature are its ability to interact with

the ambient environment and the systematized spatial distribution of its flow. Interaction and flow occur simultaneously at all scales of space and time, although at correspondingly varying rates and intensities. Thus, effects of groundwater flow are created from the land surface to the greatest depths of the porous parts of the Earth's crust, and from a day's length through geologic times. Three main types of interaction between groundwater and environment are identified in this paper, with several special processes for each one, namely: (1) Chemical interaction, with processes of dissolution, hydration, hydrolysis, oxidation-reduction, attack by acids, chemical precipitation, base exchange, sulfate reduction, concentration, and ultrafiltration or osmosis; (2) Physical interaction, with processes of lubrication and pore-pressure modification; and (3) Kinetic interaction, with the transport processes of water, aqueous and nonaqueous matter, and heat. Owing to the transporting ability and spatial patterns of basinal flow, the effects of interaction are cumulative and distributed according to the geometries of the flow systems. The number and diversity of natural phenomena that are generated by groundwater flow are almost unlimited, due to the fact that the relatively few basic types are modified by some or all of the three components of the hydrogeologic environment: topography, geology, and climate. The six basic groups into which manifestations of groundwater flow have been divided are: (1) Hydrology and hydraulics; (2) Chemistry and mineralogy; (3) Vegetation; (4) Soil and rock mechanics; (5) Geomorphology; and (6) Transport and accumulation. Based on such a diversity of effects and manifestations, it is concluded that groundwater is a general geologic agent.
© Cambridge Scientific Abstracts (CSA)

618. **Groundwater quality.**
Mayer, A. S.; Imhoff, P. T.; Mitchell, R. J.; Rabideau, A. J.; McBride, J. F.; and Miller, C. T.
Water Environment Research 66 (4): 532-585. (June 1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: groundwater pollution/ pollutants/ transport processes/ water quality/ monitoring/ biodegradation/ movement in soil/ groundwater flow/ sorption/ desorption/ pesticides/ leaching/ models/ literature reviews
This citation is from AGRICOLA.

619. **Groundwater quality.**
Mayer, A. S.; Mitchell, R. J.; Carriere, P. P. E.; Hein, G. L.; Rabideau, A. J.; and Wojick, C. L.
Water Environment Research 67 (4): 629-685. (1995)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

620. **Groundwater quality.**
Mayer, A. S.; Carriere, P. P. E.; Gallo, C.; Pennell, K. D.; Taylor, T. P.; Williams, G. A.; and Zhong, L.
Water Environment Research 69 (4): 777-844. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

621. **Growth and functioning of roots and of root systems subjected to soil compaction: Towards a system with multiple signalling?**
Tardieu, F.
Soil and Tillage Research 30 (2/4): 217-243. (1994)
NAL Call #: S590.S48;
ISSN: 0167-1987.
Notes: Issue editor: Jensen, H. E.
This citation is provided courtesy of CAB International/CABI Publishing.

622. **A guidebook for application of hydrogeomorphic assessments to riverine wetlands.**
Brinson, Mark M. and United States. Army. Corps of Engineers. U.S. Army Engineer Waterways Experiment Station. Wetlands Research Program (U.S.).
Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station; Series: Wetlands Research Program technical report WRP-DE-11. (1995)
Notes: Title from caption. At head of title: Wetlands Research Program. "December 1995 - Operational draft." Includes bibliographical references.
NAL Call #: GB621-.G84-1995
http://www.wes.army.mil/el/wetlands/pdfs/wrpde11.pdf
Descriptors: Wetlands Classification/ Ecosystem management/ Wetlands---Law and legislation---United States
This citation is from AGRICOLA.

623. **Guideline for dairy manure management from barn to storage.**
Weeks, Stanley A.
Ithaca, N.Y.: Northeast Regional Agricultural Engineering Service; vii, 36 p.: ill.; Series: NRAES 108. (1998)
Notes: Includes bibliographical references (p. 36).
NAL Call #: S675-.N72-no.108;
ISBN: 0935817271
Abstract: The 36-page guideline covers the following topics: planning the development or improvement of a manure handling system, getting technical information and assistance, and meeting regulations; manure characteristics and production; alternatives for manure management; options for transferring manure from barn to storage; and manure storage types and storage management.
© Natural Resource, Agriculture and Engineering Service (NRAES)

624. **Guideline for dairy odor management.**
Wright, P. E.; Graves, R. E.; and Koelsch, R. K.
Ithaca, NY: Natural Resource, Agriculture, and Engineering Service//Dairy Practices Council NRAES-146; 34 p. (2001);
ISBN: 0-935817-65-4
Descriptors: dairy farm management/ odor control/ animal manure management
Abstract: This guideline, a joint publication between NRAES and the Dairy Practices Council, presents various ways to reduce or eliminate odor from dairy manure and other sources on dairy farms. Topics covered include odors: perception, characteristics, and measurement; sources of on-farm odors; preventing and reducing odors from livestock and other facilities; preventing and reducing odors from manure handling systems; reducing odors during land application; and neighbor relations and regulation. An appendix provides an off-site odor report that can be used by producers to survey farm neighbors and help pinpoint odor problems. Nineteen figures and three tables supplement the text.
© Natural Resource, Agriculture and Engineering Service (NRAES)

625. **Guideline for milking center wastewater.**
Wright, P. and Graves, R. E.
Ithaca, NY: Natural Resource, Agriculture, and Engineering Service NRAES-115; 34 p. (1998);

ISBN: 0-935817-26-3
Descriptors: wastewater/ milking/ drainage/ laws and regulations / animal manure management
Abstract: Topics covered include wastewater characteristics and estimating the amount of waste produced; source control of milking center wastewater; the milking center drainage system, including codes and regulations, components, and drainage systems for the milking center; and treatment alternatives, including liquid manure system, short-term storage and land application with manure spreader, settling tanks, grass filter, aerobic lagoon, organic filter bed, septic system, constructed wetlands, stone-filled treatment trench, spray irrigation, lime flocculator treatment, and aerated septic system. Safety and health concerns are also summarized.
© Natural Resource, Agriculture and Engineering Service (NRAES)

626. **Guidelines for managing cattle grazing in riparian areas to protect water quality: Review of research and best management practices policy.**
Mosley, Jeffrey C.
Moscow, ID: Idaho Forest, Wildlife and Range Policy Analysis Group, University of Idaho; v, 67 p.: col. ill.; Series: Report (Idaho Forest, Wildlife, and Range Policy Analysis Group) no. 15. (1997)
Notes: "December 1997"--Cover. Includes bibliographical references (p. 51-63).
NAL Call #: SF85.35.I2G95--1997
Descriptors: Grazing---Idaho---Management/ Water quality---Idaho/ Riparian areas---Idaho---Management / Stream conservation---Idaho
This citation is from AGRICOLA.

627. **Guiding concepts for the application of indicators to interpret change in soil properties and processes in forests.**
Raison, R. J. and Rab, M. A.
In: Criteria and indicators for sustainable forest management: Papers presented at a IUFRO/CIFOR/FAO conference, Sustainable forest management: Fostering stakeholder input to advance development of scientifically based indicators. (Held Aug 1998 at Melbourne, Australia.) Raison, R. J.; Brown, A. G.; and Flinn, D. W. (eds.) Wallingford, UK: CAB International; pp. 231-258; 2001.
ISBN: 0-85199-392-3
This citation is provided courtesy of CAB International/CABI Publishing.

628. **Guiding principles for constructed treatment wetlands: Providing for water quality and wildlife habitat.**
Interagency Workgroup on Constructed Wetlands (U.S.) and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
Washington, DC: U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds. (2001)
Notes: Rev. 06/26/2001, Original document published in 2000; Title from web page. Developed by Interagency Workgroup on Constructed Wetlands. "October 2000" Description based on content viewed April 11, 2002. "EPA-843-B-00-003" Includes bibliographical references.
NAL Call #: TD756.5-.G85-2000
http://www.epa.gov/owow/wetlands/constructed/toc.html
Descriptors: Constructed wetlands---United States/ Water quality---United States/ Water quality management---United States/ Wetland ecology---United States
Abstract: This User's Guide provides: guiding principles for planning, siting, design, construction, operation, maintenance, and monitoring of constructed treatment wetlands; information on current [Environmental Protection] Agency policies, permits, regulations, and resources; and answers to common questions.
This citation is from AGRICOLA.

629. **Gully erosion and environmental change: Importance and research needs.**
Poesen, J.; Nachtergaele, J.; Verstraeten, G.; and Valentin, C.
Catena 50 (2/4): 91-133. (2003)
NAL Call #: GB400.C3;
ISSN: 0341-8162
This citation is provided courtesy of CAB International/CABI Publishing.

630. **Habitat coupling in lake ecosystems.**
Schindler, Daniel E and Scheuerell, Mark D
Oikos 98 (2): 177-189. (2002);
ISSN: 0030-1299
Descriptors: nutrients/ aquatic organism (Organisms)/ fish (Pisces): habitat couplers, omnivore/ organism (Organisms): alien species, benthivorous consumer, carnivore/ plankton (Organisms)/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ anthropogenic disturbances/ benthic habitats/ biological processes/ chemical processes/ ecological characteristics/ ecosystem processes/ energy flow/ eutrophication/ evolutionary characteristics/ exotic species introduction/ food web stability/ food web structure/ habitat coupling/ habitat modification/ lake ecosystems/ nutrient cycling/ pelagic habitats/ physical processes/ population dynamics/ predator prey interactions/ riparian habitats
Abstract: Lakes are complex ecosystems composed of distinct habitats coupled by biological, physical and chemical processes. While the ecological and evolutionary characteristics of aquatic organisms reflect habitat coupling in lakes, aquatic ecology has largely studied pelagic, benthic and riparian habitats in isolation from each other. Here, we summarize several ecological and evolutionary patterns that highlight the importance of habitat coupling and discuss their implications for understanding ecosystem processes in lakes. We pay special attention to fishes because they play particularly important roles as habitat couplers as a result of their high mobility and flexible foraging tactics that lead to inter-habitat omnivory. Habitat coupling has important consequences for nutrient cycling, predator-prey interactions, and food web structure and stability. For example, nutrient excretion by benthivorous consumers can account for a substantial fraction of inputs to pelagic nutrient cycles. Benthic resources also subsidize carnivore populations that have important predatory effects on plankton communities. These benthic subsidies stabilize population dynamics of pelagic carnivores and intensify the strength of their interactions with planktonic food webs. Furthermore, anthropogenic disturbances such as eutrophication, habitat modification, and exotic species introductions may severely alter habitat connections and, therefore, the fundamental flows of nutrients and energy in lake ecosystems.
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631. **Handbook for wetland creation on reclaimed surface mines.**
Brooks, Robert P.; Gardner, T. W.; United States. Office of Surface Mining Reclamation and Enforcement; Pennsylvania State University, Environmental Resources Research Institute; and Penn State Cooperative Wetlands Center
University Park, PA: Environmental Resources Research Institute, Pennsylvania State University and Penn State Cooperative Wetlands Center; Series: Report (Pennsylvania State University, Environmental Resources Research Institute) no. ER9503; iv, 59 p.: ill. (1995)
Notes: "May 1995" Includes bibliographical references (p. 55-59). Prepared under Office of Surface Mining cooperative agreement. GR196421.
NAL Call #: S621.5.S8B762--1995
Descriptors: Abandoned mined lands reclamation/ Wetlands/ Constructed wetlands/ Strip mining---Environmental aspects/ Reclamation of land
This citation is from AGRICOLA.

632. **A handbook of constructed wetlands: A guide to creating wetlands for: Agricultural wastewater, domestic wastewater, coal mine drainage, stormwater in the Mid-Atlantic Region.**
Davis, Luise.; United States. Natural Resources Conservation Service; United States. Environmental Protection Agency. Region III; and Pennsylvania. Dept. of Environmental Resources.
Washington, D.C.: U.S. Department of Agriculture. (1995)
Notes: "This document was prepared by Luise Davis"--P. [2] of cover; Contents note: v.1. General considerations -- v.2. Domestic wastewater -- v.3. Agricultural wastewater -- v.4. Coal mine drainage -- v.5. Stormwater.
NAL Call #: TD756.5.D39--1995;
ISBN: 0160529999 (v.1); 0160530008 (v.2); 0160530016 (v.3); 0160530024 (v.4); 0160530032 (v.5)
Descriptors: Constructed wetlands---Middle Atlantic States---Handbooks, manuals, etc/ Sewage Purification---Handbooks, manuals, etc/ Agricultural pollution---Handbooks, manuals, etc/ Coal mine waste---Handbooks, manuals, etc / Storm sewers---Handbooks, manuals, etc
This citation is from AGRICOLA.

633. **Harvesting, propagating,and planting wetland plants.**
Hoag, J. Chris. and
Plant Materials Center
Aberdeen, ID: USDA, Natural Resources Conservation Service, Plant Materials Center; Series: Riparian/Wetland Project information series no. 14. (2000)
Notes: Title from web page. "July, 2000." Description based on content viewed May 8, 2002. Includes bibliographical references.
NAL Call #: aQK115-.H63-2000
http://plant-materials.nrcs.usda.gov/pubs/idpmcarwproj14.pdf
Descriptors: Wetland plants---United States/ Wetland plants---Harvesting---United States/ Wetland plants---Propagation---United States/ Wetland plants---Planting---United States/ Wetland plants---Transplanting---United States/ Riparian ecology---United States/ Revegetation---United States/ Wetlands---United States
This citation is from AGRICOLA.

634. **Hazardous air pollutants (HAPS) and their effects on biodiversity: An overview of the atmospheric pathways of persistent organic pollutants (POPS) and suggestions for future studies.**
Finizio, A.; Di Guardo, A.; and Cartmale, L.
Environmental Monitoring and Assessment 49 (2/3): 327-336. (Feb. 1998)
NAL Call #: TD194.E5;
ISSN: 0167-6369 [EMASDH].
Notes: In the special issue: Atmospheric change and biodiversity: formulating a Canadian science agenda / edited by R.E. Munn. Proceedings of the workshop held February 26-29, 1996, in Toronto, Canada. Includes references.
Descriptors: organic compounds/ organochlorine pesticides/ air pollutants/ persistence/ biodiversity/ ecosystems/ toxicity/ atmosphere/ world/ cycling/ global atmospheric change
This citation is from AGRICOLA.

635. **Health Effects Associated With Wastewater Treatment, Disposal, and Reuse.**
Kindzierski, W. B.; Rogers, R. E.; and Low, N. J.
Water Environment Research 65 (6): 599-605. (1993)
NAL Call #: TD419.R47
Descriptors: Literature review/ Public health/ Reviews/ Wastewater disposal/ Wastewater renovation/ Wastewater treatment/ Water pollution effects/ Water reuse/ Chlorination/ Drinking water/ Hazardous wastes/ Human pathogens/ Nitrates/ Odors/ Organic compounds/ Shellfish/ Swimming pools/ Viruses/ Wastewater treatment processes/ Ultimate disposal of wastes/ Preparation of reviews
Abstract: The incidence of conditions such as cardiovascular and respiratory diseases is higher among retired sanitation workers of New York City than among closely matched relatives. Infectious human immunodeficiency virus is reported to be fairly stable in wastewater for up to 12 hr, but it experiences a 2-log to 3-log reduction in infectivity after 48 hr. Other studies of public-health implications of exposure to wastes and wastewater include: the survival of hepatitis A virus on human hands and its transfer on contact with animate and inanimate surfaces; the contamination of water supplies and shellfish by Giardia cysts, Legionella pneumophila, hookworm (Necator americanus), Aeromonas strains, Clostridium perfringens, Enterobacteriaceae, Campylobacter jejuni, and fecal coliforms; ill health in children aged 6-11 who used recreational beaches contaminated with wastewater; viral contamination of adjacent coastal bathing waters by wastewater outfalls and rivers; and pathogen removal efficiency of wastewater treatment and renovation schemes for purposes of wastewater irrigation. Residents near a wastewater treatment plant quantified odors by completing a numerical odor rating form for a 6-month period. A methodology for predicting volatile organic chemical levels immediately downwind of surface aeration wastewater treatment plants under neutral or stable atmospheric conditions was developed. The effects on human health of chemical contamination of drinking water supplies was studied for arsenic, methylmercury, organic solvents, chloroform, chlorine, and nitrate. An outbreak of cryptosporidiosis in swimming pools was reported. Densely populated cities discharging untreated wastewater into an estuary of Venezuela were likely responsible for the presence of infectious

enteroviruses in the water and sediments. (Geiger-PTT)

636. **Health Effects Associated With Wastewater Treatment, Disposal, and Reuse.**
Kindzierski, W. B. and Gabos, S.
Water Environment Research 67 (4): 749-755. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ public health/ wastewater treatment/ wastewater disposal/ water reuse/ wastewater collection/ water treatment facilities/ diseases/ human diseases/ disease transmission/ pathogens/ waste water/ waste utilization/ hazard assessment/ Effects of pollution/ Public health/ medicines/ dangerous organisms

637. **Health effects of aerial emissions from animal production and waste management systems.**
Schiffman, S. S.; Auverman, B. W.; and Bottcher, R. W.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

638. **Health risks caused by freshwater cyanobacteria in recreational waters.**
Chorus, I.; Falconer, I. R.; Salas, H. J.; and Bartram, J.
Journal of Toxicology and Environmental Health: Part B, Critical Reviews 3 (4): 323-347. (2000)
NAL Call #: RA565.A1J6;
ISSN: 1093-7404
This citation is provided courtesy of CAB International/CABI Publishing.

639. **Herbaceous stubble height as a warning of impending cattle grazing damage to riparian areas.**
Hall, Frederick C.; Bryant, Larry.; and Pacific Northwest Research Station
Portland, Or.: U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station; Series: General technical report PNW 362; 10 p.: ill. (1995)
Notes: Cover title. Distributed to depository libraries in microfiche. Shipping list no.: 97-0633-M. "September 1995." Includes bibliographical references (p. 7-9). SUDOCS: A 13.88:PNW-GTR-362.
NAL Call #: Fiche-S-133-A-13.88:PNW-GTR-362
Descriptors: Grazing---Environmental aspects---United States/ Riparian areas---United States/ Riparian ecology---United States/ Vegetation monitoring---United States
This citation is from AGRICOLA.

640. **Herbicide dissipation studies in southern forest ecosystems.**
Michael, J. L. and Neary, D. G.
Environmental Toxicology and Chemistry 12 (3): 405-410. (Mar. 1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268 [ETOCDK].
Notes: Paper presented at the "Symposium on Pesticides in Forest Management, 11th Annual Meeting of the Society of Environmental Toxicology and Chemistry," November 11-15, 1990, Arlington, Virginia. Literature review. Includes references.
Descriptors: watersheds/ forests/ picloram/ hexazinone/ imazapyr/ sulfonylurea herbicides/ pollution/ application methods/ surface water/ streams/ forest soils/ vegetation/ persistence/ degradation/ half life/ literature reviews/ forestry/ southeastern states of USA/ sulfometuron methyl
This citation is from AGRICOLA.

641. **Herbicide effects on ground-layer vegetation in southern pinelands (USA): A review.**
Litt, Andrea R; Herring, Brenda J; and Provencher, Louis
Natural Areas Journal 21 (2): 177-188. (2001)
NAL Call #: QH76.N37;
ISSN: 0885-8608
Descriptors: herbicides: pollutant, toxin/ Aristida beyrichiana [wiregrass] (Gramineae): nontarget organism/ Aristida stricta [wiregrass] (Gramineae): nontarget organism/ Pinus palustris [longleaf pine] (Coniferopsida)/ woody plants (Spermatophyta): endangered species, threatened species/ Angiosperms/ Gymnosperms/ Monocots/ Plants/ Spermatophytes/ Vascular Plants/ ecotoxicology/ experimental design/ ground layer vegetation/ hardwoods/ pine plantations/ quantitative data/ southern pinelands/ species richness/ woody plant cover
Abstract: Despite the fact that herbicides are widely used across the southeastern United States, their effects on ground-layer vegetation (woody and herbaceous species <1.4 m tall) are not well understood. We conducted a literature review to examine published studies and compile available data. More than 125 studies were examined, based on several criteria (e.g., a sound experimental design, quantitative data, study conducted in southern pinelands). Only 21 studies were retained for our review, and the majority of studies were conducted in pine plantations. Few clear, consistent results were revealed, probably due in large part, to the wide array of herbicides and diverse response variables examined in the studies. Woody plant cover generally declined with herbicide application, an expected result from use of hardwood-specific herbicides in most studies, but results for herbaceous plant cover were mixed. Most studies showed a decrease in total (woody and herbaceous plant) species richness. We also examined the response of plant species of special concern to herbicide application. Most species declined, while wiregrass (Aristida beyrichiana Trinius and Ruprecht (syn. A. stricta Michx. s.i.)) showed mixed responses across studies. Because our findings show that few studies have been conducted under natural conditions, experimental design shortfalls have been common, and study conclusions have been widely divergent, we suggest that research precede extensive herbicide use in pinelands.

642. **Herbicide-soil interactions in reduced tillage and plant residue management systems.**
Locke, M. A. and Bryson, C. T.
Weed Science 45 (2): 307-320. (Mar. 1997-Apr. 1997)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: herbicides/ soil/ interactions/ no-tillage/ crop residues/ crop management/ sustainability/ cover crops/ erosion/ soil water content/ weeds/ seedling emergence/ tilth/ conservation tillage/ tillage/

degradation/ leaching/ runoff/ sorption/ literature reviews
Abstract: Recent changes in technology; governmental regulation and scrutiny, and public opinion have motivated the agricultural community to examine current management practices from the perspective of how they fit into a sustainable agricultural framework. One aspect which can be incorporated into many existing farming systems is plant residue management (e.g., reduced tillage, cover crops). Many residue management systems are designed to enhance accumulation of plant residue at the soil surface. The plant residue covering the soil surface provides many benefits, including protection from soil erosion, soil moisture conservation by acting as a barrier against evaporation, improved soil tilth, and inhibition of weed emergence. This review summarizes recent literature (ca. last 25 yr) concerning the effects of plant residue management on the soil environment and how those changes impact herbicide interactions.
This citation is from AGRICOLA.

643. **Herbicides: A two-edged sword.**
Kudsk, P and Streibig, J C
Weed Research 43 (2): 90-102. (2003)
NAL Call #: 79.8-W412;
ISSN: 0043-1737
Descriptors: herbicide: discovery, fate, resistance/ crop plant (Angiospermae)/ weed (Tracheophyta)/ Angiosperms/ Plants/ Spermatophytes/ Vascular Plants
Abstract: Weeds cause yield losses and reductions in crop quality. Prior to the introduction of selective herbicides, the drudgery of manual weeding forced farmers to adhere to a suit of weed management tactics by carefully combining crop rotation, appropriate tillage and fallow systems. The introduction of selective herbicides in the late 1940s and the constant flow of new herbicides in the succeeding decades provided farmers with a new tool, 'the chemical hoe', putting them in a position to consider weed control more independently of the crop production system than hitherto. The reliance on herbicides for weed control, however, resulted in shifts in the weed flora and the selection of herbicide-resistant biotypes. In the 1980s, the public concern about side-effects of herbicides on the environment and human health resulted in increasingly strict registration requirements and, in some countries, political initiatives to reduce the use of pesticides were launched. Today, the number of new herbicides being introduced has decreased significantly and integrated weed management has become the guiding concept. Farmers also have the option of growing herbicide-resistant crops where the biology of the crop has been adapted to tolerate herbicides considered safe to humans and environmentally benign. This paper discusses some of the recent developments in herbicide discovery, technology and fate, and sketches important future developments.

644. **Higher performance through combined improvements in irrigation methods and scheduling: A discussion.**
Pereira, Luis S
Agricultural Water Management 40 (2-3): 153-169. (1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Abstract: Prior to the discussion on approaches to combine irrigation scheduling and water application practices, several farm irrigation performance indicators are defined and analysed. These indicators concern the uniformity of water distribution along an irrigated field and the efficiency of on-farm water application. Then, the analysis focus is on three main irrigation systems: surface, sprinkler and microirrigation. For each of these systems, the analysis concerns the main characteristics and constraints of the systems, more relevant aspects influencing irrigation performances, and approaches which could lead to a more appropriate coupling of irrigation scheduling and water application methods. Conclusions point out on the need for combined improvements in irrigation scheduling and methods, for expanding field evaluation of irrigation in farmers fields, for improved design of on-farm systems, and for quality control of irrigation equipments and design.

645. **Higher plants as accumulative bioindicators.**
Weiss, P.; Offenthaler, I.; Öhlinger, R.; and Wimmer, J.
In: Bioindicators and biomonitors: Principles, concepts and applications/ Markert, B. A.; Breure, A. M.; and Zechmeister, H. G., 2003; pp. 465-500.
ISBN: 0-08-044177-7
This citation is provided courtesy of CAB International/CABI Publishing.

646. **Higher-tier laboratory methods for assessing the aquatic toxicity of pesticides.**
Boxall, Alistair B A; Brown, Colin D; and Barrett, Katie L
Pest Management Science 58 (7): 637-648. (2002)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: pesticides: aquatic toxicity/ risk assessment
Abstract: Registration schemes for plant-protection products require applicants to assess the potential ecological risk of their products using a tiered approach. Standard aquatic ecotoxicity tests are used at lower tiers and clearly defined methodologies are available for assessing the potential environmental risks. Safety factors are incorporated into the assessment process to account for the uncertainties associated with the use of lower-tier single-species ecotoxicity studies. If lower-tier assessments indicate that a substance may pose a risk to the environment, impacts can be assessed using more environmentally realistic conditions through the use of either pond mesocosms, artificial streams or field monitoring studies. Whilst these approaches provide more realistic assessments, the results are difficult to interpret and extrapolation to other systems is problematic. Recently it has been recognised that laboratory approaches that are intermediate between standard aquatic toxicity tests and field/mesocosm studies may provide useful data and help reduce the uncertainties associated with standard single-species tests. However, limited guidance is available on what tests are available and how they can be incorporated into the risk-assessment process. This paper reviews a number of these higher-tier laboratory techniques, including modified exposure studies, species sensitivity studies, population studies

and tests with sensitive life stages. Recommendations are provided on how the approaches can be incorporated into the risk-assessment process.

647. **The hindrance in the development of pit additive products for swine manure odor control: A review.**
Zhu, J.; Bundy, D. S.; Li, X.; and Rashid, N.
Journal of Environmental Science and Health: Part A, Environmental Science and Engineering and Toxic and Hazardous Substance Control A32 (9/10): 2429-2448. (1997)
NAL Call #: TD172.J6;
ISSN: 1077-1204 [JESHE6]
Descriptors: pig manure/ odor abatement/ intensive livestock farming/ literature reviews
This citation is from AGRICOLA.

648. **Historical overview of vermicomposting.**
Edwards, C. A.
Biocycle 36 (6): 56-58. (June 1995)
NAL Call #: 57.8-C734;
ISSN: 0276-5055
Descriptors: vermicomposting/ organic wastes/ waste utilization/ earthworms
This citation is from AGRICOLA.

649. **History, Development and Characteristics of Lake Ecological Models.**
Xu, Fu-Liu; Tao, S. H.; Dawson, R. W.; and Lu, Xiao-Yan
Journal of Environmental Sciences (China) 14 (2): 255-263. (2002);
ISSN: 1001-0742
Descriptors: Lakes/ Aquatic Habitats/ Ecosystems/ Model Studies/ Water Quality/ Eutrophication/ Wetlands/ Model Testing/ Models/ Historical account/ Literature reviews/ Freshwater ecology/ Acidification / Pollution effects/ Ecosystem management/ Lake dynamics/ Aquatic environment/ metals/ pesticides/ Lakes/ Habitat community studies/ Environmental Modeling
Abstract: This paper provides some introductory information on the history, development, and characteristics of various lake ecosystem models. The modeling of lake ecological processes began to gain importance in the early 1960s. There are a number of models available today, with varying levels of complexity to cope with the variety of environmental problems found in lake environments, e.g. eutrophication, acidification, oxygen depletion, wetland management, heavy metal and pesticide pollution, as well as hydrodynamic problems. In particular, this paper focuses on lake eutrophication and wetland models, as well as addressing strategies appropriate for the design and development of reliable lake ecological models.

650. **History of coordinated resources management planning (CRMP) in Oregon: An overview.**
Anderson, E. W.
Rangelands 21 (2): 6-11. (Apr. 1999)
NAL Call #: SF85.A1R32;
ISSN: 0190-0528
Descriptors: range management/ resource conservation/ game animals/ prescribed burning/ watershed management/ environmental protection/ regional planning/ Oregon
This citation is from AGRICOLA.

651. **Hormonal regulation in insects: Facts, gaps, and future directions.**
Gaede, G.; Hoffmann, K. H.; and Spring, J. H.
Physiological Reviews 77 (4): 963-1032. (1997);
ISSN: 1031-9333
Descriptors: ecdysteroids/ juvenile hormones/ nEuropeptide hormones/ reviews/ Insecta/ Neuroendocrinology/ Hormones
Abstract: There are two main classes of hormones in insects: 1) the true hormones produced by epithelial glands and belonging to the ecdysteroids or juvenile hormones and 2) the neuropeptide hormones produced by neurosecretory cells. Members of these classes regulate physiological, developmental, and behavioral events in insects. Detailed accounts are given on isolation, identification, structure-activity relationships, mode of action, biological function, biosynthesis, inactivation, metabolism, and feedback for hormones involved in 1) metabolic regulation such as the adipokinetic/hypertrehalosemic peptides and the diuretic and antidiuretic peptides; 2) stimulation or inhibition of muscle activity such as the myotropic peptides; 3) control of reproduction, growth, and development such as allatotropins, allatostatins, juvenile hormones, ecdysteroids, folliculostimulins and folliculostatins, ecdysis-triggering and eclosion hormones, pheromone biosynthesis activating neuropeptides, and diapause hormones; and 4) regulation of tanning and of color change. Because of the improvements in techniques for isolation and structure elucidation, there has been rapid progress in our knowledge of the chemistry of certain neuropeptide families. With the employment of molecular biological techniques, the genes of some neuropeptides have been successfully characterized. There are, however, areas that are still quite underdeveloped. These are, for example, 1) receptor studies, which are still in their infancy; 2) the hormonal status of certain sequenced peptides is not clarified; and 3) functional studies are lacking even for established hormones. The authors plead for a concerted effort to continue research in this field, which will also advance our knowledge into the use of insect hormones as safer and species-specific molecules for insect pest management.

652. **How can increased use of biological N2 fixation in agriculture benefit the environment?**
Jensen, E. S. and Hauggaard-Nielsen, H.
Plant and Soil 252 (1): 177-186. (2003)
NAL Call #: 450 P696;
ISSN: 0032-079X
This citation is provided courtesy of CAB International/CABI Publishing.

653. **How much biodiversity is enough.**
Main, A. R.
Agroforestry Systems 45 (1/3): 23-41. (1999)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366 [AGSYE6].
Notes: Special issue: Agriculture as a mimic of natural ecosystems / edited by E.C. Lefroy, R.J. Hobbs, M.H. O'Connor and J.S. Pate. Paper presented at a workshop held September 2-6, 1997, Williams, Western Australia, Australia. Includes references.
Descriptors: biodiversity/ agriculture/ ecosystems/ sustainability/ genetic diversity/ species diversity/ history/ crop yield/ salinity/ erosion/

groundwater/ leaching/ soil fertility/ risk reduction/ cycling/ plant pests/ plant diseases/ literature reviews
This citation is from AGRICOLA.

654. **Hungry water: Effects of dams and gravel mining on river channels.**
Kondolf, G Mathias
Environmental Management 21 (4): 533-551. (1997)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: channel instability/ conservation/ damming/ floodplain gravel pits/ gravel loss/ gravel mining/ reservoirs/ resource management/ river channels/ River Rhine/ sediment deposition/ sediment transport/ spawning habitat
Abstract: Rivers transport sediment from eroding uplands to depositional areas near sea level. If the continuity of sediment transport is interrupted by dams or removal of sediment from the channel by gravel mining, the flow may become sediment-starved (hungry water) and prone to erode the channel bed and banks, producing channel incision (downcutting), coarsening of bed material, and loss of spawning gravels for salmon and trout (as smaller gravels are transported without replacement from upstream). Gravel is artificially added to the River Rhine to prevent further incision and to many other rivers in attempts to restore spawning habitat. It is possible to pass incoming sediment through some small reservoirs, thereby maintaining the continuity of sediment transport through the system. Damming and mining have reduced sediment delivery from rivers to many coastal areas, leading to accelerated beach erosion. Sand and gravel are mined for construction aggregate from river channel and floodplains. In-channel mining commonly causes incision, which may propagate up- and downstream of the mine, undermining bridges, inducing channel instability, and lowering alluvial water tables. Floodplain gravel pits have the potential to become wildlife habitat upon reclamation, but may be captured by the active channel and thereby become instream pits. Management of sand and gravel in rivers must be done on a regional basis, restoring the continuity of sediment transport where possible and encouraging alternatives to river-derived aggregate sources.
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655. **Hydraulic agitation of an earthen manure storage: Final report.**
Stock, Wayne F.; Prairie Agricultural Machinery Institute (Canada); and Saskatchewan. Agriculture Development Fund.
Regina, Saskatchewan: Saskatchewan Agriculture Development Fund.; 15 p.: ill. (2000)
Notes: Cover title. "19980116." "February 2000." Project Technologist Wayne Stock ... [et al.]. Cf. prelim.
NAL Call #: TD930.2-.H92-2000
This citation is from AGRICOLA.

656. **A hydrogeomorphic classification for wetlands.**
Brinson, Mark M.; Wetlands Research Program (U.S.); United States. Army. Corps of Engineers; and U.S. Army Engineer Waterways Experiment Station.
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; Series: Technical report (U.S. Army Engineer Waterways Experiment Station) WRP-DE-4. (1993)
Notes: Title from caption. "August 1993." At head of title: "Wetlands Research Program." "Final report." Includes bibliographical references.
NAL Call #: GB621.B75-1993
http://www.wes.army.mil/el/wetlands/pdfs/wrpde4.pdf
Descriptors: Wetlands Classification/ Geomorphology/ Hydrology/ Wetland ecology
This citation is from AGRICOLA.

657. **Hydrologic and water quality impacts of agricultural drainage.**
Skaggs, R W; Breve, M A; and Gilliamg, J W
Critical Reviews in Environmental Science and Technology 24 (1): 1-32. (1994)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: nutrient loss/ pesticides/ pollutant load/ runoff/ salinity/ sediment loss/ water table
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658. **The Hydrological and Geomorphological Significance of Forested Floodplains.**
Gurnell, A
Global Ecology and Biogeography Letters 6 (3-4): 219-229. (1997);
ISSN: 0960-7447.
Notes: Conference: Floodplain Forests: Structure, Functioning and Management, Leicester (UK), Mar 1995; Publisher:
Blackwell Science Ltd
Descriptors: flood plains/ forests/ hydrology/ geomorphology/ vegetation/ riparian environments/ Vegetation cover/ Riparian Vegetation/ interactions/ Woodlands/ Habitat community studies / Streamflow and runoff
Abstract: Within river corridors, the distribution of plant species and communities is heavily influenced by hydrological and geomorphological processes. Furthermore, the vegetation can have a direct influence on the detailed character and rate of hydrogeomorphological processes. This paper reviews such interactions at a variety of spatial scales ranging from vegetation gradients across entire floodplains from hillslope to river channel, to the local influences of bank vegetation and in-channel accumulations of woody debris.
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659. **Hydrological processes in abandoned and restored peatlands: An overview of management approaches.**
Price, J S; Heathwaite, A L; and Baird, A J
Wetlands Ecology and Management 11 (1-2): 65-83. (2003)
NAL Call #: QH541.5.M3 W472;
ISSN: 0923-4861
Descriptors: methane: production/ Sphagnum (Sphagnobrya)/ Bryophytes/ Nonvascular Plants/ Plants/ abandoned peatland/ ditch blocking/ drainage/ ecological processes/ hydraulic conductivity/ hydrological processes/ management approach overview/ microclimate management/ pore water pressure/ restoration peatland/ soil wetness/ spring snowmelt/ water balance component restoration/ water management options/ water tension/ wetlands ecology/ winter precipitation
Abstract: Mined peatlands do not readily recover their hydrological function, mainly because the dominant peat-forming plant genus, Sphagnum, cannot easily reestablish on the degraded surface peat found on cutover sites. Drainage and removal of the acrotelm can result in surface subsidence of up to 3.7 cm y-1 m-1 of peat shortly after drainage

(compression), and long-term rates up to 0.3 cm y-1 m-1 (compression and oxidation). This can decrease the hydraulic conductivity by over 75%, and decrease the water retention capacity and specific yield. In old abandoned systems, drainage ditches may continue to facilitate a significant seasonal water loss. Colonization of abandoned sites by trees may increase the evapotranspirative losses by as much as 25%, and interception losses can be as high as 32% of rainfall. Without natural or planned occlusion of ditches, some peatlands become drier over time. Blocking ditches may largely restore water balance components, although the hydrological regime requires years to stabilise sufficiently for Sphagnum recolonization, especially where residual peat is well decomposed, having inadequate water storage capacity. Consequently, winter precipitation (Europe) and spring snowmelt (North America) are critical recharge periods. Over the long term, consolidation of the peat due to drainage and methane production (where drainage systems are blocked and soils reflooded) decreases hydraulic conductivity, thereby reducing lateral seepage losses. This may actually assist in Sphagnum recolonization. A regenerated cover of Sphagnum increases soil wetness and reduces water tension (increases pore-water pressure) in the substrate, thus ameliorating its own environment. However, natural recolonization and recovery of many hydrological and ecological processes may not occur, or may require many decades. Water management and selective plant reintroduction can accelerate this. Water management options such as blocking ditches, constructing bunds, reconfiguring the surface and managing microclimate have met with varying degrees of success. No standard management prescription can be made because each site presents unique challenges.
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660. **Hydrology and wetland conservation.**
Gilman, Kevin.
Chichester; New York: Wiley; xii, 101 p.: ill., maps; Series: Water science series. (1994)
Notes: "Published on behalf of the Institute of Hydrology" Includes bibliographical references.
NAL Call #: GB628.43.G55--1994;
ISBN: 0471951528
Descriptors: Wetlands---Great Britain/ Wetland conservation---Great Britain
This citation is from AGRICOLA.

661. **Hydrolysis of sulfonylurea herbicides in soils and aqueous solutions: A review.**
Sarmah, Ajit K and Sabadie, Jean
Journal of agricultural and food chemistry 50 (22): 6253-6265. (2002)
NAL Call #: 381 J8223;
ISSN: 0021-8561
Descriptors: minerals / sulfonylureas: herbicide, hydrolysis, pyridinic ring, pyrimidine ring, triazinic ring/ aqueous solutions/ pH effect/ soils/ temperature effect
Abstract: Sulfonylureas are a unique group of herbicides used for controlling a range of weeds and some grasses in a variety of crops and vegetables. They have been extremely popular worldwide because of their low mammalian toxicity, low use rate, and unprecedented herbicidal activity. Knowledge about the fate and behavior of sulfonylurea herbicides in the soil-water environment appears to be of utmost importance for agronomic systems and environmental protection. Because these herbicides are applied at a very low rate, and their mobility is greatly affected by the chemicals' anionic nature in alkaline soils, a thorough understanding of their degradation/hydrolysis processes and mechanisms under aqueous and soil systems is important. This review brings together published information on the hydrolysis of several sulfonylureas in aqueous and soil solutions that includes the effects of pH, temperature, functional relationship between pH vs hydrolysis rate constants, and hydrolysis behavior of sulfonylureas in the presence of minerals. In addition, the transformations of sulfonylureas in soil, under laboratory and field experiments, have been discussed in connection with the compounds' varied structural features, i.e., sulfonylureas that are with or without the pyridinic, pyrimidine, and triazinic ring.
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662. **Identification of pesticide poisoning in wildlife.**
Brown, Peter; Charlton, Andrew; Cuthbert, Mary; Barnett, Libby; Ross, Leigh; Green, Margaret; Gillies, Liz; Shaw, Kathryn; and Fletcher, Mark
Journal of Chromatography A 754 (1-2): 463-478. (1996)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: strychnine/ chloralose/ metaldehyde/ paraquat/ animal (Animalia Unspecified)/ Animalia (Animalia Unspecified)/ animals/ analytical method/ analytical methods/ chloralose/ environmental analysis/ metaldehyde/ methodology/ nontarget organism/ paraquat/ pesticide poisoning/ pesticides/ pollution/ strychnine/ toxicity/ toxicology/ wildlife
Abstract: The Wildlife Incident Investigation Scheme investigates incidents of suspected poisoning of wildlife (also honey bees and companion animals) by pesticides in the United Kingdom. The approach to these investigations has evolved over the past 30 years. Field investigations, postmortem examinations, toxicological data and experience of previous poisoning incidents assist in the selection and interpretation of appropriate chemical analyses. Several 'multi-residue' and several 'individual compound' analytical methods for pesticides in wildlife are currently in use; these are described.
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663. **Identifying the major sources of nutrient water pollution.**
Puckett, L. J.
Environmental Science and Technology 29 (9): 408A-414A. (1995)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG]
This citation is from AGRICOLA.

664. **IDMP guidelines: How to prepare an irrigation and drainage management plan.**
NSW Agriculture.
New South Wales: NSW Agriculture, c2002. 17 p.: col. ill., col. maps. (2002)
Notes: WaterWise on the farm.
NAL Call #: TC812-.I36-2002;
ISBN: 0734714122
Descriptors: Irrigation---Australia---New South Wales---Management/ Drainage---Australia---New South Wales---Management/ Irrigation---Australia---New South Wales---

Planning/ Drainage---Australia---New South Wales---Planning
This citation is from AGRICOLA.

665. **Illustrations and guidelines for selecting statistical methods for quantifying spatial pattern in ecological data.**
Perry, J N; Liebhold, A M; Rosenberg, M S; Dungan, J; Miriti, M; Jakomulska, A; and Citron, Pousty S
Ecography 25 (5): 578-600. (2002);
ISSN: 0906-7590
Descriptors: animal (Animalia)/ plant (Plantae)/ Animals/ Plants/ animal ecology/ coastal regions/ deserts/ frequency distributions/ geostatistics/ landscape ecology/ mapping/ mountainous regions/ philosophy/ plant ecology/ rangeland types/ sampling effects/ shrub cover/ spatial patterns: quantification/ spatially explicit data/ variance mean indices/ visualization techniques
Abstract: This paper aims to provide guidance to ecologists with limited experience in spatial analysis to help in their choice of techniques. It uses examples to compare methods of spatial analysis for ecological field data. A taxonomy of different data types is presented, including point- and area-referenced data, with and without attributes. Spatially and non-spatially explicit data are distinguished. The effects of sampling and other transformations that convert one data type to another are discussed; the possible loss of spatial information is considered. Techniques for analyzing spatial pattern, developed in plant ecology, animal ecology, landscape ecology, geostatistics and applied statistics are reviewed briefly and their overlap in methodology and philosophy noted. The techniques are categorized according to their output and the inferences that may be drawn from them, in a discursive style without formulae. Methods are compared for four case studies with field data covering a range of types. These are: 1) percentage cover of three shrubs along a line transect; 2) locations and volume of a desert plant in a 1 ha area; 3) a remotely-sensed spectral index and elevation from 105 km2 of a mountainous region; and 4) land cover from three rangeland types within 800 km2 of a coastal region. Initial approaches utilize mapping, frequency distributions and variance-mean indices. Analysis techniques we compare include: local quadrat variance, block quadrat variance, correlograms, variograms, angular correlation, directional variograms, wavelets, SADIE, nearest neighbour methods, Ripley's L(t), and various landscape ecology metrics. Our advice to ecologists is to use simple visualization techniques for initial analysis, and subsequently to select methods that are appropriate for the data type and that answer their specific questions of interest. It is usually prudent to employ several different techniques.

666. **Immunoassays for Pesticides.**
Meulenberg, E. P.; Mulder, W. H.; and Stoks, P. G.
Environmental Science and Technology 29 (3): 553-561. (1995)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: assay/ pollutants/ pesticides/ assessments/ cost benefit analysis/ sampling/ water analysis/ water pollution control/ water quality standards/ immunoassays/ water sampling/ reviews/ water quality/ water quality control/ toxicity tests/ bioassays/ immunology/ pollution detection/ immunoassay/ Identification of pollutants/ Freshwater pollution/ Analytical procedures/ Immunology/ Instrumentation and process engineering/ Methods and instruments
Abstract: Immunoassay is recognized as a promising method for screening environmental contaminants. Numerous immunoassays have already been developed, and especially the rapidity, sensitivity, and cost-effectiveness of this method are considered as advantageous for screening purposes to reduce sample load for conventional analyses. A particular interesting application involves water quality control with regard to pesticides, for which in Europe a threshold concentration of 0.1 mu g/L applies. An overview is given of the various pesticides for which immunoassays have been developed, including commercially available kits. Pros and cons, applicability, and results of fields tests are discussed. Additionally, a survey is given on further developments for improvement of existing or new immunoassays and on the application of immunochemistry in other embodiments (immunoaffinity chromatography, immunosensors). Particular emphasis is laid on validation and standardization of immunoassays.

667. **Impact and management of purple loosestrife (Lythrum salicaria) in North America.**
Blossey, Bernd; Skinner, Luke C; and Taylor, Janith
Biodiversity and Conservation 10 (10): 1787-1807. (2001);
ISSN: 0960-3115
Descriptors: Lythrum salicaria [purple loosestrife] (Lythraceae): weed/ black tern (Charadriiformes)/ insects (Insecta)/ least bittern (Ciconiiformes)/ marsh wren (Passeriformes)/ pied billed grebe (Podicipediformes)/ Angiosperms/ Animals/ Arthropods/ Birds/ Chordates/ Dicots/ Insects/ Invertebrates/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ biological invasions/ ecological succession/ ecosystem function/ ecosystem integrity/ environmental impact/ weed management: benefits, risks/ wetland habitats: encroachment
Abstract: The invasion of non-indigenous plants is considered a primary threat to integrity and function of ecosystems. However, there is little quantitative or experimental evidence for ecosystem impacts of invasive species. Justifications for control are often based on potential, but not presently realized, recognized or quantified, negative impacts. Should lack of scientific certainty about impacts of non-indigenous species result in postponing measures to prevent degradation? Recently, management of purple loosestrife (Lythrum salicaria), has been criticized for (1) lack of evidence demonstrating negative impacts of L. salicaria, and (2) management using biocontrol for lack of evidence documenting the failure of conventional control methods. Although little quantitative evidence on negative impacts on native wetland biota and wetland function was available at the onset of the control program in 1985, recent work has demonstrated that the invasion of purple loosestrife into North American freshwater wetlands alters decomposition rates and nutrient cycling, leads to reductions in wetland plant diversity, reduces pollination and seed output of the native Lythrum alatum, and reduces habitat suitability for specialized wetland bird species

such as black terns, least bitterns, pied-billed grebes, and marsh wrens. Conventional methods (physical, mechanical or chemical), have continuously failed to curb the spread of purple loosestrife or to provide satisfactory control. Although a number of generalist insect and bird species utilize purple loosestrife, wetland habitat specialists are excluded by encroachment of L. salicaria. We conclude that (1) negative ecosystem impacts of purple loosestrife in North America justify control of the species and that (2) detrimental effects of purple loosestrife on wetland systems and biota and the potential benefits of control outweigh potential risks associated with the introduction of biocontrol agents. Long-term experiments and monitoring programs that are in place will evaluate the impact of these insects on purple loosestrife, on wetland plant succession and other wetland biota.

668. **The impact of agricultural practices on biodiversity.**
McLaughlin, A. and Mineau, P.
Agriculture, Ecosystems and Environment 55 (3): 201-212. (1995)
NAL Call #: S601 .A34;
ISSN: 0167-8809
This citation is provided courtesy of CAB International/CABI Publishing.

669. **Impact of alien plants on Grant Basin rangelands.**
Young, James A and Longland, William S
Weed Technology 10 (2): 384-391. (1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: weeds (Tracheophyta)/ Artemisia tridentata (Compositae)/ angiosperms/ dicots/ plants/ spermatophytes/ vascular plants/ alien plants/ big sagebrush/ ecosystem function/ environmental sciences/ terrestrial ecology/ great basin rangeland/ pest assessment control and management/ succession
Abstract: Our purpose is to discuss the impact of alien plants on rangeland ecosystems of the Great Basin in terms of their effects on biological functions. The sagebrush/bunchgrass ranges of western North America are used as a model ecosystem for the impact of alien plants. Alien weed species have been introduced in successive waves, with the success of each new introduction dependent on how well adapted to the environment and how competitive the new weed is with those previously introduced. Annual species have been successful across extensive areas of Great Basin rangelands. Biennial and short- and long-lived perennial introductions have been restricted to much more specific habitats. Alien plants impact rangelands through stand renewal and successional processes. Alien weeds can cause such processes to be accelerated and/or truncated depending on the species and range site.

670. **Impact of composting strategies on the treatment of soils contaminated with organic pollutants.**
Semple, K T; Reid, B J; and Fermor, T R
Environmental Pollution 112 (2): 269-283. (2001)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: organic compounds: degradation, pollutant, soil, toxin/ actinomycetes (Actinomycetes and Related Organisms): decomposer, xenobiotic degrading microorganism/ bacteria (Bacteria): decomposer, xenobiotic degrading microorganism/ fungi (Fungi): decomposer, lignolytic, xenobiotic degrading microorganism/ Bacteria/ Eubacteria/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants/ pollutant bioavailability/ pollutant biotransformation/ soil contamination
Abstract: Chemical pollution of the environment has become a major source of concern. Studies on degradation of organic compounds have shown that some microorganisms are extremely versatile at catabolizing recalcitrant molecules. By harnessing this catabolic potential, it is possible to bioremediate some chemically contaminated environmental systems. Composting matrices and composts are rich sources of xenobiotic-degrading microorganisms including bacteria, actinomycetes and lignolytic fungi, which can degrade pollutants to innocuous compounds such as carbon dioxide and water. These microorganisms can also biotransform pollutants into less toxic substances and/or lock up pollutants within the organic matrix, thereby reducing pollutant bioavailability. The success or failure of a composting/compost remediation strategy depends however on a number of factors, the most important of which are pollutant bioavailability and biodegradability. This review discusses the interactions of pollutants with soils; look critically at the clean up of soils contaminated with a variety of pollutants using various composting strategies and assess the feasibility of using composting technologies to bioremediate contaminated soil.

671. **The impact of conservation tillage on pesticide runoff into surface water: A review and analysis.**
Fawcett, R. S.; Christensen, B. R.; and Tierney, D. P.
Journal of Soil and Water Conservation 49 (2): 126-135. (1994)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

672. **Impact of crop rotation and land management on soil erosion and rehabilitation.**
Amir, J.
In: Soil erosion, conservation and rehabilitation/ Agassi, M.
New York: Marcel Dekker, 1996; pp. 375-397.
ISBN: 0-8247-8984-9
This citation is provided courtesy of CAB International/CABI Publishing.

673. **Impact of environmental regulations on cattle production.**
Morse, D.
Journal of Animal Science 74 (12): 3103-3111. (Dec. 1996)
NAL Call #: 49-J82;
ISSN: 0021-8812 [JANSAG].
Notes: Paper presented at the symposium "Ruminant Nutrition from an Environmental Perspective" at the ASAS 87th Annual Meeting, July 1995, Orlando, Florida.
Includes references.
Descriptors: livestock farming/ water quality/ environmental legislation/ regulations/ endangered species/ riparian vegetation/ environmental protection/ economic impact/ animal manures/ application to land/ pollution control/ dairy farms/ poultry manure/ United States/ Florida
Abstract: A greater focus of legislative mandates is directed toward nonpoint sources of pollution.

This article focuses on environmental regulations and their impact on cattle production. Key legislation will be reviewed to stress how variations in the type of law, degree of impact, enforcement mechanism, and time line for compliance affect the ability for research to be designed and accomplished in a desired time frame and to yield data on which imposed management practices should be based. Science-based regulations are desired to maximize beneficial impacts of management practices; however, many regulations are developed and management practices are imposed prior to research to minimize liability of the regulatory agency in case natural resources are degraded in the absence of management practices. The technology adoption process will be reviewed. Documented impact of imposed management practices (technology adoption) will be presented. Of particular interest is the importance of documenting the economic and resource impacts of regulations on livestock operators. Types of research needed prior to implementing management practices will be reviewed. Local involvement can increase the adoption rate of practices and technologies.
This citation is from AGRICOLA.

674. **The impact of human activities on freshwater aquatic systems.**
Skurlatov, Yu I and Ernestova, L S
Acta Hydrochimica et Hydrobiologica 26 (1): 5-12. (1998);
ISSN: 0323-4320
Descriptors: hydrogen peroxide/ hydroxyl radicals/ manganese: pollutant/ oxygen/ sulfur: pollutant/ superoxide radicals/ atmospheric fallout/ biogeochemical cycling/ biological quality/ bottom sediment composition/ environmental quality/ freshwater aquatic systems/ human activities/ wastewater treatment
Abstract: The roles of oxygen and its activated species (superoxide radicals, hydrogen peroxide, hydroxyl radicals), as well as that of sulfur compounds, are considered in relation to biological quality and the self-cleaning capacity of freshwater aquatic systems. The effects on the aquatic redox-processes are discussed in terms of atmospheric fallout of sulfur compounds, bottom sediment composition, and input of wastewaters containing reducing substances. It is shown that the totality of anthropogenic influences, and/or unfavourable natural geochemical conditions, as well as climatic effects in a region can increase the significance of one-electron transfer processes in bio-geochemical cycles of oxygen, sulfur and manganese, compared with the significance of two-electron transfer processes. The resulting, reactive intermediate products of one-electron transfer processes are very important with respect to the composition and properties of aquatic systems. Examples are given of practical applications of wastewater treatment, using hydrogen peroxide and UV-irradiation, and of regulation of consumers' activities which affect natural waters.
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675. **Impact of insecticide resistance mechanisms on management strategies.**
Horowitz, A. R. and Denholm, I.
In: Biochemical sites of insecticide action and resistance/ Ishaaya, Isaac. Berlin: Springer-Verlag, 2001; pp. 323-338.
ISBN: 3540676252
Descriptors: insecticides/ applied entomology/ evolutionary biology/ insecticide resistance/ management strategies/ Pest Assessment Control and Management/ Pesticides/ in vitro assay: analytical method/ applied entomology/ evolutionary biology/ insecticide resistance/ management strategies
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676. **Impact of nutrition on reduction of environmental pollution by pigs: An overview of recent research.**
Jongbloed AW; Lenis NP; and Mroz Z
Veterinary Quarterly 19 (3): 130-134; 36 ref. (1997)
This citation is provided courtesy of CAB International/CABI Publishing.

677. **Impact of ploughless soil tillage on yield and soil quality: A Scandinavian review.**
Rasmussen, K. J.
Soil and Tillage Research 53 (1): 3-14. (1999)
NAL Call #: S590.S48;
ISSN: 0167-1987.
Notes: Issue editor: Arshad, M. A.
This citation is provided courtesy of CAB International/CABI Publishing.

678. **The impact of reduced tillage on soilborne plant pathogens.**
Bockus, W. W. and Shroyer, J. P.
Annual Review of Phytopathology 36: 485-500. (1998)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]
Descriptors: plant pathogens/ soil flora/ no-tillage/ crop residues/ erosion/ soil water content/ crop yield/ degradation/ soil temperature/ plant disease control/ biological control/ cultural control/ disease resistance/ rotations/ literature reviews
This citation is from AGRICOLA.

679. **Impact of soil erosion on crop yields in North America.**
Biggelaar, C. den.; Lal, R.; Wiebe, K.; and Breneman, V.
Advances in Agronomy 72: 1-52. (2001)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: crop yield/ erosion/ soil degradation/ data analysis/ data collection/ yield losses/ experimental design/ techniques/ soil management/ technology/ history/ agricultural research/ agricultural policy/ economic analysis / literature reviews/ North America
This citation is from AGRICOLA.

680. **Impacts of agricultural herbicide use on terrestrial wildlife in temperate landscapes: A review with special reference to North America.**
Freemark, K. and Boutin, C.
Agriculture, Ecosystems and Environment 52 (2/3): 67-91. (Feb. 1995)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Abstract: The existing literature was examined to assess the extent to which wildlife (plants, soil organisms, above-ground insects/arthropods, mammals, birds) living in terrestrial habitats has been affected by use of agricultural herbicides in temperate landscapes. Although North America was of special interest for regulatory reasons, the review was extended to western Europe because the most extensive and intensive work has been done there. The half-life of herbicides in the environment ranges from less than 1 month to more than 1 year. Wildlife within fields is most likely to be exposed to herbicides, particularly when fields are planted with crops (e.g. corn, soybean, wheat, cotton) which are routinely sprayed.

Wildlife is also likely to be exposed in non-crop habitats adjoining croplands, primarily from direct overspray (especially during aerial application), and drift during and/or volatilisation after application. The most conclusive scientific evidence for direct effects of herbicides on arable weeds, and associated indirect effects on insects and birds exists in the United Kingdom. Evidence for similar effects in North America is primarily circumstantial at present. Little work has been done anywhere on impacts of herbicides on plants and their associated fauna in non-crop habitats adjoining treated fields. Chemical farming (in particular, the use of herbicides) has dramatically altered the habitat pattern of temperate landscapes in North America and western Europe. Strong evidence exists for adverse effects of changes in habitat pattern on beneficial insects and arthropods in the United Kingdom, and on birds in North America and western Europe. Toxicity testing guidelines. for non-target plant protection need to be developed and enforced to support pesticide registration. In addition, research is needed to include more ecologically relevant plant species in laboratory tests, to develop multi-species tests (particularly in the field), to improve methods for risk assessment, and to develop options for mitigating risks. Large scale, long-term trans-disciplinary research of different farming systems is needed, particularly in North America, to integrate and better evaluate ecological, agronomic, and socio-economic costs and benefits of agricultural herbicide use in temperate landscapes.
This citation is from AGRICOLA.

681. **Impacts of agricultural practices on subsurface microbial ecology.**
Madsen, E. L.
Advances in Agronomy 54: 1-67. (1995)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: bacteria/ microorganisms/ groundwater/ community ecology/ environmental factors/ agriculture/ irrigation/ agricultural chemicals/ leaching/ pollutants/ groundwater pollution/ literature reviews
This citation is from AGRICOLA.

682. **Impacts of animal manure management on ground and surface water quality.**
Sharpley, A.; Meisinger, J. J.; Breeuwsma, A.; Sims, J. T.; Daniel, T. C.; and Schepers, J. S.
In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A. Chelsea, MI: Ann Arbor Press, 1998; pp. 173-242
NAL Call #: S655.A57 1998
This citation is provided courtesy of CAB International/CABI Publishing.

683. **Impacts of Atrazine in Aquatic Ecosystems.**
Graymore, M.; Stagnitti, F.; and Allinson, G.
Environment International 26 (7-8): 483-495. (2001)
NAL Call #: TD169.E54;
ISSN: 0160-4120
Descriptors: Atrazine / Ecology/ Water quality (Natural waters)/ Herbicides/ Runoff/ Groundwater/ Leaching/ Aquatic environment/ Community structure/ Environmental impact/ Pollution effects/ Ecosystems/ Aquatic organisms/ Community composition/ Water Pollution Effects/ Pesticides/ Aquatic Life/ Groundwater Pollution/ Agricultural Runoff/ atrazine/ Water Quality/ Freshwater pollution/ Effects on organisms/ Effects of pollution
Abstract: A portion of all herbicides applied to forests, croplands, road sides, and gardens are inevitably lost to water bodies either directly through runoff or indirectly by leaching through groundwater into ephemeral streams and lakes. Once in the aquatic environment, herbicides may cause stress within aquatic communities and radically alter community structure. Atrazine is one of the most effective and inexpensive herbicides in the world and is consequently used more frequently than any other herbicide. Atrazine is frequently detected in aquatic waters, and has been known to affect reproduction of aquatic flora and fauna, which in turn impacts on the community structure as a whole. This paper presents a summary of the reported direct and indirect impacts of atrazine on aquatic organisms and community structure. The information can be used for developing improved management guidelines and legislation. It is concluded that a single universal maximum limit on the atrazine application in catchments, as suggested by many regulatory authorities, does not provide adequate protection of the aquatic environment. Rather, it is advocated that flexible limits on the application of atrazine be developed in line with the potential risk of contamination to surface and subsurface water and fragility of the aquatic environment.

684. **Impacts of Changing Precipitation Patterns on Water Quality.**
Hatfield, J. L. and Prueger, J. H.
Journal of Soil and Water Conservation 59 (1): 51-58. (Jan. 2004-Feb. 2004)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: Conservation Practices/ Drainage/ Soil Management/ Soil Water Balance/ Surface Runoff/ Water Quality/ Conservation Tillage/ Management Systems/ Manure Application/ Swine Manure/ Runoff/ Phosphorus/ Soil/ Nitrogen/ Nitrate/ Surface
Abstract: Changing climate across the United States has been observed in the increasing intensity and amount of precipitation. One of the predicted areas for this impact is in the upper Midwest or the Corn Belt, and one concern is that current soil management practices in this region may not adequately protect the soil under these changes resulting in water quality impacts. To address this concern, this study was conducted to survey the current literature on the water quality impacts from current soil management practices and evaluate potential impacts on runoff and drainage from soil management practices under a number of precipitation scenarios. Soil management practices, e.g., crop residue, no-tilt, incorporation of manure, provide protection under today's climate. However, increasing precipitation amounts, or frequencies, rapidly decrease the effectiveness of these practices with the deleterious effect being even greater on soils with low water holding capacity and limited depth. The water quality impacts may be even more dramatic with the likelihood of increased surface runoff events. Soil management practices need to be developed and evaluated under precipitation patterns that may

represent future scenarios so that producers can begin to adopt these practices into their management programs.

685. **Impacts of Climate Change on Aquatic Ecosystem Functioning and Health.**
Meyer, J. L.; Sale, M. J.; Mulholland, P. J.; and Leroy Poff, N.
Journal of the American Water Resources Association 35 (6): 1373-1386. (1999)
NAL Call #: GB651.W315;
ISSN: 1093-474X.
Notes: Special issue on water resources and climate change; Publisher: American Water Resources Association
Descriptors: USA/ Ecosystems/ Climatic Changes/ Food Chains/ Reviews/ Mixing/ Runoff/ Instream Flow/ Model Studies/ Risk/ Benefits/ Cost Analysis/ Inland water environment/ Environmental impact/ Fresh water/ Ecosystem disturbance/ Freshwater environments/ Water quality/ Nutrient loading/ Hydrology/ North America/ Ecology/ Climate/ Food chains/ Hazard/ Economics/ United States/ Mechanical and natural changes/ Air pollution/ Water Resources and Supplies
Abstract: We review published analyses of the effects of climate change on goods and services provided by freshwater ecosystems in the United States. Climate-induced changes must be assessed in the context of massive anthropogenic changes in water quantity and quality resulting from altered patterns of land use, water withdrawal, and species invasions; these may dwarf or exacerbate climate-induced changes. Water to meet instream needs is competing with other uses of water, and that competition is likely to be increased by climate change. We review recent predictions of the impacts of climate change on aquatic ecosystems in eight regions of North America. Impacts include warmer temperatures that alter lake mixing regimes and availability of fish habitat; changed magnitude and seasonality of runoff regimes that alter nutrient loading and limit habitat availability at low flow; and loss of prairie pothole wetlands that reduces waterfowl populations. Many of the predicted changes in aquatic ecosystems are a consequence of climatic effects on terrestrial ecosystems; shifts in riparian vegetation and hydrology are particularly critical. We review models that could be used to explore potential effects of climate change on freshwater ecosystems; these include models of instream flow, bioenergetics models, nutrient spiraling models, and models relating riverine food webs to hydrologic regime. We discuss potential ecological risks, benefits, and costs of climate change and identify information needs and model improvements that are required to improve our ability to predict and identify climate change impacts and to evaluate management options.

686. **Impacts of disturbance on detritus food webs in agro-ecosystems of contrasting tillage and weed management practices.**
Wardle, D. A.
Advances in Ecological Research 26: 105-185. (1995);
ISSN: 0065-2504
This citation is provided courtesy of CAB International/CABI Publishing.

687. **The impacts of irrigation and drainage on the environment = Les impacts de l'irrigation et du drainage sur l'environnement.**
Jensen, Marvin Eli
The Hague, the Netherlands: ICID; 26 p.: ill.; Series: N.D. Gulhati memorial lecture (5th). (1993)
Notes: Includes bibliographical references (p. 24-26).
NAL Call #: TC809-.J46-1993
Descriptors: Irrigation---Environmental aspects
This citation is from AGRICOLA.

688. **Impacts of riparian vegetation on hydrological processes.**
Tabacchi, E.; Lambs, L.; Guilloy, H.; Planty-Tabacchi, A. M.; Muller, E.; and Decamps, H.
Hydrological Processes 14 (16/17): 2959-2976. (2000)
NAL Call #: GB651.H93;
ISSN: 0885-6087
This citation is provided courtesy of CAB International/CABI Publishing.

689. **The Implications of Grassland and Heathland Management for the Conservation of Spider Communities: A Review.**
Bell, JR; Wheater, CP; and Cullen, WR
Journal of Zoology 255 (3): 377-387. (2001);
ISSN: 0952-8369
Descriptors: Heaths/ Grasslands/ Conservation/ Community composition/ Habitat/ Management/ Araneae/ Spiders/ Populations & general ecology/ Conservation
Abstract: Both intensity and type of habitat management in grasslands and heathlands affect spider communities. With high intensity management, spider communities often lack diversity and are dominated by a few r-selected species affiliated with bare ground. Low intensity management produces more complex communities introducing more niches for aerial web spinners and climbing spiders. The preferred management will be site-dependent and may not be appropriate for all spiders in all situations, particularly for some rare or threatened species. Providing natural cover is recommended when using extreme forms of management or intensive grazing (particularly by sheep). In extreme cases, or where trampling is heavy, the litter layer should be conserved. We advocate research and survey before and after major management implementation. Habitat management for spiders should not be considered alone, but integrated into a holistic plan. Management for spiders may conflict with rare plant conservation and small reserves should examine the viability of providing two contrasting regimes.

690. **Implications of grazing vs. no grazing on today's rangelands.**
Laycock, W. A.
In: Ecological implications of livestock herbivory in the West/ Vavra, M.; Laycock, W. A.; and Pieper, R. D. Denver, CO: Society for Range Management, 1994; pp. 250-280.
ISBN: 1-884930-00-X; Proceedings of the 42nd annual meeting of the American Institute of Biological Sciences.
NAL Call #: SF85.35.A17E28
This citation is provided courtesy of CAB International/CABI Publishing.

691. **Implications of movement in developing and deploying integrated pest management strategies.**
Irwin, Michael E
Agricultural and Forest Meteorology 97 (4): 235-248. (1999)

NAL Call #: 340.8-AG8;
ISSN: 0168-1923
Descriptors: aphid (Homoptera)/ vector/ soybean mosaic potyvirus (Potyvirus)/ pathogen/ Animals/ Arthropods/ Insects/ Invertebrates/ Microorganisms/ Plant Viruses/ Viruses/ integrated pest management/ pest movement/ disease transmission/ movement/ soybean mosaic potyvirus/ disease vectors/ case studies/ information needs/ flight/ disease prevention/ epidemiology/ simulation models/ mathematical models/ aphididae/ glycine max/ aerial insects/ air microbiology/ literature reviews
Abstract: To develop an integrated pest management (IPM) program, one must rely on detailed knowledge of pest movement at several levels. The tenets of IPM and the three tiers of information (fundamental, tactical, and operational) needed to deploy an IPM program are considered. I highlight the soybean mosaic potyvirus pathosystem, a pest system that is nearly impossible to control once the pathogen enters a field, to illustrate how the pathogen can be contained through IPM practices, but only with a reasonable understanding of pathogen transport by insect vectors. The virus is transmitted by a suite of aphids with different flight activity modes. Disease spread is rapid and irreversible if initial inoculum is high and vector flight activity is great. For that reason, the management mode must be preventive, not remedial. The complex epidemiology involves vector movement over both landscape and ecoregional scales, and movement, especially as it is influenced by atmospheric motion systems over both scales, should be understood to effectively manage soybean mosaic virus epidemics. The importance of conceptual, simulation, and predictive models that take into consideration vector movement cannot be overstated when dealing with a pest complex of this nature.

692. **Implications of phytic acid and supplemental microbial phytase in poultry nutrition: A review.**
Sebastian, S.; Touchburn, S. P.; and Chavez, E. R.
World's Poultry Science Journal 54 (1): 27-47. (Mar. 1998)
NAL Call #: 47.8-W89;
ISSN: 0043-9339 [WPSJAO]
Descriptors: broilers/ turkeys/ bioavailability/ phosphorus/ phytic acid/ nutrient-nutrient interactions/ female animals/ male animals/ enzyme preparations/ feed additives/ dietary minerals/ calcium/ fiber content/ copper/ zinc/ cereals/ grain legumes/ oilseeds/ age differences/ sex differences/ protein digestibility/ excretion/ poultry manure/ literature reviews
This citation is from AGRICOLA.

693. **Implications of weed seedbank dynamics to weed management.**
Buhler, D. D.; Hartzler, R. G.; and Forcella, F.
Weed Science 45 (3): 329-336. (May 1997-June 1997)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6].
Notes: Paper presented at the Weed Science Society of America Meeting on Importance of weed biology to weed management held February 6, 1996, Norfolk, VA.
Includes references.
Descriptors: weeds/ seed banks/ population dynamics/ weed control/ tillage/ weed biology/ population ecology/ botanical composition/ cropping systems/ depth/ rotations/ integrated pest management/ decision making/ mathematical models/ yield losses/ crop yield/ light/ requirements/ literature reviews
Abstract: The species composition and density of weed seed in the soil vary greatly and are closely linked to the cropping history of the land. Altering tillage practices changes weed seed depth in the soil, which plays a role in weed species shifts and affects efficacy of control practices. Crop rotation and weed control practices also affect the weed seedbank. Information on the influence of cropping practices on the weed seedbank should be a useful tool for integrated weed management. Decision aid models use information on the weed seedbank to estimate weed populations, crop yield loss, and recommend weed control tactics. Understanding the light requirements of weed seed may provide new approaches to weed management. Improving and applying our understanding of weed seedbank dynamics is essential to developing improved weed management systems. The principles of plant ecology must be integrated with the science of weed management to develop strategies that take advantage of basic plant responses in weed management systems for agronomic crops.
This citation is from AGRICOLA.

694. **The importance of different scale processes for the restoration of floodplain woodlands.**
Hughes, F M R; Adams, W M; Muller, E; Nilsson, C; Richards, K S; Barsoum, N; Decamps, H; Foussadier, R; Girel, J; Guilloy, H; Hayes, A; Johansson, M; Lambs, L; Pautou, G; Peiry, J L; Perrow, M; Vautier, F; and Winfield, M
Regulated Rivers Research and Management 17 (4-5): 325-345. (2001)
NAL Call #: TC530.R43;
ISSN: 0886-9375
Descriptors: trees (Spermatophyta): seedling/ Plants/ Spermatophytes/ Vascular Plants/ channel movements/ ecosystem responses/ environmental flows/ environmental management/ flood events/ floodplain woodlands: restoration/ geomorphological processes/ hydrology/ mortality/ river restoration/ sediment inputs/ sedimentation sites/ spatial scale processes/ tree regeneration/ water tables
Abstract: The restoration of floodplain woodlands demands an understanding of the linkages between process, form and past management history at both a local and catchment scale. Site and reach scale processes that influence the species composition of floodplain woodland species are described with a particular focus on the relationships between hydrological and sediment inputs to floodplains and the regeneration response by tree species. The importance of integrating natural science knowledge gained at the site reach scale with decisions taken at the catchment scale on water allocation priorities is then discussed. Research was carried out on the River Ore in Sweden, The River Ouse in the United Kingdom and the River Isere and River Garonne in France. Research results at the site and reach scale allow broad definition of ideal conditions for the regeneration and growth of floodplain tree species and the flows that provide them: (1) channel movement has to occur for the creation of sedimentation sites required for the regeneration of early successional species and the flows that provide them; (2) flooding events should occur periodically to cause both channel movement and recharge

floodplain water tables; (3) water table decline rates following a flood event must be slow enough that seedling roots can maintain contact with the retreating water front; (4) unseasonal flood events can cause high mortality of seedlings and prevent successful regeneration in any season. Some of the requirements for the restoration of floodplain woodlands can be delivered through site and reach scale restoration projects with reasonably predictable ecological outcomes. A more holistic approach to the provision of regeneration sites for floodplain woodlands would also include water allocation decisions targeted at providing flow conditions which could restore geomorphological processes. However, it is difficult to predict ecosystem responses to catchment scale flow allocation measures and, therefore, in the intensively managed river corridors of Western Europe, river restoration initiatives tend to be restricted to the site and reach scale.

695. **Importance of mechanisms and processes of the stabilisation of soil organic matter for modelling carbon turnover.**
Krull, E. S.; Baldock, J. A.; and Skjemstad, J. O.
Functional Plant Biology 30 (2): 207-222. (2003);
ISSN: 1445-4408
This citation is provided courtesy of CAB International/CABI Publishing.

696. **The Importance of Palaeolimnology to Lake Restoration.**
Battarbee, R. W.
Hydrobiologia 395/396: 149-159. (1999)
NAL Call #: 410 H992;
ISSN: 0018-8158
Descriptors: Lake Restoration/ Paleolimnology/ Reviews/ Lake Sediments/ Lakes/ Paleoecology/ Methodology/ Environmental restoration/ Restoration/ Eutrophication/ Acidification/ Environment management/ Palaeolimnology/ Lake deposits/ Ecosystem management/ transfer functions/ Lakes/ Methodology general/ Protective measures and control/ Freshwater pollution/ Water quality control/ Reclamation
Abstract: Palaeolimnology has developed rapidly over the last two decades to deal with problems of eutrophication, and acidification. This paper reviews the techniques for coring, dating and interpreting sediments. The applications of palaeolimnology in interpreting the past through `transfer functions' calculated from biological indices are reviewed. Rates of change, the causes of change, and the restoration of lakes to some predefined target are reviewed and the direction of future developments considered.

697. **The Importance of Pathogenic Organisms in Sewage and Sewage Sludge.**
Dumontet, S.; Scopa, A.; Kerje, S.; and Krovacek, K.
Journal of the Air and Waste Management Association 51 (6): 848-860. (2001);
ISSN: 1047-3289
Descriptors: Pathogens/ Sewage/ Sewage sludge/ Waste treatment/ Soil amendment/ Reviews/ Viruses/ Bacteria/ Yeasts/ Fungi/ Parasites/ Recycling/ Epidemiology/ Waste management/ Wastewater/ Sludge/ Organic Matter/ Public Health/ epidemiology/ Non patents/ Waste management/ Wastewater treatment processes/ Waste Management/ Sewage & wastewater treatment
Abstract: Deficient sanitation poses a serious threat to human and animal health, involving complex relationships between environments, animals, refuse, food, pathogens, parasites, and man. However, by sanitizing and stabilizing the organic matter of sewage sludge, agriculture can utilize it to maintain soil, water, and air quality. As ingredients in soil amendments, such bioresidues are a source of nutrients for plants. Stabilization and sanitation of sewage sludge safely couple its recycling and disposal. This coupling becomes increasingly important as economic and environmental constraints make strategies for waste disposal more difficult to apply. The occurrence of viruses, bacteria, yeasts, fungi, and zooparasites in sewage sludge is reviewed in this article, and consequential epidemiologic concerns that arise from sewage sludge recycling is also addressed.

698. **The importance of pesticides and other pest management practices in U.S. alfalfa production.**
Hower, Arthur A.; Harper, Jayson K.; Harvey, R. Gordon.; and National Agricultural Pesticide Impact Assessment Program (U.S.).
United States: s.n.; xi, 221 p.: map; Series: NAPIAP report no. 2-CA-99. (1999)
Notes: Includes bibliographical references (p. 124-131). Funded by U.S. Dept. of Agriculture, National Agricultural Pesticide Impact Assessment Program.
NAL Call #: SB608.A5-H69-1999
Descriptors: Alfalfa---Diseases and pests---Control---United States/ Pesticides---United States/ Pests---Control/ Weeds---Control/ Alfalfa industry---United States
This citation is from AGRICOLA.

699. **The importance of pesticides and other pest management practices in U.S. tomato production.**
Davis, R. Michael.
United States: s.n.; x, 263 p.: maps; Series: NAPIAP report no. 1-CA-98. (1998)
Notes: "A special funded project of the United States Department of Agriculture, National Agricultural Pesticide Impact assessment Program, document number 1-CA-98." Includes bibliographical references (p. 262-263).
NAL Call #: SB608.T75-I48-1998
Descriptors: Tomatoes---Diseases and pests---Control---United States/ Tomato industry---United States/ Pesticides---Economic aspects---United States
This citation is from AGRICOLA.

700. **The importance of scouting in cotton IPM.**
Matthews, G. A.
Crop Protection 15 (4): 369-374. (1996)
NAL Call #: SB599.C8;
ISSN: 0261-2194
This citation is provided courtesy of CAB International/CABI Publishing.

701. **Importance of the riparian zone to the conservation and management of freshwater fish: A review.**
Pusey, Bradley J and Arthington, Angela H
Marine and Freshwater Research 54 (1): 1-16. (2003);
ISSN: 1323-1650

Descriptors: nutrients/ fish (Pisces): alien species, egg, freshwater species, larva/ grass (Gramineae): alien species, exotic pasture species, insolation, proliferation/ Angiosperms/ Animals/ Chordates/ Fish/ Monocots/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ UV B irradiation/ atmosphere/ biodiversity/ body morphology/ coarse organic matter/ disease resistance/ flow regimen/ food web structure/ habitat structure/ light quality/ light quantity/ metabolic rate/ mortality rate/ population deterioration/ potential mate discrimination / predation/ reproduction/ riparian zone integrity/ riparian aquatic ecosystem linkages / solar energy transmission/ stream shade/ terrestrial sediments/ thermal energy transfer/ water clarity

Abstract: The relationship between freshwater fish and the integrity of the riparian zone is reviewed with special emphasis on the fauna of northern Australia. Linkages between freshwater fish and riparian zone processes are diverse and important. The riparian zone occurs at the interface between terrestrial and aquatic ecosystems and it may, therefore, regulate the transfer of energy and material between these systems, as well as regulating the transmission of solar energy into the aquatic ecosystem. Riparian influences on light quantity, quality and shade in streams are discussed and predictions are made about the likely impacts associated with changes in light quality. Increased rates of transfer of thermal energy between the atmosphere and the aquatic environment in the absence of an intact riparian zone may potentially disrupt reproduction by desynchronizing the thermal regimen from regional factors, such as the flow regimen, as well as having direct effects on mortality rates, body morphology, disease resistance and metabolic rates. Impacts associated with changes in light quality range from increased egg and larval mortality due to increased ultraviolet (UV) B irradiation and a decreased ability to discriminate between potential mates to increased conspicuousness to predators. Increased insolation and proliferation of exotic pasture grasses, an increasing threat in northern Australia, are shown to have a range of impacts, including changes in habitat structure, food-web structure and the facilitation of invasion by exotic fish species. The interception of terrestrial sediments and nutrients by the riparian zone has important consequences for stream fish, maintaining habitat structure, water clarity and food-web structure. Coarse organic matter donated to the aquatic environment by the riparian zones has a large range of influences on stream habitat, which, in turn, affect biodiversity and a range of process, such as fish reproduction and predation. Terrestrial matter is also consumed directly by fish and may be a very important source of energy in some Australian systems and under certain circumstances. Attention to the linkages between fish and riparian systems is essential in efforts to rehabilitate degraded stream environments and to prevent further deterioration in freshwater fish populations in northern Australia.

702. **The importance of wetlands in water resource management: A literature review.**
Brady, Anne.; Riding, Tim.; and New South Wales. Dept. of Land and Water Conservation.
Sydney: Dept. of Land & Water Conservation; 48 p.: ill. (1996)
Notes: "March 1996"--T.p. verso. Includes bibliographical references (p. 30-37).
NAL Call #: QH541.5.M3B73--1996; *ISBN:* 0731023544
Descriptors: Wetland conservation---Australia---New South Wales/ Wetlands---Australia---New South Wales---Management
This citation is from AGRICOLA.

703. **Improved methods of injecting swine manure to agricultural land.**
Prairie Agricultural Machinery Institute (Canada) and Saskatchewan. Agriculture Development Fund.
Regina: Agriculture Development Fund, Saskatchewan Agriculture and Food; 19, 40 p.: ill. (1996)
Notes: "Final report" "March, 1996."
NAL Call #: S655-.I47-1996
Descriptors: Manures/ Manure handling
This citation is from AGRICOLA.

704. **Improved technologies to reduce emission of methyl bromide from fumigated soil.**
Gamliel, A; Grinstein, A; and Katan, J
Phytoparasitica 25 ([supplement]): 21S-30S. (1997);
ISSN: 0334-2123
Descriptors: methyl bromide/ emission reduction/ fumigated soil/ improved technologies/ intensive agriculture/ methodology/ methyl bromide/ pesticides/ postharvest quarantine treatments/ soil fumigant/ soil science

Abstract: Methyl bromide (MB) is the chemical most widely used for soil fumigation in intensive agriculture, and for commodity and postharvest quarantine treatments. MB was listed by the Montreal Protocol in 1992 as a controlled ozone-depleting substance, and a phaseout process has been initiated. Several technologies to reduce the fumigation dosage and subsequent emission of MB from the fumigated soil were tested and applied in field trials and commercial application. These include dosage reduction by using impermeable films, improving uniformity of distribution, and preventing possible escape sources such as the edges of the fumigated plot. Combining MB with other pesticides, solarization, or biocontrol agents is another approach to reducing MB emission and dosage. Adapting these technologies may result in a 60-90% reduction of MB emitted from fumigated soil.

705. **Improvement of vegetable quality and water and fertilizer utilization in low-tech greenhouses through a decision support management system.**
Passam, H. C.; Sideridis, A. B.; Yialouris, C. P.; and Maliappis, M. T.
Journal of Vegetable Crop Production 7 (1): 69-82. (2001)
NAL Call #: SB320.J68;
ISSN: 1049-6467
Descriptors: lycopersicon esculentum/ cucumis sativus/ cucumis melo/ solanum melongena/ capsicum annuum/ lactuca sativa/ greenhouse culture/ decision making/ crop quality/ irrigation water/ nutrient requirements/ fertilizers/ evaporation/ expert systems/ plant pests/ plant diseases/ diagnosis/ symptoms/ nutritional disorders/ databases/ literature reviews
This citation is from AGRICOLA.

706. **Improving the Evaluation of Conservation Programs.**
Kleiman, G. D.; Reading, P. R.; Miller, J. B.; Clark, W. T.; Scott, M. J.; Robinson, J.; Wallace, L. R.; Cabin, J. R.; and Felleman, F.
Conservation Biology 14 (2): 356-365. (Apr. 2000)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892.
Notes: Publisher:
Blackwell Science Ltd
Descriptors: Conservation/ Reviews/ Government policy
Abstract: The evaluation of conservation programs is rare but increasingly important in improving their effectiveness. Regular evaluations of conservation programs and the implementation of recommendations resulting from such assessments are infrequent because of resistance by participants and lack of funding. Evaluations may be internal or external, depending on the purpose of the review and how broadly it is focused. We strongly recommend external peer review of long-term complex conservation programs every 5 years, supported by more frequent (annual) internal reviews. Criteria for success must encompass both biological and social measures and include learning and the application of new knowledge to management. Evaluations must also go beyond monitoring to assess the value of the program. We emphasize the need to include the organization and function of a conservation program (the process) in any evaluation in addition to substantive criteria for success, which usually involve biological measures (numbers). A dysfunctional program organization and process can as effectively cripple a conservation effort as can a major biological catastrophe. We provide examples of different types of conservation program evaluations, including moderated workshops and case-study analysis, and provide advice on the logistics and organization of the review, emphasizing the importance of the evaluation process itself to a successful outcome. One important aspect of an evaluation is having an individual with leadership ability and considerable expertise to organize the format and oversee the review process itself. Second, it is essential at the outset to ensure agreement among the program participants and the review committee on the goals and objectives of the conservation program, what is to be evaluated, and the criteria for defining success. Finally, the best evaluations are inclusive and involve all participants and stakeholders.
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707. **Improving water use efficiency as part of integrated catchment management.**
Batchelor, Charles
Agricultural Water Management 40 (2-3): 249-263. (1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: water use efficiency: integrated catchment management
Abstract: Sustainable agricultural development requires technologies and practices that make more efficient and productive use of resources and an enabling environment that encourages the adoption of these technologies. Many institutions and international agencies are showing considerable interest in integrated catchment management (ICM) as a practical means of improving the management of water resources, reducing environmental degradation and promoting sustainable agricultural development. This paper outlines some of the main components of ICM and lists some of the prerequisites for establishing collective responsibility for, in particular, groundwater resources. This paper also discusses the extent to which programmes of ICM can be used as a means of conserving water resources and improving water use efficiency and productivity at the farm and catchment scales.
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708. **In search of swampland: A wetland sourcebook and field guide.**
Tiner, Ralph W.
New Brunswick, N.J.: Rutgers University Press; xviii, 264 p.: ill. (some col.), maps. (1998)
Notes: Includes bibliographical references (p. [259]-260) and index.
NAL Call #: GB624.T56--1998;
ISBN: 0813525055 (cloth: alk. paper); 0813525063 (pbk.: alk. paper)
Descriptors: Wetlands---Northeastern States
This citation is from AGRICOLA.

709. **The incidence and severity of sediment contamination in surface waters of the United States: National sediment survey: Data summaries for areas of probable concern.**
United States. Environmental Protection Agency. Office of Science and Technology.
Washington, DC: U.S. Environmental Protection Agency, Office of Science and Technology; 3 v.: ill., maps. (1997)
Notes: National sediment contaminant point source inventory; "September 1997." Includes bibliographical references.
NAL Call #: TD223.I53-1997
http://www.epa.gov/cgi-bin/claritgw?op-Display&document=clserv:OW:1030;rank=1&template=epa
Descriptors: Water---Pollution---United States/ Contaminated sediments---United States/ Sedimentation and deposition---Environmental aspects---United States
This citation is from AGRICOLA.

710. **Incorporating natural variability, uncertainty, and risk into water quality evaluations using duration curves.**
Bonta, J. V. and Cleland, B.
Journal of the American Water Resources Association 39 (6): 1481-1496. (2003)
NAL Call #: GB651.W315;
ISSN: 1093-474X.
Notes: Number of References: 38
Descriptors: Environment/ Ecology/ water quality/ BMP/ best management practice/ derived distribution/ TMDL/ duration curves/ Ohio watersheds/ flow duration/ reclamation/ discharge/ impact
Abstract: Quantifying natural variability, uncertainty, and risk with minimal data is one of the greatest challenges facing those engaged in water quality evaluations, such as development of total maximum daily loads (TMDL), because of regulatory, natural, and analytical constraints. Quantification of uncertainty and variability in natural systems is illustrated using duration curves (DCs), plots that illustrate the percent of time that a particular flow rate (FDC), concentration (CDC), or load rate (LDC; "TMDL") is exceeded, and are constructed using simple derived distributions. Duration curves require different construction methods and

interpretations, depending on whether there is a statistically significant correlation between concentration (C) and flow (Q), and on the sign of the C-Q regression slope (positive or negative). Flow DCs computed from annual runoff data vary compared with an FDC developed using all data. Percent exceedance for DCs can correspond to risk; however, DCs are not composed of independent quantities. Confidence intervals of data about a regression line can be used to develop confidence limits for the CDC and LDC. An alternate expression to a fixed TMDL is suggested as the risk of a load rate being exceeded and lying between confidence limits. Averages over partial ranges of DCs are also suggested as an alternative expression of TMDLs. DCs can be used to quantify watershed response in terms of changes in exceedances, concentrations, and load rates after implementation of best management practices.

711. **Incorporating water goals into forest management decisions at a local level.**
Twery, M. J. and Hornbeck, J. W.
Forest Ecology and Management 143 (1/3): 87-93. (Apr. 2001)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW].
Notes: Special issue: The science of managing forests to sustain water resources / edited by R.T. Brooks and N. Lust. Paper presented at a conference held November 8-11, 1998, Sturbridge, Massachusetts. Includes references.
Descriptors: forest management/ water quality/ water flow/ decision making/ local planning/ silvicultural systems/ wildlife/ water yield/ aesthetic value/ forest ecology/ streams/ wetlands/ riparian vegetation/ fishes/ habitats/ literature reviews
This citation is from AGRICOLA.

712. **Indicators and assessment methods for measuring the ecological integrity of semi-aquatic terrestrial environments.**
Innis, S. A.; Naiman, R. J.; and Elliott, S. R.
Hydrobiologia 422/423: 111-131. (2000)
NAL Call #: 410 H992;
ISSN: 0018-8158
This citation is provided courtesy of CAB International/CABI Publishing.

713. **Indicators of rangeland health and functionality in the Intermountain West.**
O'Brien, Renee and Rocky Mountain Research Station
Fort Collins, Colo.: U.S. Dept. of Agriculture, Rocky Mountain Research Station; Series: General technical report RMRS GTR-104. (2003)
Notes: Title from web page viewed Oct. 1, 2003. "June 2003." Includes bibliographical references.
NAL Call #: aSD144.A14-G46-no.-104
http://www.fs.fed.us/rm/pubs/rmrs%5Fgtr104.pdf
Descriptors: Rangelands---West---United States/ Range management---West---United States/ Range plants---West---United States/ Invasive plants---West---United States/ Noxious weeds---West---United States/ Ecosystem health West United States
This citation is from AGRICOLA.

714. **Industrialized animal production: A major source of nutrient and microbial pollution to aquatic ecosystems.**
Mallin, M. A. and Cahoon, L. B.
Population and Environment 24 (5): 369-385. (May 2003);
ISSN: 0199-0039.
Notes: Number of References: 54
Descriptors: Environmental Studies, Geography & Development/ swine/ poultry/ nutrients/ pathogens/ eutrophication/ column nitrate enrichment/ eelgrass zostera marina/ Eastern North Carolina/ water quality/ coastal plain/ toxic pfiesteria/ lagoon effluent/ swine manure/ fish kills/ Cape Fear
Abstract: Livestock production has undergone massive industrialization in recent decades. Nationwide, millions of swine, poultry, and cattle are raised and fed in concentrated animal feeding operations (CAFOs) owned by large, vertically integrated producer corporations. The amount of nutrients (nitrogen and phosphorus) in animal manure produced by CAFOs is enormous. For example, on the North Carolina Coastal Plain alone an estimated 124,000 metric tons of nitrogen and 29,000 metric tons of phosphorus are generated annually by livestock. CAFO wastes are largely either spread on fields as dry litter or pumped into waste lagoons and sprayed as liquid onto fields. Large amounts of nitrogen and phosphorus enter the environment through runoff, percolation into groundwater, and volatilization of ammonia. Many CAFOs are located in nutrient-sensitive watersheds where the wastes contribute to the eutrophication of streams, rivers, and estuaries. There is as yet no comprehensive Federal policy in place to protect the environment and human health from CAFO generated pollutants.

715. **Influence of abiotic and biotic factors in measuring and modeling soil erosion on rangelands: State of knowledge.**
Weltz, M. A.; Kidwell, M. R.; and Fox, H. D.
Journal of Range Management 51 (5): 482-495. (Sept. 1998)
NAL Call #: 60.18-J82;
ISSN: 0022-409X [JRMGAQ]
Descriptors: rangeland soils/ erosion/ simulation models/ rain/ universal soil loss equation/ slope/ canopy/ tillage/ terrain/ topography/ soil texture/ data collection/ rainfall simulators/ interrill erosion/ rill erosion/ literature reviews/ revised universal soil loss equation/ water erosion prediction project model
Abstract: The first standardized soil erosion prediction equation used on rangelands was the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was developed to address deficiencies in the USLE by accounting for temporal changes in soil erodibility and plant factors which were not originally considered. Improvements were also made to the rainfall, length, slope, and management practice factors of the original USLE model. The Water Erosion Prediction Project (WEPP) model was developed to estimate soil erosion from single events, long-term soil loss from hillslopes, and sediment yield from small watersheds. Temporal changes in biomass, soil erodibility, and land management practices, and to a limited extent, spatial distribution of soil, vegetation, and land use are addressed in the WEPP model. To apply new process-based erosion prediction technology, basic research must be conducted to better model the interactions and feedback mechanisms of plant

communities and landscape ecology. Thresholds at which accelerated soil erosion results in unstable plant communities must be identified. Research is needed to determine the confidence limits for erosion predictions generated by simulation models so that the probability of meeting specified soil loss values (kg ha-1 yr-1) for given management systems can be calculated at specific significance levels. As the technology for modeling soil erosion on rangelands has improved, limitations with the techniques of parameter estimation have been encountered. Improvements in model parameterization techniques and national databases that incorporate vegetation and soil variability are required before existing erosion prediction models can be implemented.
This citation is from AGRICOLA.

716. **Influence of agricultural management on soil organic carbon: A compendium and assessment of Canadian studies.**
VandenBygaart, A J; Gregorich, E G; and Angers, D A
Canadian Journal of Soil Science 83 (4): 363-380. (2003)
NAL Call #: 56.8 C162;
ISSN: 0008-4271
Descriptors: organic carbon: agricultural management, soil/ Agropyron cristatum (Gramineae): forage crop/ Linum usitatissimum (Linaceae)/ Lolium perenne (Gramineae): forage crop/ Medicago sativa (Leguminosae): forage crop/ Trifolium pratense (Leguminosae): forage crop/ Triticum aestivum [wheat] (Gramineae): grain crop/ Angiosperms/ Dicots/ Monocots/ Plants/ Spermatophytes/ Vascular Plants
Abstract: To fulfill commitments under the Kyoto Protocol, Canada is required to provide verifiable estimates and uncertainties for soil organic carbon (SOC) stocks, and for changes in those stocks over time. Estimates and uncertainties for agricultural soils can be derived from long-term studies that have measured differences in SOC between different management practices. We compiled published data from long-term studies in Canada to assess the effect of agricultural management on SOC. A total of 62 studies were compiled, in which the difference in SOC was determined for conversion from native land to cropland, and for different tillage, crop rotation and fertilizer management practices. There was a loss of 24+-6% of the SOC after native land was converted to agricultural land. No-till (NT) increased the storage of SOC in western Canada by 2.9+-1.3 Mg ha-1; however, in eastern Canada conversion to NT did not increase SOC. In general, the potential to store SOC when NT was adopted decreased with increasing background levels of SOC. Using no-tillage, reducing summer fallow, including hay in rotation with wheat (Triticum aestivum L.), plowing green manures into the soil, and applying N and organic fertilizers were the practices that tended to show the most consistent increases in SOC storage. By relating treatment SOC levels to those in the control treatments, SOC stock change factors and their levels of uncertainty were derived for use in empirical models, such as the United Nations Intergovernmental Panel on Climate Change (IPCC) Guidelines model for C stock changes. However, we must be careful when attempting to extrapolate research plot data to farmers' fields since the history of soil and crop management has a significant influence on existing and future SOC stocks.

717. **The influence of hedge structure, management and landscape context on the value of hedgerows to birds: A review.**
Hinsley, S. A. and Bellamy, P. E.
Journal of Environmental Management 60 (1): 33-49. (Sept. 2000)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797 [JEVMAW].
Notes: Special issue: Hedgerows: perspectives on biodiversity and environmental management / edited by D. McCollin. Selected papers from the 'Hedgerow conservation: policy, protection and evaluation' meeting held July 21, 1999, in Northampton, United Kingdom. Includes references.
Descriptors: birds/ hedges/ habitats/ lowland areas/ farming/ landscape/ literature reviews/ UK
This citation is from AGRICOLA.

718. **Influence of hydrologic loading rate on phosphorus retention and ecosystem productivity in created wetlands.**
Mitsch, William J.; Cronk, Julie K.; and United States. Army. Corps of Engineers. U.S. Army Engineer Waterways Experiment Station. Wetlands Research Program (U.S.).
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; xii, 84 p.: ill., maps; Series: Wetlands Research Program technical report WRP-RE-6. (1995)
Notes: At head of title: Wetlands Research Program. "January 1995." Final report. Includes bibliographical references (p. 73-84).
NAL Call #: QH541.5.M3M57--1995
Descriptors: Wetland conservation/ Constructed wetlands/ Freshwater productivity/ Water---Phosphorus content/ Restoration ecology
This citation is from AGRICOLA.

719. **Influence of lime, fertilizer and manure applications on soil organic matter content and soil physical conditions: A review.**
Haynes, R. J. and Naidu, R.
Nutrient Cycling in Agroecosystems 51 (2): 123-137. (June 1998)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: soil organic matter/ soil physical properties/ lime/ manures/ liming/ flocculation/ sustainability/ soil ph/ calcium ions/ ion activity/ aluminum/ soil chemistry/ chemical reactions/ crop yield/ fertilizers/ application rates/ phosphate/ phosphoric acid/ ammonium/ soil water/ water holding capacity/ soil texture/ hydraulic conductivity/ bulk density/ cation exchange capacity/ literature reviews
Abstract: The effects of lime, fertilizer and manure applications on soil organic matter status and soil physical properties are of importance to agricultural sustainability. Their effects are complex and many interactions can occur. In the short-term, liming can result in dispersion of clay colloids and formation of surface crusts. As pH is increased the surface negative charge on clay colloids increases and repulsive forces between particles dominate. However, at higher lime rates, Ca2+ concentrations and ionic strength in soil solution increase causing compression of the electrical double layer and renewed flocculation. When present in sufficient quantities, both

lime and hydroxy-A1 polymers formed by precipitation of exchangeable A1, can act as cementing agents bonding soil particles together and improving soil structure. Liming often causes a temporary flush of soil microbial activity but the effect of this on soil aggregation is unclear. It is suggested that, in the long-term, liming will increase crop yields, organic matter returns, soil organic matter content and thus soil aggregation. There is a need to study these relationships on existing long-term liming trials. Fertilizers are applied to soils in order to maintain or improve crop yields. In the long-term, increased crop yields and organic matter returns with regular fertilizer applications result in a higher soil organic matter content and biological activity being attained than where no fertilizers are applied. As a result, long-term fertilizer applications have been reported, in a number of cases, to cause increases in water stable aggregation, porosity, infiltration capacity and hydraulic conductivity and decreases in bulk density. Fertilizer additions can also have physico-chemical effects which influence soil aggregation. Phosphatic fertilizers and phosphoric acid can favour aggregation by the formation of A1 or Ca phosphate binding agents whilst where fertilizer NH4+ accumulates in the soil at high concentrations, dispersion of clay colloids can be favoured. Additions of organic manures result in increased soil organic matter content. Many reports have shown that this results in increased water holding capacity, porosity, infiltration capacity, hydraulic conductivity and water stable aggregation and decreased bulk density and surface crusting. Problems associated with large applications of manure include dispersion caused by accumulated K+, Na+ and NH4+ in the soil and production of water-repellant substances by decomposer fungi. This citation is from AGRICOLA.

720. **The influence of organic nitrogen mineralization on the management of agricultural systems in the UK.**
Shepherd, M. A.; Stockdale, E. A.; Powlson, D. S.; and Jarvis, S. C.
Soil Use and Management 12 (2): 76-85. (June 1996)
NAL Call #: S590.S68;
ISSN: 0266-0032 [SUMAEU]
Descriptors: agricultural soils/ soil organic matter/ nitrogen/ mineralization/ immobilization/ nutrient sources/ release/ crop management/ fertilizer requirement determination/ crop residues/ animal manures/ grassland soils/ cultivation/ nitrogen cycle/ nitrogen supply/ nitrogen management
Abstract: The understanding of nitrogen mineralization is central to providing good advice to ensure that nitrogen (N), from whatever source, is utilized by crops as efficiently as possible to minimize pollution. We have reviewed how mineralization is accounted for in current advice. It is clear that there is at least a qualitative understanding of the effects of soil and crop management on N mineralization and N supply, which has enabled the development of Codes of Good Agricultural Practice and fertilizer recommendations systems, based on sound scientific principles. However, to refine advice there is a need for a better quantitative understanding. Although soil organic matter (SOM) is a major source of N for crops, we are unable adequately to predict fertilizer requirement as affected by mineralization of SOM. Nitrogen returns from crop residues can vary considerably between fields; the provision of better field specific advice is restricted by our inability accurately to quantify this variability. The qualitative controls on the amount and timing of N release from ploughed grass are known, but better quantification of mineralization/immobilization over both the short- and long-term and better understanding of the relationship with sward age, inputs and management are essential. Much N can also be released from pasture and lost to the environment, especially where long-term leys have been grazed and there is a need to quantify the changing balance of mineralization and immobilization with the age of sward and N input. Whilst the overall principle of cultivation affecting mineralization is well known and appreciated, little is known about the mechanisms and quantification is only possible for a comparison of such extremes as ploughing and direct drilling.
This citation is from AGRICOLA.

721. **The Influence of Salinity on the Toxicity of Various Classes of Chemicals to Aquatic Biota.**
Hall, L. W. and Anderson, R. D.
Critical Reviews in Toxicology 25 (4): 281-346. (1995);
ISSN: 1040-8444
Descriptors: salinity / toxicity/ aquatic environment/ literature review/ organophosphorus pesticides/ heavy metals/ biota/ salinity effects/ lethal effects/ exposure tolerance/ pollution effects / pesticides/ bioaccumulation/ food chains/ reviews/ aquatic organisms/ Effects of pollution / Toxicology and health/ Effects on organisms/ Environmental effects
Abstract: The objective of this study was to review all available aquatic toxicity literature regarding the effects of salinity on the toxicity of various classes of inorganic and organic chemicals. Toxicity data for studies in which toxicity was assessed at various salinities were organized by chemical classes and trophic groups. Seventy percent of the studies were conducted with either crustaceans or fish. The other 30% were with mollusks, annelids, zooplankton, bacteria, phytoplankton, or fungi. Results from 173 data entries showed that negative correlations (toxicity increasing with decreasing salinity) were reported most frequently (55%), followed by no correlations (27%) and positive correlations (18%). The toxicity of most metals such as cadmium, chromium, copper, mercury, nickel, and zinc was reported to increase with decreasing salinity. This finding is likely related to the greater bioavailability of the free metal ion (toxic form) at lower salinity conditions. There was generally no consistent trend for the toxicity of most organic chemicals with salinity. The one exception to this was reported with organophosphate insecticides, the toxicity of which appeared to increase with increasing salinity. Physiological characteristics of the various test species were important in determining the toxicity of the various classes of chemicals at a range of salinities. Results from various studies showed that euryhaline species were more resistant to toxic conditions at isosmotic salinities due to minimization of osmotic stress. Specific examples showed that fish were more resistant to toxic chemicals at middle salinities when compared with either lower or higher extremes. Life history and ecology of test

species were important factors to consider when interpreting salinity/contaminant interaction data.

722. **The influence of soil biodiversity on hydrological pathways and the transfer of materials between terrestrial and aquatic ecosystems.**
Bardgett, R. D.; Anderson, J. M.; Behan-Pelletier, V.; Brussaard, L.; Coleman, D. C.; Ettema, C.; Moldenke, A.; Schimel, J. P.; and Wall, D. H.
Ecosystems 4 (5): 421-429. (2001)
NAL Call #: QH540.E3645;
ISSN: 1432-9840
This citation is provided courtesy of CAB International/CABI Publishing.

723. **The influence of some forest operations on the sustainable management of forest soils: A review.**
Worrell, R and Hampson, A
Forestry 70 (1): 61-85. (1997);
ISSN: 0015-752X
Descriptors: erosion rates/ forestry/ forestry method/ nutrient removal/ soil science/ sustainable management/ tree harvesting methods
Abstract: This review paper describes the nature and scale of changes to forest soils brought about by forestry operations. A relatively non-technical approach is adopted with the aim of stimulating debate within as wide an audience as possible. The paper does not aim To be exhaustive but rather a position statement. Areas where further study is required are highlighted. The concept of sustainability is explored in relation to forest soils, and the condition highlighted is that impacts of forest management operations should not, in the long term, exceed the capacity of soil to recover by natural processes (e.g. erosion losses should not exceed soil formation rates, nutrient removals should not exceed nutrient inputs etc.). Soil erosion, nutrient removal, compaction, and changes in organic matter content and soil water status are identified as the most important processes involved in the impacts of management. The impacts of some of the more intensive forest management regimes on soil compaction, nutrient removal and erosion rates appear to be of similar magnitude to the recovery capacity of soils. Where the most intensive forms of forest operation are used on susceptible sites some degree of long-term soil degradation appears to be likely, and it can be regarded as valid to describe such management practices as unsustainable. However, the scale of occurrence of such management is probably relatively modest, and decreasing. On less susceptible sites, and where less intensive forms of management are employed, impacts on soils are low enough for management to be regarded as sustainable, and are often less than under pre-existing land uses. Compaction caused by heavy harvesting and extraction machinery, nutrient depletion resulting from whole tree harvesting on infertile sites where rotations are short, and erosion following cultivation and harvesting on erodible soils are the greatest causes of concern. Compliance with recent Forestry Commission guidelines should lead to lower impacts than those recorded during recent decades. However, rotation-length audits of the impacts of different forest management regimes on a range of site types are needed before definitive statements about the sustainability of management operations can be made.

724. **Influence of tillage systems on weed population dynamics and management in corn and soybean in the central USA.**
Buhler, Douglas D
Crop Science 35 (5): 1247-1258. (1995);
ISSN: 0011-183X
Descriptors: plant (Plantae Unspecified)/ Glycine max (Leguminosae)/ Plantae (Plantae Unspecified)/ Zea mays (Gramineae)/ angiosperms/ dicots/ monocots/ plants/ spermatophytes/ vascular plants/ population density/ species composition/ weed control
Abstract: Species composition and population densities of weed communities of arable land reflect agronomic practices. The trend toward reducing tillage in corn (Zea mays L.) and soybean (Glycine max (L.) Merr.) production changes the environment where weeds are managed, survive, and reproduce. The shift from tillage systems that include extensive annual soil disturbance to systems that minimize soil disturbance will cause major changes in weed population dynamics. These changes often reduce the effectiveness of weed control practices. Reduced herbicide efficacy has slowed adoption of conservation tillage because many conservation tillage systems rely heavily on herbicides for weed management. Poor understanding of weed population dynamics and lack of suitable control alternatives often result in increased herbicide use in conservation tillage systems. While results have varied among experiments, some general trends in weed population dynamics have arisen as tillage is reduced. These include increased populations of perennial, summer annual grass, biennial, and winter annual species. Densities of large-seeded dicot species often decrease. The ecological and management aspects of these changes are varied and complex. Effective, economical, and environmentally sound weed management in conservation tillage systems will require integration of new information with established principles of weed management. New management systems and control technologies are needed to develop integrated weed management systems for the altered ecosystems created by conservation tillage production systems.

725. **Inland flood hazards: Human, riparian and aquatic communities.**
Wohl, Ellen E.
Cambridge, U.K.; New York: Cambridge University Press; xiv, 498 p., 4 p. of plates: ill. (some col.), maps (some col.). (2000)
NAL Call #: GB1399-.I54-2000;
ISBN: 0521624193 (hb)
Descriptors: Floods/ Flood control
This citation is from AGRICOLA.

726. **Innovative management of agricultural phosphorus to protect soil and water resources.**
Sharpley, A. N.; Kleinman, P.; and McDowell, R.
Communications in Soil Science and Plant Analysis 32 (7/8): 1071-1100. (2001)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Special issue: Potential use of innovative nutrient management alternatives to increase nutrient use efficiency, reduce losses, and protect soil and water quality/edited by J. Delgado. Proceedings of the Annual

Conference of the Soil and Water Conservation Society held Aug. 8-11, 1999, Biloxi, Mississippi.
Includes references.
Descriptors: phosphorus/ phosphorus fertilizers/ nitrogen/ nitrogen fertilizers/ animal manures/ losses from soil/ pollution control/ leaching/ runoff/ transport processes/ crop management/ application rates/ application methods/ soil fertility/ literature reviews/ best management practices
Abstract: Agriculture, particularly livestock agriculture, is receiving increasing public scrutiny due to non-point source phosphorus (P) pollution and eutrophication. Much of today's situation may be attributed to system level trends in specialization and intensification that result in excess P entering livestock farms. Balancing P at the farm gate represents a necessary step for long-term soil and water quality protection. Remedial P management combines source and transport control that confront critical areas of P export in surface and subsurface runoff from agricultural landscapes. Source management seeks to immobilize P in the environment through such strategies as reducing soluble P in manure, targeting P application to soils with high retention capacities, and managing soil P. Transport controls employ an understanding of loss or transfer mechanisms to avoid P application on areas with a high transport potential. Also, the potential for P transport can be reduced by implementation of conservation practices such as reduced tillage, terracing, and stream buffers. However, implementation of agricultural management strategies that minimize P export must consider the cost effectiveness of alternative measures, as low practice adoption may limit or impede water quality benefits.
This citation is from AGRICOLA.

727. **Insect pheromone olfaction: New targets for the design of species-selective pest control agents.**
Plettner, Erika
Current Medicinal Chemistry 9 (10): 1075-1085. (2002);
ISSN: 0929-8673
Descriptors: pheromone olfaction inhibitors: insecticide/ pheromones: analogs, degradation, recognition, transport/ species selective pest control agents: pesticide/ insect (Insecta): pest/ Animals/ Arthropods/ Insects/ Invertebrates/ insect chemical communication / mating disruption/ pheromone olfaction/ structure activity relationships

728. **Insect population responses to environmental stress and pollutants.**
Pimentel, David
Environmental Reviews 2 (1): 1-15. (1994)
NAL Call #: GE140.E59
Descriptors: Insecta (Insecta Unspecified)/ animals/ arthropods/ insects/ invertebrates/ air pollution/ biosphere/ chemicals/ ecosystem/ fertilizers/ pesticides/ soil pollution/ water pollution

729. **Insect resistance to Bacillus thuringiensis: Uniform or diverse?**
Tabashnik, Bruce E; Liu, Yong Biao; Malvar, Thomas; Heckel, David G; Masson, Luke; and Ferre, Juan
Philosophical Transactions of the Royal Society of London B: Biological Sciences 353 (1376): 1751-1756. (1998)
NAL Call #: 501 L84Pb;
ISSN: 0962-8436
Descriptors: Cry1A toxin/ Bacillus thuringiensis (Endospore forming Gram Positives): biocontrol agent, entomopathogen/ Plutella xylostella [diamondback moth] (Lepidoptera): agricultural pest/ Animals/ Arthropods/ Bacteria/ Eubacteria/ Insects/ Invertebrates/ Microorganisms/ allelism/ evolution/ genetic variation/ insecticide resistance
Abstract: Resistance to the insecticidal proteins produced by the soil bacterium Bacillus thuringiensis (Bt) has been documented in more than a dozen species of insect. Nearly all of these cases have been produced primarily by selection in the laboratory, but one pest, the diamondback moth (Plutella xylostella), has evolved resistance in open-field populations. Insect resistance to Bt has immediate and widespread significance because of increasing reliance on Bt toxins in genetically engineered crops and conventional sprays. Furthermore, intense interest in Bt provides an opportunity to examine the extent to which evolutionary pathways to resistance vary among and within species of insect. One mode of resistance to Bt is characterized by more than 500-fold resistance to at least one CrylA toxin, recessive inheritance, little or no cross-resistance to CrylC, and reduced binding of at least one CrylA toxin. Analysis of resistance to Bt in the diamondback moth and two other species of moths suggests that although this particular mode of resistance may be the most common, it is not the only means by which insects can attain resistance to Bt.

730. **Insect-resistant transgenic plants in a multi-trophic context.**
Groot, A. T. and Dicke, M.
Plant Journal 31 (4): 387-406. (Aug. 2002)
NAL Call #: QK710.P68;
ISSN: 0960-7412
Descriptors: transgenic plants/ trophic levels/ pest resistance/ genetic engineering/ genetic resistance/ insecticidal properties/ natural enemies/ arthropods/ plant breeding/ sustainability/ pest management/ nontarget effects/ nontarget organisms/ pollinators/ parasitoids/ predators/ risk assessment/ toxicity/ toxins/ food chains/ ecology/ literature reviews
Abstract: So far, genetic engineering of plants in the context of insect pest control has involved insertion of genes that code for toxins, and may be characterized as the incorporation of biopesticides into classical plant breeding. In the context of pesticide usage in pest control, natural enemies of herbivores have received increasing attention, because carnivorous arthropods are an important component of insect pest control. However, in plant breeding programmes, natural enemies of herbivores have largely been ignored, although there are many examples that show that plant breeding affects the effectiveness of biological control. Negative influences of modified plant characteristics on carnivorous arthropods may induce population growth of new, even more harmful pest species that had no pest status prior to the pesticide treatment. Sustainable pest management will only be possible when negative effects on non-target, beneficial arthropods are minimized. In this review, we summarize the effects of insect-resistant crops and insect-resistant transgenic crops, especially

Bt crops, from a food web perspective. As food web components, we distinguish target herbivores, non-target herbivores, pollinators, parasitoids and predators. Below-ground organisms such as Collembola, nematodes and earthworms should also be included in risk assessment studies, but have received little attention. The toxins produced in Bt plants retain their toxicity when bound to the soil, so accumulation of these toxins is likely to occur. Earthworms ingest the bound toxins but are not affected by them. However, earthworms may function as intermediaries through which the toxins are passed on to other trophic levels. In studies where effects of. insect-resistant (Bt) plants on natural enemies were considered, positive, negative and no effects have been found. So far, most studies have concentrated on natural enemies of target herbivores. However, Bt toxins are structurally rearranged when they bind to midgut receptors, so that they are likely to lose their toxicity inside target herbivores. What happens to the toxins in non-target herbivores, and whether these herbivores may act as intermediaries through which the toxins may be passed on to the natural enemies, remains to be studied.
This citation is from AGRICOLA.

731. **Insect science in the twenty-first century: Molting or metamorphosis?**
Oberlander, Herbert
American Entomologist 42 (3): 140-147. (1996)
NAL Call #: QL461.A52;
ISSN: 1046-2821
Descriptors: Plantae (Plantae Unspecified)/ plants/ Economic Entomology/ Entomologist/ Field Method/ Howard A. Schneiderman/ Insect Science/ Insecticide Resistance Management/ Integrated Pest Management/ Pest Management/ Transgenic Crop Plants/ 21st Century
© Thomson

732. **Insects in biodiversity conservation: Some perspectives and directives.**
Samways, M. J.
Biodiversity and Conservation 2 (3): 258-282. (June 1993)
NAL Call #: QH75.A1B562;
ISSN: 0960-3115 [BONSEU].
Notes: Special Issue: Global Biodiversity and Conservation of Insects. Includes references.
Descriptors: insects/ conservation/ species diversity/ landscape conservation/ biotopes/ literature reviews
This citation is from AGRICOLA.

733. **Integrated animal waste management.**
Council for Agricultural Science and Technology.
Ames, IA: Council for Agricultural Science and Technology; vii, 87 p.: col. ill., col. maps; Series: Task force report (Council for Agricultural Science and Technology) no. 128. (1996)
Notes: Includes bibliographical references (p. 75-83) and index.
NAL Call #: TD930.2.I54--1996;
ISBN: 1887383085
Descriptors: Animal waste---Management/ Dead animals, Removal and disposal of/ Integrated solid waste management
This citation is from AGRICOLA.

734. **Integrated assessment of IPM impacts: An overview.**
Antle, J. M.
In: Proceedings of the Third National Integrated Pest Management Symposium and Workshop. (Held February 27-March 1, 1996 at Washington, D.C.)
Washington, D.C.: U.S. Dept. of Agriculture, Economic Research Service; pp. 33-39; 1997.
Notes: Miscellaneous publication (United States. Dept. of Agriculture) no. 1542
NAL Call #: 1-Ag84M-no.1542
Descriptors: integrated pest management/ agricultural research/ economic impact/ environmental impact/ social impact/ public health/ assessment
This citation is from AGRICOLA.

735. **Integrated management of greenhouse vegetable crops.**
Papadopoulos, A. P.; Pararajasingham, S.; Shipp, J. L.; Jarvis, W. R.; and Jewett, T. J.
Horticultural Reviews 21: 1-39. (1997)
NAL Call #: SB317.5.H6;
ISSN: 0163-7851 [HORED5]
Descriptors: lycopersicon esculentum/ cucumis sativus/ capsicum annuum/ greenhouse crops/ greenhouse culture / crop management/ integrated pest management/ disease control/ relative humidity/ carbon dioxide/ environmental temperature/ light intensity/ growing media/ literature reviews
This citation is from AGRICOLA.

736. **Integrated management of sensitive catchment systems.**
Burt, T P
Catena 42 (2-4): 275-290. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: nitrate: leaching, pollutant/ nutrients/ pesticides/ catchment systems/ hydrological pathways/ integrated management/ land use/ pollutant transport/ soil erosion/ water quality/ water supply
Abstract: Until recently, 'land use' was regarded as a single function: in rural areas of the UK this simply meant 'farming' or, in the uplands, 'forestry'. However, there is now growing recognition of the multiple use of land, and farming or forestry must compete with other functions, in particular water supply. Links between hydrological pathways and stream water quality are described as a context for understanding the transport of pollutants to the river system. The concept of landscape sensitivity is then described and applied to the topics of soil erosion and nitrate leaching. Based on these analyses, guidelines for integrated management of sensitive catchment systems are proposed.
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737. **Integrated pest management.**
National Foundation for Integrated Pest Management Education (U.S.) and International Food Information Council (U.S.)
Austin, Tex.; Washington, D.C. National Foundation for Integrated Pest Management Education; International Food Information Council; 1 portfolio: ill. (1994)
Notes: Cover title.
NAL Call #: SB950.2.A1-I57-1994
Descriptors: Pests---Integrated control---United States
This citation is from AGRICOLA.

738. **Integrated pest management.**
Dent, D.
New York: Chapman and Hall; 356 p. (1995)
Descriptors: integrated control/ pest control/ Insecta
Abstract: This book provides a practical guide to the principles and practice of developing an integrated pest management (IPM) programme.

Integrated Pest Management answers the question "how do you devise, develop and implement a practical IPM system which will fully meet the real needs of farmers?". The term "pest" in this book is used in its broadest sense and includes insects, pathogens, weeds, nematodes, etc. The book commences by outlining the basic principles which underlie pest control (crop husbandry, socio-economics, population ecology and population genetics) and reviews the control measures available and their use in IPM systems. Subsequent chapters cover the techniques and approaches used in defining a pest problem, programme planning and management, systems analysis, experimental paradigms and implementation of IPM systems. The final section of the book contains four chapters giving examples of IPM in different cropping systems, contributed by invited specialists and outlining four different perspectives. Integrated Pest Management will be of use to agricultural and plant scientists, entomologists, acarologists and nematologists and all those studying crop protection, particularly at MSc level and above. It will be particularly useful for, and should find a place on the shelves of all personnel within the agrochemical industry, universities and research establishments working in this subject area and as a reference in libraries for students and professionals alike.
© Cambridge Scientific Abstracts (CSA)

739. **Integrated pest management for cotton in the western region of the United States.**
Western Regional IPM Project (U.S.) and University of California Integrated Pest Management Program.
Oakland, Calif.: University of Calif., Division of Agriculture and Natural Resources; 164 p.: ill. (chiefly col.); Series: Publication (University of California, Division of Agricultural and Natural Resources) 3305. (1996)
Notes: 2nd ed.; Alternative title: IPM for cotton; "Western Regional Integrated Pest Management Project" ... [et al.]--Cover. "Prepared by IPM Education and Publications, an office of the University of California Statewide IPM Project at Davis"--P. 5. Includes bibliographical references (p. 159-160).
NAL Call #: SB608.C8I585--1996;
ISBN: 1879906309
Descriptors: Cotton---Diseases and pests---West---United States/ Cotton---Diseases and pests---Integrated control---West---United States
This citation is from AGRICOLA.

740. **Integrated pest management: Historical perspectives and contemporary developments.**
Kogan, M.
Annual Review of Entomology 43: 243-270. (1998)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: integrated pest management/ integrated control/ control programs/ history/ reviews/ United States
This citation is from AGRICOLA.

741. **Integrated pest management in European apple orchards.**
Blommers, L. H. M.
Annual Review of Entomology 39: 213-241. (1994)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: integrated pest management/ apples/ orchards/ malus pumila/ insect pests/ dysaphis plantaginea/ insect control/ mite control/ biological control/ chemical control/ natural enemies/ biological control agents/ typhlodromus pyri/ pesticide resistance/ predators of insect pests/ literature reviews/ Europe
This citation is from AGRICOLA.

742. **Integrated pest management in forage alfalfa.**
Summers, C. G.
Integrated Pest Management Reviews 3 (3): 127-154. (Sept. 1998)
NAL Call #: SB950.9.I572;
ISSN: 1353-5226 [IPMRF5]
Descriptors: medicago sativa/ pest control/ integrated pest management/ literature reviews
This citation is from AGRICOLA.

743. **Integrated pest management in practice: Pathways towards successful application.**
Way, M. J. and Van Emden, H. F.
Crop Protection 19 (2): 81-103. (Mar. 2000)
NAL Call #: SB599.C8;
ISSN: 0261-2194 [CRPTD6]
Descriptors: integrated pest management/ research/ genetic engineering/ semiochemicals/ literature reviews/ bioinsecticides
This citation is from AGRICOLA.

744. **Integrated pest management in rice.**
Teng, P. S.
Experimental Agriculture 30 (2): 115-137. (Apr. 1994)
NAL Call #: 10-Ex72;
ISSN: 0014-4797 [EXAGAL]
Descriptors: oryza sativa/ integrated pest management/ high yielding varieties/ pest resistance/ pesticides/ biological control/ integrated control/ profitability/ control programs/ literature reviews
This citation is from AGRICOLA.

745. **Integrated pest management in tree fruit crops.**
Brunner, J. F.
Food Reviews International 10 (2): 135-157. (1994)
NAL Call #: TX341.F662;
ISSN: 8755-9129 [FRINEL].
Notes: Special issue on Integrated pest management.
Includes references.
Descriptors: fruit trees/ integrated pest management/ history/ pesticide resistance/ literature reviews
This citation is from AGRICOLA.

746. **Integrated pest management in vegetables.**
Zehnder, G.
Food Reviews International 10 (2): 119-134. (1994)
NAL Call #: TX341.F662;
ISSN: 8755-9129 [FRINEL].
Notes: Special issue on Integrated pest management.
Includes references.
Descriptors: vegetables/ integrated pest management/ food acceptability/ food safety/ literature reviews
This citation is from AGRICOLA.

747. **Integrated pest management (IPM) in fruit orchards.**
Edland, T.
In: Biological control: Benefits and risks/ Hokkanen, H. M. and Lynch, J. M.; Vol. 4; Series: Plant and microbial biotechnology research series No. 4, 1995; pp. 44-50.
ISBN: 052154405X
NAL Call #: TP248.27.P55P54
Descriptors: orchards / fruit trees/ insect pests/ integrated pest management/ integrated control/ insecticides/ acaricides/ biological control agents / biological control/ introduced species/ natural enemies/

predatory mites/ parasites of insect pests/ predators of insect pests/ literature reviews
This citation is from AGRICOLA.

748. **Integrated Pest Management Reviews.**
Integrated Pest Management Reviews (1995)
NAL Call #: SB950.9.I572;
ISSN: 1353-5226 [IPMRF5].
Notes: Title from cover.
London; New York, NY: Chapman & Hall, c1995- v.: ill.
Descriptors: Pests Integrated control Periodicals/ Pests Integrated control Research Periodicals
This citation is from AGRICOLA.

749. **Integrated weed management and weed species diversity.**
Clements, D. R.; Weise, S. F.; and Swanton, C. J.
Phytoprotection 75 (1): 1-18. (1994);
ISSN: 0031-9511
This citation is provided courtesy of CAB International/CABI Publishing.

750. **Integrated weed management: Quo vadis.**
Zoschke, A. and Quadranti, M.
Weed Biology and Management 2 (1): 1-10. (2002)
NAL Call #: SB610-.W447;
ISSN: 1444-6162
Descriptors: weeds/ integrated pest management/ pest control/ crop management/ plant nutrition/ hygiene/ seed germination/ population dynamics/ weed biology/ literature reviews/ innovation adoption
This citation is from AGRICOLA.

751. **Integrating agricultural nutrient management with environmental objectives: Current state and future prospects.**
Powlson, D. S. and Fertiliser Society.
York: Fertiliser Society; 44 p.: ill.; Series: Proceedings (Fertiliser Society of London) no. 402. (1997)
Notes: "Paper presented to the Fertiliser Society in Cambridge, on the 11th December 1997." Includes bibliographical references (p. 33-42).
NAL Call #: 57.9-F41-no.402;
ISBN: 0853100365
Descriptors: Fertilizer industry---Great Britain---Management/ Soil fertility---Great Britain---Management
This citation is from AGRICOLA.

752. **Integrating hydrogeomorphic and index of biotic integrity approaches for environmental assessment of wetlands.**
Stevenson, R Jan and
Hauer, F Richard
Journal of the North American Benthological Society 21 (3): 502-513. (2002)
NAL Call #: QL141.F7;
ISSN: 0887-3593
Descriptors: environmental assessments/ hydrogeomorphic indexes / index of biotic integrity/ water quality/ wetlands
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753. **Integrating management objectives and grazing strategies on semi-arid rangeland.**
Reece, Patrick E.
Hasting, Neb.: University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Agricultural Research Division, Cooperative Extension; 19 p.: col. ill., col. map; Series: E.C. (University of Nebraska--Lincoln. Cooperative Extension) 00-158. (2001)
Notes: Cover title. Includes bibliographical references (p. 19).
NAL Call #: 275.29-N272Ex-no.-2001-158
This citation is from AGRICOLA.

754. **Integration in orchard pest and habitat management: A review.**
Prokopy, R. J.
Agriculture, Ecosystems and Environment 50 (1): 1-10. (1994)
NAL Call #: S601 .A34;
ISSN: 0167-8809.
Notes: Conference: 19. International Congress of Entomology, Beijing (People's Rep. China), 28 Jun-4 Jul 1992
Descriptors: orchards / biological control/ integrated control/ reviews/ pest control/ Agricultural & general applied entomology/ Control
Abstract: Manipulating the composition of groundcover within orchards and vegetation adjacent to orchards might enhance biological control of orchard arthropod pests. It can also generate effects that may be counter-productive to the overall goals of integrated orchard pest management. Measuring progress toward achieving integration of orchard pest management practices can be viewed as analogous to climbing a step ladder. The first step (equivalent to first-level integrated pest management (IPM) entails the use of ecologically sound multiple management tactics for a single class of pests (either arthropods, diseases, weeds or vertebrates). The second step (second-level IPM) involves integration of multiple management practices across all classes of pests. The third step (third-level IPM) calls for integration of combined pest management approaches with the entire system of crop production. The fourth and top step of the ladder (fourth-level IPM) envisions blending the concerns of all those having a vital interest in pest management: researchers, extension personnel, private consultants, industry, growers, processors and distributors, consumers, neighbors of growers, environmentalists and government regulatory agencies. The probability is high that manipulating orchard groundcover and surrounding vegetation will affect the outcome of strategies and tactics at each of these four levels of integration of pest management practices. Here, examples are given of potential merits and possible shortcomings of orchard habitat manipulation at each level of integration.
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755. **Integration of herbicides with arthropod biocontrol agents for weed control.**
Ainsworth, Nigel
Biocontrol Science and Technology 13 (6): 547-570. (2003);
ISSN: 0958-3157
Descriptors: herbicide: herbicide/ arthropod (Arthropoda): biological control agent/ plant (Plantae): pest/ Animals/ Arthropods/ Invertebrates/ Plants/ oviposition choice/ parasitism/ predation
Abstract: Classical biological control of weeds using arthropods is being attempted on a large scale in a number of countries, sometimes with spectacularly successful outcomes. However, in many cases biocontrol is not completely effective and use of herbicides on weeds continues to occur, either in the presence of biocontrol agents or as an alternative to them. The ways in which the two techniques may interact are discussed, including direct toxicity of herbicides to biocontrol agents, responses to death of host plants and responses to sublethal changes caused by herbicides with different modes of action. A literature review

for selected weed taxa showed that the great majority of publications relate to either chemical or to biological control techniques separately, with integration of the two seldom addressed. Possible reasons for this situation are discussed and some suggestions for future priorities are made.
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756. **Intensive animal production and environmental aspects with special reference to phosphorus.**
Jongbloed, A. W. and Valk, H.
In: Production diseases in farm animals: 10th international conference. (Held 24 Aug 1998-28 Aug 1998 at Utrecht, The Netherlands.) Wensing, T (eds.) Wageningen, The Netherlands: Wageningen Pers; pp. 282-295; 1999.
Notes: A review.
This citation is provided courtesy of CAB International/CABI Publishing.

757. **Interactions between forests and herbivores: The role of controlled grazing experiments.**
Hester, A. J.; Edenius, L.; Buttenschon, R. M.; and Kuiters, A. T.
Forestry 73 (4): 381-391. (2000)
NAL Call #: 99.8-F767;
ISSN: 0015-752X [FRSTAH]
Descriptors: forests/ herbivores/ grazing/ grazing trials/ forest management/ browsing/ wild animals/ botanical composition/ grazing intensity/ recruitment/ forest trees/ species differences/ biomass production/ vegetation/ literature reviews
This citation is from AGRICOLA.

758. **Interactions between weeds, arthropod pests, and their natural enemies in managed ecosystems.**
Norris, R. F. and Kogan, M.
Weed Science 48 (1): 94-158. (2000)
NAL Call #: 79.8-W41;
ISSN: 0043-1745
This citation is provided courtesy of CAB International/CABI Publishing.

759. **Interactions of pesticides and metal ions with soils: Unifying concepts.**
Gamble, D. S.; Langford, C. H.; and Barrie Webster, G. R.
Reviews of Environmental Contamination and Toxicology 135: 63-91. (1994)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: soil/ pesticides/ metal ions/ interactions/ literature reviews
This citation is from AGRICOLA.

760. **Interagency rangeland water erosion project report and state data summaries: NRST's rainfall simulation sites.**
Franks, Carol D. and United States. Natural Resources Conservation Service.
Lincoln, NE: U.S. Dept. of Agriculture, Agricultural Research Service, Natural Resources Conservation Service; iii, 121 p.: col. maps; Series: NWRC 98-1. (1998)
Notes: Original title: Interagency rangeland water erosion project report and state data summaries: Interagency Rangeland Water Erosion Team (IRWET) and National Range Study Team (NRST): NRST's rainfall simulation sites; "August 1998"--Cover. Includes bibliographical references (p. 117-121).
NAL Call #: aGB701-.I57-1998
Descriptors: Hydrology, Rangeland---United States---States/ Rain and rainfall---United States---States/ Range ecology---United States---States/ Erosion---United States---States
This citation is from AGRICOLA.

761. **Intercropping and Pest Management: A Review of Major Concepts.**
Smith, H. A. and McSorley, R.
American Entomologist 46 (3): 154-161. (2000)
NAL Call #: QL461.A52;
ISSN: 1046-2821
Descriptors: Crop production (intercropping)/ Agricultural practices/ Pest control/ Arthropoda/ Agricultural & general applied entomology
Abstract: The misconception persists that crop diversity in itself reduces pest damage. The key to managing pests through polyculture may lie in the specifics of arthropod behavior and arthropod-plant relations.
© Cambridge Scientific Abstracts (CSA)

762. **Intercropping in field vegetable crops: Pest management by agrosystem diversification: An overview.**
Theunissen, J.
Pesticide Science 42 (1): 65-68. (Sept. 1994)
NAL Call #: SB951.P47;
ISSN: 0031-613X [PSSCBG].
Notes: Paper presented at the symposium, "Farming for the Environment", March 15, 1994, London, England.
Includes references.
Descriptors: intercropping/ vegetables/ pest management/ low input agriculture/ sustainability
Abstract: Intercropping field vegetables with other species such as clovers shows insect pest suppression which may make chemical control unnecessary. Examples are given to illustrate these effects and the underlying mechanisms are discussed. Intercropping fits into environmentally acceptable and sustainable vegetable-producing practices. Both economic and ecological conditions must be fulfilled before intercropping-based commercial production methods can be developed.
This citation is from AGRICOLA.

763. **Interior wetlands of the United States: A review of wetland status, general ecology, biodiversity, and management.**
Giudice, John H.; Ratti, John T.; United States. Army. Corps of Engineers; U.S. Army Engineer Waterways Experiment Station; and Wetlands Research Program (U.S.).
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; 156 p. in various pagings: ill.; Series: Wetlands Research Program technical report WRP-SM-9. (1995)
Notes: "November 1995." Includes bibliographical references (p. 100-132).
NAL Call #: QH76.G58-1995
Descriptors: Biological diversity conservation---United States/ Ecosystem management---United States/ Wetlands---United States
This citation is from AGRICOLA.

764. **Interpretation and analysis of complex environmental data using chemometric methods.**
Wenning, Richard J and Erickson, Gerald A
Trends in Analytical Chemistry 13 (10): 446-457. (1994)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: human (Hominidae)/ Plantae (Plantae Unspecified)/ animals/ chordates/ humans/ mammals/ plants/ primates/ vertebrates/ air pollution/ analytical method/ anthropogenic contaminant distribution/ biological tissue/ contaminated sediment/ forest

productivity/ industrial waste management/ petroleum pollution/ plant productivity/ rainwater/ water quality

765. **Interpreting indicators of rangeland health: Version 3.**
Pellant, Michael L.; National Science and Technology Center (U.S.), Information and Communications Staff; United States. Bureau of Land Management; United States. Natural Resources Conservation Service; and United States. Agricultural Research Service. Forest and Rangeland Ecosystem Science Center (U.S.).
Denver, Colo.: United States Department of the Interior, Bureau of Land Management, National Science and Technology Center, Information and Communications Group, 2000. iv, 118 p.: ill. (some col.), forms. (2000)
Notes: "Nov. 2000"--Report documentation p. "BLM/WO/ST-00/001+1734"--P. [2] of cover. Produced by interagency coordination among "the Bureau of Land Management (BLM), the Natural Resources Conservation Service (NRCS), the Agricultural Research Service (ARS), and the USGS Forest and Rangeland Ecosystem Science Center"--P. i. Also issued as a chapter in: Defining and assessing soil quality / health on rangelands. Includes bibliographical references (p. 43-48). SUDOCS: I 53.35:1734-06.
NAL Call #: SF85.3-.I583-2000
ftp://ftp-fc.sc.egov.usda.gov/GLTI/technical/publications/range-health-indicate.pdf
Descriptors: Range management---United States/ Rangelands---United States/ Range ecology---United States / Environmental monitoring---United States / Ecological integrity---United States/ Soil stabilization---United States
This citation is from AGRICOLA.

766. **Intraguild predation among biological-control agents: Theory and evidence.**
Rosenheim, Jay A; Kaya, Harry K; Ehler, Lester E; Marois, James J; and Jaffee, Bruce A
Biological Control 5 (3): 303-335. (1995);
ISSN: 1049-9644
Descriptors: Parasitism/ Pest species/ Plant pathogen/ Population dynamics/ Simulation model/ Trophic interactions/ Weed control/ arthropods (Arthropoda Unspecified)/ nematode (Nematoda)/ Arthropoda (Arthropoda Unspecified)/ Plantae (Plantae Unspecified)/ animals/ aschelminths/ helminths/ invertebrates/ plants
Abstract: Theoretical and empirical evidence developed in four subdisciplines of biological control (biocontrol of plant pathogens, weeds, nematodes, and arthropods) is brought to bear upon a shared question: the significance of intraguild predation. Intraguild predation ("IGP") occurs when two species that share a host or prey (and therefore may compete) also engage in a trophic interaction with each other (parasitism or predation). We describe the prevalence of IGP and its role in the population dynamics of biological-control agents and target pests. IGP is a widespread interaction within many, but not all, communities of biological-control agents. IGP appears to be pervasive among communities of control agents associated with nematode or arthropod pests. Common forms of IGP include pathogens that infect both herbivores and parasitoids of the herbivore; facultative hyperparasitoids, which can parasitize either an herbivore or a primary parasitoid of the herbivore; predators that attack herbivores that harbor a developing parasitoid; and predators that attack each other. In contrast, IGP appears to be relatively uncommon among biological-control agents of plant pathogens because trophic interactions are less important than competition or antibiosis. Likewise, biological-control agents of weeds interact primarily through competition alone because host ranges are mostly restricted to plant taxa. Empirically based simulation models and general analytical models of interactions involving arthropod pathogens or facultative hyperparasitoids yield variable and often conflicting predictions for the influence of IGP on the success of biological control. Models for predator-predator interactions, however, consistently predict that IGP disrupts biological control. All the field-documented cases of IGP leading to disruption of biological control stem from studies of predators, including mites, insects, and predatory fishes. IGP between two predators or between a predator and an adult parasitoid does not require mortality of the shared prey/host (i.e., the target pest); thus, IGP can be intense, resulting in high levels of mortality for one or both of the natural enemies, while the total mortality imposed on the target pest population is minimal. For this reason, we hypothesize that IGP by predators is particularly likely to influence the efficacy of biological control. Our ability to develop successful programs of biological control will be enhanced by field studies that address the complexity of trophic interactions occurring in agroecosystems. There is a critical need for additional manipulative experiments conducted in the field that test not only population ecology theory for two-species interactions, but also community ecology theory for multispecies interactions.

767. **An introduction and user's guide to wetland restoration, creation, and enhancement.**
Interagency Workgroup on Wetland Restoration.
U.S. Environmental Protection Agency, 2003 (application/pdf)
http://www.epa.gov/owow/wetlands/restdocfinal.pdf
Descriptors: wetlands / constructed wetlands/ ecological restoration/ monitoring/ wildlife habitats

768. **Introduction: Ecosystem research in a human context.**
Finch, D. M. and Tainter, J. A.
In: Ecology, diversity, and sustainability of the Middle Rio Grande Basin; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 1995. pp. 1-11.
NAL Call #: aSD11.A42-no.268
Descriptors: ecosystems/ rivers/ watersheds/ history/ natural resources/ vegetation/ ecotones/ biodiversity/ land use/ water resources/ resource management/ ecology/ upland areas/ runoff/ social values/ land management/ literature reviews/ New Mexico/ Colorado/ Texas/ Mexico
This citation is from AGRICOLA.

769. **Invasive weeds in rangelands: Species, impacts, and management.**
DiTomaso, J. M.
Weed Science 48 (2): 255-265. (Mar. 2000-Apr. 2000)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: rangelands/ pastures/ bromus tectorum/ centaurea diffusa/

centaurea maculosa/ centaurea solstitialis/ euphorbia esula/ species diversity/ weed control/ integrated pest management/ grasslands/ annuals/ invasion/ economic analysis/ livestock/ forage/ yields/ nutritive value/ grazing/ costs/ land prices/ wildlife/ grassland management/ ecosystems/ weeds/ landscape/ education/ literature reviews/ range management

Abstract: Rangeland and pastures comprise about 42% of the total land area of the United States. About three-quarters of all domestic livestock depend upon grazing lands for survival. Many ranges have had domestic stock grazing for more than 100 years and, as a result, the plant composition has changed greatly from the original ecosystems. Western rangelands previously dominated by perennial bunchgrasses have been converted, primarily through overgrazing, to annual grasslands that are susceptible to invasion by introduced dicots. Today there are more than 300 rangeland weeds in the United States. Some of the most problematic include Bromus tectorum, Euphorbia esula, Centaurea solstitialis, C. diffusa, C. maculosa, and a number of other Centaurea species. In total, weeds in rangeland cause an estimated loss of $2 billion annually in the United States, which is more than all other pests combined. They impact the livestock industry by lowering yield and quality of forage, interfering with grazing, poisoning animals, increasing costs of managing and producing livestock, and reducing land value. They also impact wildlife habitat and forage, deplete soil and water resources, and reduce plant and animal diversity. Numerous mechanical and cultural control options have been developed to manage noxious rangeland weeds, including mowing, prescribed burning, timely grazing, and perennial grass reseeding or interseeding. In addition, several herbicides are registered for use on rangelands and most biological control programs focus on noxious rangeland weed control. Successful management of noxious weeds on rangeland will require the development of a long-term strategic plan incorporating prevention programs, education materials. and activities, and economical and sustainable multi-year integrated approaches that improve degraded rangeland communities, enhance the utility of the ecosystem, and prevent reinvasion or encroachment by other noxious weed species.
This citation is from AGRICOLA.

770. **Invasiveness in Wetland Plants in Temperate North America.**
Galatowitsch, S. M.; Anderson, N. O.; and Ascher, P. D.
Wetlands 19 (4): 733-755. (1999)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212.
Notes: Conference: Temperate Wetlands Restoration Workshop, Barrie, ON (Canada), 27 Nov-1 Dec 1995; Publisher: Society of Wetlands Scientists, Box 1897 Lawrence KS 66044 USA, [URL:http://www.sws.org/wetlands/journalsearch.html]
Descriptors: North America/ Exotic Species/ Wetlands/ Vegetation/ Literature Review/ Hydrology/ Salinity / Introduced species/ Vegetation patterns/ Growth/ Herbivores/ Hybridization/ Ecosystem disturbance/ Plant populations/ Salinity effects/ Temperate zones/ Phragmites australis/ Typha glauca/ Lythrum salicaria/ Myriophyllum spicatum/ Phalaris arundinacea/ North America/ invasive taxa/ Water and plants/ Wetlands/ Habitat community studies/ Mechanical and natural changes/ Geographical distribution

Abstract: The spread of invasive taxa, including Lythrum salicaria, Typha X glauca, Myriophyllum spicatum, Phalaris arundinacea, and Phragmites australis, has dramatically changed the vegetation of many wetlands of North America. Three theories have been advanced to explain the nature of plant invasiveness. Aggressive growth during geographic expansion could result because 1) growth is more favorable under new environmental conditions than those of resident locales (environmental constraints hypothesis); 2) herbivores may be absent in the new locale, resulting in selection of genotypes with improved competitive ability and reduced allocation to herbivore defenses (evolution of increased competitive ability hypothesis); and 3) interspecific hybridization occurred between a new taxon and one existing in an area, resulting in novel phenotypes with selective advantages in disturbed sites or phenotypes that can grow under conditions not favorable for either parent (introgression/hybrid speciation hypothesis). A review of published literature found few studies that compare the growth and dynamics of invasive populations in their new range versus those in historic ranges. However, there is evidence that hydrologic alterations could facilitate invasions by Typha X glauca and Phalaris arundinacea and that increased salinity promoted spread of Typha angustifolia (parental taxon) and Phragmites australis. The potential for reduced herbivory causing aggressive growth is greatest for Lythrum salicaria. Introgressive hybridization is potentially a cause of invasiveness for all five species but has been established only for Typha X glauca and Lythrum salicaria.

771. **Inventory of U.S. greenhouse gas emissions and sinks, 1990-1994.**
United States. Environmental Protection Agency. Office of Policy, Planning and Evaluation.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Policy, Planning, and Evaluation; 1 v. (various pagings): ill. (some col.), map. (1995)
Notes: Shipping list no.: 96-0202-P. "November 1995." "EPA-230-R-96-006"--Cover. Includes bibliographical references (R-1 - R-12). SUDOCS: EP 1.2:G 83/2.
NAL Call #: QC912.3.I58--1995
Descriptors: Greenhouse effect, Atmospheric---United States/ Atmospheric carbon dioxide---United States/ Greenhouse gases---United States
This citation is from AGRICOLA.

772. **Invertebrates in freshwater wetlands of North America: Ecology and management.**
Batzer, Darold P.; Rader, Russell Ben.; and Wissinger, Scott A.
New York: J. Wiley; xviii, 1100 p.: ill. (1999)
NAL Call #: QL365.4.A1I58-1999;
ISBN: 0471292583
Descriptors: Freshwater invertebrates---Ecology---North America/ Wetland ecology---North America/ Wetlands---North America/ Wildlife conservation---North America
This citation is from AGRICOLA.

773. **Investing in ecosystems and communities.**
Luzadis, V. A.; Alkire, C.; Mater, C. M.; Romm, J.; Stewart, W.; Wills, L.; and Vaagen, D. R.
Journal of Sustainable Forestry 12 (3/4): 169-194. (2001)
NAL Call #: SD387.S87J68;
ISSN: 1054-9811.
Notes: In the special issue: Understanding community-based forest ecosystem management, Part I / edited by G.J. Gray, M.J. Enzer, and J. Kusel. Paper presented at a workshop held June 23-38, 1998, Bend, Oregon, USA.
Includes references.
Descriptors: community forestry/ forest management/ forest ecology/ ecosystems/ investment/ communities/ population growth/ international trade/ literature reviews
This citation is from AGRICOLA.

774. **IPM: Approaches and prospects.**
Parrella, M. P.
NATO ASI Series: Series A, Life Sciences 276: 357-363. (1995)
NAL Call #: QH301.N32;
ISSN: 0258-1213 [NALSDJ].
Notes: In the series analytic: Thrips biology and management / edited by B. L. Parker, M. Skinner and T. Lewis. Proceedings of a NATO Advanced Research Workshop on "Thysanoptera: Towards Understanding Thrips Management" held September 28-30, 1993, Burlington, Vermont.
Includes references.
Descriptors: thysanoptera/ integrated pest management/ insect control/ frankliniella occidentalis/ ornamental plants/ floriculture/ greenhouse crops/ literature reviews
This citation is from AGRICOLA.

775. **IPM handbook for golf courses.**
Schumann, Gail L.
Chelsea, Mich.: Ann Arbor Press; vii, 264 p.: ill. (some col.). (1998)
NAL Call #: GV975.5.I75-1998;
ISBN: 1575040654
Descriptors: Golf courses---United States---Management---Handbooks, manuals, etc/ Pests Control---United States---Handbooks, manuals, etc
This citation is from AGRICOLA.

776. **IPM: What has it delivered?**
Harris, M. K.
Plant Disease 85 (2): 112-121. (2001)
NAL Call #: 1.9-P69P;
ISSN: 0191-2917 [PLDIDE]
Descriptors: gossypium hirsutum/ integrated pest management/ history/ costs/ application rates/ phenology/ crop yield/ natural enemies/ pest resistance/ economic analysis/ coevolution/ crop management/ insecticides/ literature reviews / Texas
This citation is from AGRICOLA.

777. **Irrigated agriculture and the environment.**
Shortle, J. S. and Griffin, Ronald C.
Cheltenham, UK; Northampton, MA: Edward Elgar; xix, 272 p.: ill., maps; Series: Management of water resources 1 (An Elgar reference collection). (2001)
NAL Call #: S613-.I66-2001;
ISBN: 1840645032
Descriptors: Irrigation farming/ Irrigation farming---Environmental aspects/ Water quality management/ Irrigation farming---United States/ Irrigation farming---Environmental aspects---United States/ Water quality management---United States
This citation is from AGRICOLA.

778. **Irrigation and drainage reference manual.**
Mulcahy, Sue.; Schroen, James.; and Target 10 Water On Water Off Working Group.
Victoria, Autstralia: Target 10 Water On Water Off Working Group; 1 v. (various pagings): ill. (1993)
Notes: Cover title. At head of title: Target 10. "September 1993."
NAL Call #: S616.A8I76--1993
Descriptors: Irrigation---Australia---Victoria---Handbooks, manuals, etc/ Drainage---Australia---Victoria---Handbooks, manuals, etc
This citation is from AGRICOLA.

779. **Irrigation drainage: International and national perspectives.**
Hooja, Rakesh.; Mundra, S. N.; Ram, Sewa.; and Rajasthan Agricultural Drainage Research Project, National Seminar on Subsurface Drainage
Udaipur, India: Agro Tech Pub. Academy; 424 p.: maps. (2000)
Notes: Papers presented in the National Seminar on Subsurface Drainage organized by Rajasthan Agricultural Drainage Research Project at Jaipur, India in May 1995; also includes papers from other seminars and publications.
NAL Call #: TC803-.I77-2000;
ISBN: 818568037X
Descriptors: Irrigation---Congresses/ Drainage---Congresses
This citation is from AGRICOLA.

780. **Irrigation-induced contamination of water, sediment, and biota in the Western United States: Synthesis of data from the National Irrigation Water Quality Program.**
Seiler, R. L.
Denver, CO: U.S. Dept. of the Interior, U.S. Geological Survey; vi, 123 p.: ill., maps (some col.); 28 cm. (2003)
Notes: U.S. Geological Survey professional paper 1655
NAL Call #: 407 G29Pr no. 1655
http://water.usgs.gov/pubs/pp/pp1655/pp1655_v1.1.pdf
Descriptors: Selenium---Environmental aspects---West (United States)/ Irrigation---Environmental aspects---West (United States)/ Geographic information systems---West (United States)
This citation is from AGRICOLA.

781. **Irrigation management under water scarcity.**
Pereira, Luis Santos; Oweis, Theib; and Zairi, Abdelaziz
Agricultural Water Management 57 (3): 175-206. (2002)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: agricultural production/ aridity/ desertification/ drought/ irrigation performances/ saline water usage/ wastewater usage/ water scarcity: environmental impact, health impact/ water shortage
Abstract: The use of water for agricultural production in water scarcity regions requires innovative and sustainable research, and an appropriate transfer of technologies. This paper discusses some of these aspects, mainly relative to on-farm irrigation management including the use of treated wastewater and saline waters. First, the paper proposes some concepts relative to water scarcity, concerning aridity, drought, desertification and water shortage, as well as policies to cope with these water stressed regimes. Conceptual approaches on irrigation performances, water use and water savings are reviewed in a wide perspective. This is followed by a discussion of supply management to cope with water scarcity, giving particular attention to the use of wastewater and low-quality waters, including the respective impacts on

health and the environment as water scarcity is requiring that waters of inferior quality be increasingly used for irrigation. The paper then focuses on demand management, starting with aspects relating to the improvement of irrigation methods and the respective performances, mainly the distribution uniformity (DU) as a fundamental tool to reduce the demand for water at the farm level, and to control the negative environmental impacts of over-irrigation, including salt stressed areas. Discussions are supported by recent research results. The suitability of irrigation methods for using treated wastewaters and saline waters is analysed. Supplemental irrigation (SI) and deficit irrigation strategies are also discussed, including limitations on the applicability of related practices. The paper also identifies the need to adopt emerging technologies for water management as well as to develop appropriate methodologies for the analysis of social, economic, and environmental benefits of improved irrigation management.

782. **Irrigation performance indicators based on remotely sensed data: A review of literature.**
Bastiaanssen, W. G. M. and Bos, M. G.
Irrigation and Drainage Systems 13 (4): 291-311. (1999)
NAL Call #: TC801.I66;
ISSN: 0168-6291 [IRDSEG]
Descriptors: irrigation/ performance/ irrigation water/ water flow/ irrigation channels/ remote sensing/ crops/ irrigated soils/ evapotranspiration/ satellite surveys/ irrigated sites/ irrigated farming/ evaporation/ transpiration/ vegetation/ literature reviews
Abstract: The earlier generation of irrigation performance indicators was based on canal flow data. Commonly, they quantify performance in a command area downstream of a discharge measurement device. Remote sensing determinants, such as actual evapo-transpiration, soil water content and crop growth reflect the overall water utilization at a range of scales, up to field level. Crop evapo-transpiration includes water originating from irrigation supply, water from precipitation, groundwater and water withdrawn from the unsaturated zone. Hence, this is a refinement in spatial scale as compared to the classically collected flow measurements, and describes moreover depletion from all water resources. If these possibilities are well implemented, we expect that a new generation of irrigation performance indicators can be quantified in a cost-effective manner. Especially, because satellite measurements pave a way to standardize data collection between different irrigation schemes and among different countries at costs which are currently decreasing. These challenges can only turn into a success if irrigation managers are involved in pilot projects and demonstration studies exploring satellite data.
This citation is from AGRICOLA.

783. **Irrigation with sewage effluents: The Israeli experience.**
Avnimelech, Yoram
Environmental Science and Technology 27 (7): 1278-1281. (1993)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: plant (Plantae Unspecified)/ Hominidae (Hominidae)/ Plantae (Plantae Unspecified)/ animals/ chordates/ humans/ mammals/ plants/ primates/ vertebrates/ activated sludge/ agriculture/ heavy metals/ human consumption/ organic pollution/ wastewater recycling

784. **Is an enhanced soil biological community, relative to conventional neighbours, a consistent feature of alternative (organic and biodynamic) agricultural systems.**
Ryan, M.
Biological Agriculture and Horticulture 17 (2): 131-144. (1999)
NAL Call #: S605.5.B5;
ISSN: 0144-8765 [BIAHDP]
Descriptors: farms/ soil fertility/ alternative farming/ farming systems/ soil biology/ communities/ fertilizers/ composts/ manures/ minerals/ growth/ green manures/ legumes/ soil flora/ microbial flora/ soil fauna/ plant pathogenic fungi/ symbionts/ nutrient uptake/ case studies/ data analysis/ literature reviews/ Australia
This citation is from AGRICOLA.

785. **Is the productivity of organic farms restricted by the supply of available nitrogen?**
Berry, P M; Sylvester, Bradley R; Philipps, L; Hatch, D J; Cuttle, S P; Rayns, F W; and Gosling, P
Soil Use and Management 65 ([supplement]): 181-192. (2002)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: carbon/ nitrogen: availability dynamics, available supply, mineralization, nutrient/ crop (Angiospermae): major growth phases/ Angiosperms/ Plants/ Spermatophytes/ Vascular Plants / carbon:nitrogen ratio/ case study data/ cash crop residues: application timing, mineralization rates, nitrogen content, soil incorporation/ leys: application timing, soil incorporation/ literature data/ organic farms: productivity limitations/ sustainability/ uncomposted manure: application timing, soil incorporation
Abstract: This paper reviews information from the literature and case studies to investigate whether productivity in organic systems is restricted by the supply of available N during the major phases of crop growth. Organic systems have the potential to supply adequate amounts of available N to meet crop demand through the incorporation of leys, N rich cash crop residues and uncomposted manures. However, this is seldom achieved because leys are only incorporated once every few years and organically produced crop residues and manures tend to have low N contents and slow mineralization rates. N availability could be improved by delaying ley incorporation until spring, applying uncomposted manures at the start of spring growth, transferring some manure applications from the ley phase to arable crops, preventing cover crops from reaching a wide C:N ratio and better matching crop type with the dynamics of N availability.

786. **Issues in the economics of pesticide use in agriculture: A review of the empirical evidence.**
Fernandez Cornejo, J.; Jans, S.; and Smith, M.
Review of Agricultural Economics 20 (2): 462-488. (Fall 1998-Winter 1998)
NAL Call #: HD1773.A3N6;
ISSN: 1058-7195
Descriptors: pesticides/ use value/ application rates/ economic impact/

regulations/ pest management/ productivity/ crop yield/ losses/ cost benefit analysis/ elasticities/ integrated pest management/ maize/ soybeans/ wheat/ cotton/ rice/ peanuts/ sorghum/ United States/ pesticide productivity
This citation is from AGRICOLA.

787. **Keeping science in environmental regulations: The role of the animal scientist.**
Powers, W. J.
Journal of Dairy Science 86 (4): 1045-1051. (2003)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

788. **Killing cover crops mechanically: Review of recent literature and assessment of new research results.**
Creamer, N. G. and Dabney, S. M.
American Journal of Alternative Agriculture 17 (1): 32-40. (2002)
NAL Call #: S605.5.A43;
ISSN: 0889-1893
This citation is provided courtesy of CAB International/CABI Publishing.

789. **Kinetic constraints on the loss of organic chemicals from contaminated soils: Implications for soil-quality limits.**
Beck, Angus J; Wilson, Susan C; Alcock, Ruth E; and Jones, Kevin C
Critical Reviews in Environmental Science and Technology
25 (1): 1-43. (1995)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: biphenyls/ Hominidae (Hominidae)/ Plantae (Plantae Unspecified)/ animals/ chordates/ humans/ mammals/ plants/ primates/ vertebrates/ diffusion/ human exposure/ pesticides/ phytotoxicity/ polychlorinated biphenyls/ polynuclear aromatic hydrocarbons/ remediation/ solvents/ sorption/ volatile aromatic compounds
© Thomson

790. **Land application of agricultural, industrial, and municipal by-products.**
Power, J. F.
Madison, Wis.: Soil Science Society of America; 653 p. (2000)
Notes: Contents note: Chemical, physical, and biological characteristics of agricultural and forest by-products for land application / J.H. Edwards and Arun V. Someshwar -- Description of food processing by-products / Allen V. Barker, Tara A. O'Brien, and Margie L. Stratton -- Characterization of industrial by-products / D.M. Miller ... [et al.] -- Quantities, characteristics, barriers, and incentives for use of organic municipal by-products / Richard M. Kashmanian ... [et al.] -- Soil and by-product characteristics that impact the beneficial use of by-products / Allen V. Barker, Margie L. Stratton, and Jack E. Rechcigl -- Sustainable use of by-products in land management / Leslie R. Cooperband -- Assessing the impacts of agricultural, municipal, and industrial by-products on soil quality / J. Thomas Sims and Gary M. Pierzynski -- Potential impact of land application of by-products on ground and surface water quality / William F. Ritter -- Odor and other air quality issues associated with organic and inorganic by-products / P.D. Millner and L.L. McConnell -- Composting and beneficial utilization of composted by-product materials / Harold M. Keener, Warren A. Dick, and Harry A.J. Hoitink -- Combining by-products to achieve specific soil amendment objectives / S. Brown and R.L. Chaney -- Estimating the benefits of agricultural use of municipal, animal, and industrial by-products / Wen-Yuan Huang and Yao-Chi Lu -- Examples and case studies of beneficial reuse of beef cattle by-products / B.A. Stewart, C.A. Robinson, and David B. Parker -- Liquid dairy manure utilization in a cropping system: A case study / Deanne Meyer and Lawrence J. Schwankl -- Beneficial use of poultry by-products: Challenges and opportunities / Miguel L. Cabrera and J. Thomas Sims -- Beneficial uses of swine by-products: Opportunities for the future / Robert L. Mikkelsen -- Examples and case studies of beneficial reuse.
NAL Call #: S633-.L364-2000;
ISBN: 0891188347
Descriptors: Fertilizers---Environmental aspects/ Factory and trade waste as fertilizer/ Waste products as fertilizer/ Agricultural wastes---Recycling---Environmental aspects
This citation is from AGRICOLA.

791. **Land application of manure for beneficial resuse.**
Risse, L. M.; Cabrera, M. L.; Franzluebber, A. K.; Gaskin, J. W.; Gilley, J. E.; Killorn, R.; Radcliffe, D. E.; Tollner, W. E.; and Zhang, H
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

792. **Land quality indicators: Research plan.**
Dumanski, J. and Pieri, C.
Agriculture, Ecosystems and Environment 81 (2): 93-102. (Oct. 2000)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Indicators of land quality and sustainable land management / edited by J. Dumanski. Paper presented at a symposium held August 1998, Montpellier, France. Includes references.
Descriptors: land management/ quality/ environmental degradation/ monitoring/ land use/ indicators/ decision making/ economic indicators/ social indicators/ air quality/ water quality/ environment/ crop yield/ environmental management/ literature reviews
Abstract: Indicators of land quality (LQIs) are being developed as a means to better coordinate actions on land related issues, such as land degradation. Economic and social indicators are already in regular use to support decision making at global, national and sub-national levels and in some cases for air and water quality, but few such indicators are available to assess, monitor and evaluate changes in the quality of land resources. Land refers not just to soil but to the combined resources of terrain, water, soil and biotic resources that provide the basis for land use. Land quality refers to the condition of land relative to the requirements of land use, including agricultural production, forestry, conservation, and environmental management. The LQI program addresses the dual objectives of environmental monitoring as well as sector performance monitoring for

managed ecosystems (agriculture, forestry conservation and environmental management). The primary research issue in the LQI program is the development of indicators that identify and characterize the impact(s) of human interventions on the landscape for the major agroecological zones of tropical, sub-tropical and temperate environments. Core LQIs identified for immediate development are: nutrient balance, yield gap, land use intensity and diversity, and land cover; LQIs requiring longer term research include: soil quality, land degradation, and agro-biodiversity; LQIs being developed by other authoritative groups include: water quality, forestland quality, rangeland quality and land contamination/pollution.
This citation is from AGRICOLA.

793. **Land-use characterization for nutrient and sediment risk assessment.**
Valk, Arnoud van der; United States. Environmental Protection Agency. Health and Ecological Criteria Division.; United States. Environmental Protection Agency. Wetlands Division.; and United States. Environmental Protection Agency. Office of Water.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2003.
Notes: Original title: Land use characterization for nutrient and sediment risk assessment #17; Title from web page. "March 2002." Prepared jointly by: the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetland Division (Office of Wetlands, Oceans, and Watersheds). "EPA-822-R-02-025." Description based on content viewed Feb. 28, 2003. Includes bibliographical references.
NAL Call #: QH76.5.N8-V47-2002
http://www.epa.gov/waterscience/criteria/wetlands/17LandUse.pdf
Descriptors: Wetland ecology---Evaluation/ Land use surveys---United States/ Wetland management---United States/ Water quality management---United States
This citation is from AGRICOLA.

794. **Landscape challenges to ecosystem thinking: Creative flood and drought in the American southwest.**
Fisher, Stuart G; Welter, Jill; Schade, John; and Henry, Julia
Scientia Marina 65 (2 [supplement]): 181-192. (2001);
ISSN: 0214-8358
Descriptors: organism (Organisms)/ biogeochemistry/ black box rates/ climate change/ conceptual challenges/ dimensionality/ droughts/ ecosystem functioning/ ecosystem science/ environmental heterogeneity/ floods/ hierarchical structures/ landscape science/ nutrient dynamics/ research objectives/ riparian ecosystems/ sandbars/ spatial patterns/ stream ecology/ system scales
Abstract: Stream ecology is undergoing a transition from ecosystem to landscape science. This change is reflected in many studies; work at Sycamore Creek in Arizona will be used to illustrate the challenges of this transition and several applications. Conceptual challenges involve clear determination of the organization of research objectives. Ecosystem science is largely concerned with how things work while landscape ecology focuses on the influence of spatial pattern and heterogeneity on system functioning. Questions of system scale, hierarchical structure, dimensionality, and currency must be resolved in order to productively execute research objectives. The new stream ecology is more integrative, more realistic spatially, deals with streams at a larger scale, and treats them as branched system more than former approaches. At Sycamore Creek, studies of sand bar patches and their influence on organisms and nutrient cycling illustrate how variations in patch shape and configuration can alter system outputs. Beyond sandbars, inclusion of riparian zones as integral parts of streams produces a more coherent view of nutrient dynamics than previous studies that began at the water's edge. Integration of streams with the landscape they drain requires that streams be viewed as branched structures, not linear systems. This view in ecology is in its infancy but it provides an opportunity to identify processing hot spots along flow paths and to reveal presumptive effects of climate change in terms of spatial shifts in biogeochemical activity rather than black-box rate changes.
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795. **Landscape cohesion: An index for the conservation potential of landscapes for biodiversity.**
Opdam, P.; Verboom, J.; and Pouwels, R.
Landscape Ecology 18 (2): 113-126. (2003)
NAL Call #: QH541.15.L35L36;
ISSN: 0921-2973.
Notes: Number of References: 72
Descriptors: Environment/ Ecology/ biodiversity/ habitat fragmentation/ landscape cohesion/ landscape indices/ landscape planning/ metapopulation persistence/ network cohesion/ spatial cohesion/ habitat fragmentation/ agricultural landscape/ metapopulations/ populations/ connectivity/ birds/ survival/ reserves/ dynamics/ woodland
Abstract: In urbanising landscapes, planning for sustainable biodiversity occurs in a context of multifunctional land use. Important conditions for species persistence are habitat quality, the amount and configuration of habitat and the permeability of the landscape matrix. For planning purposes, these determinants should be integrated into simple indicators for spatial conditions of persistence probability. We propose a framework of three related indices. The cohesion index is based on the ecology of metapopulations in a habitat network. We discuss how an indicator for species persistence in such a network could be developed. To translate this network index into an area index, we propose the concept of spatial cohesion. Habitat cohesion and spatial cohesion are defined and measured for single species or, at best, for species profiles. Since species differ in their perception of the same landscape, different species will rate different values of these indices for the same landscape. Because landscapes are rarely planned for single species, we further propose the index of landscape cohesion, which integrates the spatial cohesion indices of different species. Indices based on these concepts can be built into GIS tools for landscape assessment. We illustrate different applications of these indices, and emphasise the

distinction between ecological and political decisions in developing and applying such tools.

796. **A landscape ecology perspective for research, conservation, and management.**
Freemark, K. E.; Dunning, J. B.; Hejl, S. J.; and Probst, J. R.
In: Ecology and management of neotropical migratory birds: A synthesis and review of critical issues/ Martin, T. E. and Finch, D. M.
New York: Oxford University Press, 1995; pp. 381-427.
ISBN: 0-19-508452-7
This citation is provided courtesy of CAB International/CABI Publishing.

797. **Landscape erosion and evolution modeling.**
Harmon, R. S. and Doe, William W.
New York: Kluwer Academic/Plenum Publishers; xxi, 540 p.: ill., maps l computer optical disc (4 3/4 in.). (2001)
NAL Call #: S627.M36-L36-2001;
ISBN: 0306467186
Descriptors: Soil erosion---Mathematical models/ Soil erosion---United States---Mathematical models
This citation is from AGRICOLA.

798. **Landscape fate of nitrate fluxes and emissions in Central Europe. A critical review of concepts, data, and models for transport and retention.**
Haag, D. and Kaupenjohann, M.
Agriculture, Ecosystems and Environment 86 (1): 1-21. (July 2001)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: landscape/ nitrate/ emission/ simulation models/ nitrogen cycle/ agriculture/ ecosystems/ movement in soil/ streams/ metabolism/ ecotones/ drainage/ riparian vegetation/ quantitative analysis/ spatial variation/ denitrification/ nitrous oxide/ literature reviews/ central Europe
Abstract: Agroecosystems are leaky systems emitting nutrients like nitrate, which affect ecosystems on a range of scales. This paper examines the fate of nitrate on the landscape level focussing on how landscape components either facilitate or impede N translocation from the field to the stream (headwater). According to their role in landscape metabolism, two categories of landscape components are distinguished, ecotones/retention compartments and conduits/corridors. Conduits such as macropores, preferential interflow-paths, drainage tiles and streams rapidly relocate nitrate to headwaters. Retention compartments like the capillary fringe/saturated zone and riparian vegetation eliminate N through denitrification. The differential role of compartments is illustrated with quantitative examples from the literature. On the landscape level retention potential for N is spatially variable and quantitatively limited, while its realisation is uncertain. Notwithstanding, the literature indicates that on a watershed basis the bulk of total N input is retained; thus the potential is discussed for the retention of nitrate on different scales, i.e. the field, landscape, regional and global scale. The transitory retention of excess nitrate in soil and subsoil solution, soil organic matter, groundwater and riparian vegetation may delay nitrate discharge to the aquatic system for decades, contributing to the low emission factors on basin scale. The adverse effects arising from denitrification are discussed, presenting data on the emission of nitrous oxide from the entirety of the different landscape compartments. It is concluded that reliance on landscape metabolism and self-purification postpones the problem of global N overload and partially transfers it to the atmosphere. An assessment scheme is presented which in the face of the unpredictability of ecosystem and landscape behaviour is risk oriented (instead of impact oriented). The scheme uses a budget approach, which accounts for the critical role of corridors and considers the scale and scope of N emissions. A conceptual framework for the remediation of N overload is presented which rests on the realisation of cycling principles and zero-emission approaches on all scales of agricultural production and which pleads for regional approaches that transcend sectoral boundaries and take account of overall regional N fluxes.
This citation is from AGRICOLA.

799. **Landscape Indicators of Human Impacts to Riverine Systems.**
Gergel, S. E.; Turner, M. G.; Miller, J. R.; Melack, J. M.; and Stanley, E. H.
Aquatic Sciences 64 (2): 118-128. (2002);
ISSN: 1015-1621
Descriptors: Water Pollution Effects/ Human Population/ Rivers/ Bioindicators/ Ecological Effects/ Hydrology/ Watershed Management/ Man induced effects/ Environmental impact/ Land use/ Catchment area/ Riparian zone/ landscape indicators/ Effects of pollution/ Conservation/ Mechanical and natural changes
Abstract: Detecting human impacts on riverine systems is challenging because of the diverse biological, chemical, hydrological and geophysical components that must be assessed. We briefly review the chemical, biotic, hydrologic and physical habitat assessment approaches commonly used in riverine systems. We then discuss how landscape indicators can be used to assess the status of rivers by quantifying land cover changes in the surrounding catchment, and contrast landscape-level indicators with the more traditionally used approaches. Landscape metrics that describe the amount and arrangement of human-altered land in a catchment provide a direct way to measure human impacts and can be correlated with many traditionally used riverine indicators, such as water chemistry and biotic variables. The spatial pattern of riparian habitats may also be an especially powerful landscape indicator because the variation in length, width, and gaps of riparian buffers influences their effectiveness as nutrient sinks. The width of riparian buffers is also related to the diversity of riparian bird species. Landscape indicators incorporating historical land use may also hold promise for predicting and assessing the status of riverine systems. Importantly, the relationship between an aquatic system attribute and a landscape indicator may be non-linear and thus exhibit threshold responses. This has become especially apparent from landscape indicators quantifying the percent impervious surface (or urban areas) in a watershed, a landscape indicator of hydrologic and geomorphic change.

800. **A landscape level analysis of potential excess nitrogen in East-Central North Carolina, USA.**
Garten, C. T. and Ashwood, T. L.
Water, Air and Soil Pollution 146 (1-4): 3-21. (2003)

NAL Call #: TD172.W36;
ISSN: 0049-6979.
Notes: Number of References: 46; Publisher: Kluwer Academic Publ
Descriptors: Environment/ Ecology/ landscape ecology/ mass balance model/ eutrophication/ environmental health/ water pollution/ harmful algal blooms/ Neuse River estuary/ riparian zones/ United States/ nitrate/ export/ waters/ denitrification/ groundwaters/ phosphorus/ dynamics
Abstract: The objective of this research was to arrive at an assessment of potential excess nitrogen (N) under different land cover categories in the Neuse River Basin (North Carolina, USA) on a seasonal basis. Data on five processes (atmospheric N deposition, fertilization, net soil N mineralization, plant uptake, and denitrification) that contribute to potential excess N under different land cover categories were obtained from a literature review. Factors were also estimated to apportion annual N fluxes among different seasons of the year. Potential excess N was calculated as the difference between inputs to and outputs from an inorganic N pool. If inputs exceeded outputs, then the difference was assumed to represent N at risk of loss from the landscape to surface receiving waters and groundwaters. Land covers that were classified as potential N sources were influenced by soil N inventories and rates of net soil N mineralization (which is a natural process). The results indicated that there are large land areas in the Neuse River Basin that could be classified as either a N source or a N sink. Such areas are potentially sensitive because future changes in land use, or small alterations in N fluxes, could convert areas that are essentially in balance with respect to N biogeochemistry into the N source or N sink category. In this respect, model predictions indicate that the timing of N inputs and outputs on the landscape can be a critical determinant of potential excess N.

801. **A landscape perspective of surface-subsurface hydrological exchanges in river corridors.**
Malard, Florian; Tockner, Klement; Dole, Olivier Marie Jose; and Ward, J V
Freshwater Biology 47 (4): 621-640. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: organic matter/ terminal electron acceptors/ invertebrate (Invertebrata)/ Animals/ Invertebrates/ bed topography/ biodiversity/ biogeochemical processes/ ecological refugia/ flood events/ fluvial action/ ground water/ hyporheic zones/ landscape ecology/ nutrient cycling/ patch shape/ patch size/ river corridors/ sediment permeability/ spatial variations/ streams/ surface-subsurface hydrological exchanges/ water temperature
Abstract: 1. River corridors can be visualised as a three-dimensional mosaic of surface-subsurface exchange patches over multiple spatial scales. Along major flow paths, surface water downwells into the sediment, travels for some distance beneath or along the stream, eventually mixes with ground water, and then returns to the stream. 2. Spatial variations in bed topography and sediment permeability result in a mosaic of patch types (e.g. gravel versus sandy patches) that differ in their hydrological exchange rate with the surface stream. Biogeochemical processes and invertebrate assemblages vary among patch types as a function of the flux of advected channel water that determines the supply of organic matter and terminal electron acceptors. 3. The overall effect of surface-subsurface hydrological exchanges on nutrient cycling and biodiversity in streams not only depends on the proportion of the different patch types, but also on the frequency distribution of patch size and shape. 4. Because nutrients are essentially produced or depleted at the downwelling end of hyporheic flow paths, reach-scale processing rates of nutrients should be greater in stretches with many small patches (e.g. short compact gravel bars) than in stretches with only a few large patches (e.g. large gravel bars). 5. Based on data from the Rhone River, we predict that a reach with many small bars should offer more hyporheic refugia for epigean fauna than a reach containing only a few large gravel bars because benthic organisms accumulate preferentially in sediments located at the upstream and downwelling edge of bars during floods. However, large bars are more stable and may provide the only refugia during severe flood events. 6. In river floodplain systems exhibiting pronounced expansion/contraction cycles, hyporheic assemblages within newly created patches not only depend on the intrinsic characteristics of these patches but also on their life span, hydrological connection with neighbouring patches, and movement patterns of organisms. 7. Empirical and theoretical evidence illustrate how the spatial arrangement of surface-subsurface exchange patches affects heterogeneity in stream nutrient concentration, surface water temperature, and colonisation of dry reaches by invertebrates. 8. Interactions between fluvial action and geomorphic features, resulting from seasonal and episodic flow pulses, alter surface-subsurface exchange pathways and repeatedly modify the configuration of the mosaic, thereby altering the contribution of the hyporheic zone to nutrient transformation and biodiversity in river corridors.

802. **Landscape sensitivity in time and space: An introduction.**
Thomas, Michael F
Catena 42 (2-4): 83-98. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: earth surface systems/ inherited features/ landscape mosaics/ landscape sensitivity/ sediments/ spatial sensitivity/ stratigraphy/ temporal sensitivity
Abstract: Landscape sensitivity may be discussed in terms of the response of landscape systems to perturbation on different time and spatial scales. Unstable systems behave chaotically but may show self organised criticality, while stable systems resist change until threshold values of system parameters are exceeded. Spatial sensitivity is expressed in different rates of change, between landscape components or elements. This leads to divergence between landscape elements, and the inheritance of palaeoforms in present-day landscape mosaics. Temporal sensitivity reflects the magnitude and frequency of individual events nested within patterns of longer term environmental changes occurring on different timescales. The resulting landscape complexity reflects the spatio-temporal sensitivity of earth surface systems over ten orders of scale magnitude. The connectivity within landscapes ensures that site instabilities can be propagated within multievent feedback systems.

Landscapes record their own histories in sediments and soils, but interpretation of event stratigraphy may not be straightforward, while soil profiles can absorb individual events without erosion. Although we are increasingly able to model the present, environmental management is dominantly about conserving inherited properties of landscapes: forests, soils, floodplains, coastlines. Landscape sensitivity for landscape management must, therefore, address not only active, largely nonlinear, environmental systems, but also the mosaics and palimpsests that are the inheritance from past environments.

803. **Landscape variables affecting livestock impacts on water quality in the humid temperate zone.**
Clark, E Ann
Canadian Journal of Plant Science 78 (2): 181-190. (1998)
NAL Call #: 450-C16;
ISSN: 0008-4220
Descriptors: beef cattle (Bovidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ agriculture/ humid temperate zone/ landscape variables/ livestock impacts/ pasture fertility/ riparian ecosystem/ soil conservation/ water conservation/ water quality
Abstract: The potential for impact by grazing livestock on unprotected watercourses may vary with climate, with landscape level factors including the landform within which the pasture is located, with the biophysical characteristics of the water-course itself, and with pasture and grazing management practices. Policies seeking to implement cost-effective measures to protect downstream water quality need to acknowledge large-scale as well as small-scale processes which can moderate or exacerbate potential sources of pollution. Applied and scholarly evidence suggest that unrestricted livestock access accounts for a relatively modest share of watercourse pollution in humid temperate regions, as compared with such watershed-specific factors as leaking septic tanks and confinement feeding systems. A wide variety of evidence suggests that the degree of compatibility of grazing livestock with a healthy riparian ecosystem should be viewed as an hypothesis that is testable on a site-specific basis. Greater understanding of the factors causal to livestock behavior in, and impact on, watercourses may help to better focus preventative and remediation efforts by both producers and policymakers.

804. **Landscapes to Riverscapes: Bridging the Gap between Research and Conservation of Stream Fishes.**
Fausch, K. D.; Torgersen, C. E.; Baxter, C. V.; and Li, H. W.
Bioscience 52 (6): 483-498. (2002)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Publisher: American Institute of Biological Sciences
Descriptors: Scaling/ Population ecology/ Movements/ Research programs/ Management/ Conservation/ Streams/ Reviews/ Fishery management/ Environment management/ River fisheries/ Nature conservation/ Habitat/ freshwater fish/ Fish/ Stock assessment and management
Abstract: In this article we draw together threads of recent theoretical and empirical results to argue for studying and managing lotic fishes and their habitats in the context of riverscapes (a term coined by Ward 1998 for riverine landscapes). We first explore the interface between landscape ecology and stream ecology and incorporate it with ideas from Schlosser (1991, 1995a) to propose a new approach for stream fish ecology that explicitly embraces the continuous, hierarchical, and heterogeneous nature of these linear aquatic habitats. Second, we consider what new empirical data support this view, focusing on the heterogeneous nature of stream habitat at intermediate spatial and temporal scales and the role of fish movement in linking the habitat patches together through time. We then use these ideas to advance five principles for more effective research and conservation of stream fishes. We conclude by identifying emerging challenges in stream fish management that will require integrating information across scales using the riverscape approach that we advocate.

805. **Large-scale headcut erosion testing.**
Robinson, K. M. and Hanson, G. J.
Transactions of the ASAE 38 (2): 429-434. (Mar. 1995-Apr. 1995)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: erosion/ spillways/ damage/ simulation models/ literature reviews/ headcuts
Abstract: The development and movement of gully headcuts can cause major damage in earth emergency spillways. A 1.8-m-wide and 29-m-long flume with 2.4-m-high sidewalls was constructed to perform research on headcut advance. Headcut advance tests were conducted holding discharge, overfall height, and backwater level constant while varying soil properties. Two soil types were examined, and the soil properties were altered by compacting the material in the flume at varying moisture and density conditions. The observed headcut advance rates varied by a factor of more than 100 depending on the placement conditions. By placing a sand layer under the upstream half of the fill, the influence of a sand layer on headcut advance was also examined. Headcut advance and failure mechanics were observed and described.
This citation is from AGRICOLA.

806. **Large wood and fluvial processes.**
Gurnell, A M; Piegay, H; Swanson, F J; and Gregory, S V
Freshwater Biology 47 (4): 601-619. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: climatic regimes/ flow hydraulics/ flow velocity/ fluvial processes/ geomorphology/ hydrology/ mineral transfer/ organic sediment transfer/ physical characteristics/ riparian zones/ river channels: geometry/ river management/ wood: accumulation, breakage, buoyancy, delivery, mobility, morphology, retention, size, storage/ woodland river ecosystems
Abstract: 1. Large wood forms an important component of woodland river ecosystems. The relationship between large wood and the physical characteristics of river systems varies greatly with changes in the tree species of the marginal woodland, the climatic and hydrological regime, the fluvial geomorphological setting and the river and woodland management

context. 2. Research on large wood and fluvial processes over the last 25 years has focussed on three main themes: the effects of wood on flow hydraulics; on the transfer of mineral and organic sediment; and on the geomorphology of river channels. 3. Analogies between wood and mineral sediment transfer processes (supply, mobility and river characteristics that affect retention) are found useful as a framework for synthesising current knowledge on large wood in rivers. 4. An important property of wood is its size when scaled to the size of the river channel. 'Small' channels are defined as those whose width is less than the majority of wood pieces (e.g. width < median wood piece length). 'Medium' channels have widths greater than the size of most wood pieces (e.g. width < upper quartile wood piece length), and 'Large' channels are wider than the length of all of the wood pieces delivered to them. 5. A conceptual framework defined here for evaluating the storage and dynamics of wood in rivers ranks the relative importance of hydrological characteristics (flow regime, sediment transport regime), wood characteristics (piece size, buoyancy, morphological complexity) and geomorphological characteristics (channel width, geomorphological style) in 'Small', 'Medium' and 'Large' rivers. 6. Wood pieces are large in comparison with river size in 'small' rivers, therefore they tend to remain close to where they are delivered to the river and provide important structures in the stream, controlling rather than responding to the hydrological and sediment transfer characteristics of the river. 7. For 'Medium' rivers, the combination of wood length and form becomes critical to the stability of wood within the channel. Wood accumulations form as a result of smaller or more mobile wood pieces accumulating behind key pieces. Wood transport is governed mainly by the flow regime and the buoyancy of the wood. Even quite large wood pieces may require partial burial to give them stability, so enhancing the importance of the sediment transport regime. 8. Wood dynamics in 'Large' rivers vary with the geometry of the channel (slope and channel pattern), which controls the delivery, mobility and breakage of wood, and also the characteristics of the riparian zone, from where the greatest volume of wood is introduced. Wood retention depends on the channel pattern and the distribution of flow velocity. A large amount is stored at the channel margins. The greater the contact between the active channel and the forested floodplain and islands, the greater the quantity of wood that is stored.

807. **Legal Issues Related to Livestock Watering in Federal Grazing Districts.**
Baldwin, P.
Congressional Research Service (CRS) [Also available as: CRS Report for Congress 94-688a], 1994 (text/html)
http://cnie.org/NLE/CRSreports/water/h2o-14.cfm
Descriptors: range management/ rangelands/ livestock production/ grazing management/ water resources/ public water supply/ reservoirs/ water rights/ agricultural law/ environmental law/ public lands/ water policy/ agricultural policy/ United States/ Taylor Grazing Act/ TGA
Abstract: In response to several congressional inquiries on the subject, this Report examines the legal history of livestock watering in federal grazing districts. Little analysis of this history appears to have been done in the past, despite the crucial importance of water to the management of the federal rangelands. Livestock watering has been the subject of a distinct sequence of Congressional enactments that imposed federal policies different from those that pertain to water rights in the context of homesteading and settlement. The Department of the Interior has recently proposed regulations that in part relate to water rights in grazing districts. The proposed regulations also raise the controversial issue of state versus federal authority over the public lands and water.

808. **Legal structures governing animal waste management.**
Centner, T. J.; Lichtenberg, E.; Richardson, J. J.; and Grossman, M. R.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

809. **Legitimizing fluvial ecosystems as users of water: An overview.**
Naiman, Robert J; Bunn, Stuart E; Nilsson, Christer; Petts, Geoff E; Pinay, Gilles; and Thompson, Lisa C
Environmental Management 30 (4): 455-467. (2002)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: aquatic biota evolution/ aquatic ecosystems: topographical uniqueness/ basic ecological principles: effective implementation challenges, effective implementation opportunities/ biodiversity/ biogeochemistry/ catchment scale processes/ climate/ cumulative effects/ ecological processes: evolution/ effective assessment procedures: formulation/ effective monitoring procedures: formulation/ fluvial ecosystems: water use legitimization/ fresh water/ land/ long term ecological vitality maintenance/ multidisciplinary knowledge/ multidisciplinary models/ natural flow regime/ physical processes/ riparian communities/ river biotic community/ river flow regime/ water regime changes: ecological consequences
Abstract: We suggest that fluvial ecosystems are legitimate users of water and that there are basic ecological principles guiding the maintenance of long-term ecological vitality. This article articulates some fundamental relationships between physical and ecological processes, presents basic principles for maintaining the vitality of fluvial ecosystems, identifies several major scientific challenges and opportunities for effective implementation of the basic ecological principles, and acts as an introduction to three specific articles to follow on biodiversity, biogeochemistry, and riparian communities. All the objectives, by necessity, link climate, land, and fresh water. The basic principles proposed are: (1) the natural flow regime shapes the evolution of aquatic biota and ecological processes, (2) every river has a characteristic flow regime and an associated biotic community, and (3) aquatic ecosystems are topographically unique in occupying the lowest position in the landscape, thereby integrating catchment-scale processes. Scientific challenges for

the immediate future relate to quantifying cumulative effects, linking multidisciplinary knowledge and models, and formulating effective monitoring and assessment procedures. Additionally, forecasting the ecological consequences of changing water regimes is a fundamental challenge for science, especially as environmental issues related to fresh waters escalate in the next two to three decades.

810. **Legumes and diversification of the rice-wheat cropping system.**
Lauren JG; Shrestha R; Sattar MA; and Yadav RL
Journal of Crop Production 3 (2): 67-102; 173 ref. (2000)
NAL Call #: SB1.J683
This citation is provided courtesy of CAB International/CABI Publishing.

811. **Lessons learned while extending physiological principles from growth chambers to satellite studies.**
Waring, R. H.
Tree Physiology 18 (8/9): 491-497. (Aug. 1998-Sept. 1998)
NAL Call #: QK475.T74;
ISSN: 0829-318X [TRPHEM].
Notes: In the special issue: Forest at the limit: environmental constraints on forest function / edited by P.J. Dye. Paper presented at a workshop held May 11-17, 1997, Skukuza, Kruger National Park, South Africa. Includes references.
Descriptors: trees/ plant physiology/ forestry/ research/ interdisciplinary research/ management/ ecosystems/ ecology/ plant water relations/ mathematical models/ integrated pest management/ climatic change/ literature reviews
Abstract: Over the last three decades, physiological principles established in laboratory studies have been applied to systems at progressively larger scales and are now firmly merged into the fields of ecology, ecosystem modeling, forest protection, and global change research. To expand the vision of any field requires that scientists from different disciplines build a bridge across the chasm that normally exists between the knowledge bases and perspectives of different fields. Bridges are built most quickly when representatives of different disciplines see the possibility of mutual advantage in collaboration and seek to quickly demonstrate that potential. Usually, however, the process is laborious because approaches and techniques must be modified to address problems at a different level of integration. Successful bridge builders have, almost without exception, established credibility in their own field and have then identified a kindred spirit with similar credentials in another. They usually establish a pilot study that involves apprentices as well as established scientists. If the approach is successful, the younger members of the team often take the lead in further advancements. Managers of large centralized programs should foster interdisciplinary exchange, particularly at times when advancement in one field languishes. To expand collaboration, it is often necessary for scientists to seek common properties that simplify relations across a wide range of biological and physical conditions. This integrative perspective is essential and is fostered by participating in cross-disciplinary workshops and conferences and by reading outside one's field.
This citation is from AGRICOLA.

812. **Lidar remote sensing for ecosystem studies.**
Lefsky, Michael A; Cohen, Warren B; Parker, Geoffrey G; and Harding, David J
Bioscience 52 (1): 19-30. (2002)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: Douglas fir western hemlock forest stands/ aboveground biomass [AGBM]/ canopy surface topology/ coastal erosion/ ecosystem studies/ land topography/ leaf area index [LAI]/ three dimensional plant canopy distribution/ vegetation structure estimation

813. **Linkages among diverse aquatic ecosystems: A neglected field of study.**
Gorham, Eville
In: Freshwater ecosystems: Revitalizing educational programs in limnology.
Washington, D.C.: National Academy Press, 1996; pp. 203-217
http://www.nap.edu/books/0309054435/html/
Descriptors: diverse aquatic ecosystems linkages/ education/ freshwater ecology/ functional couplings/ lakes/ neglected field study/ research/ rivers/ streams/ teaching/ wetlands

814. **Linkages between aquatic sediment biota and life above sediments as potential drivers of biodiversity and ecological processes.**
Palmer, Margaret A; Covich, Alan P; Lake, Sam; Biro, Peter; Brooks, Jacqui J; Cole, Jonathan; Dahm, Cliff; Gibert, Janine; Goedkoop, Willem; Martens, Koen; Verhoeven, Jos; and Bund, Wouter J van de
Bioscience 50 (12): 1062-1075. (2000)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: algae (Algae)/ annelids (Annelida)/ aschelminthes (Helminthes)/ bacteria (Bacteria)/ bivalves (Pelecypoda)/ crustaceans (Crustacea)/ fish (Pisces)/ fungi (Fungi)/ insects (Insecta)/ mites (Acarina)/ plants (Plantae)/ protozoa (Protozoa)/ Algae/ Animals/ Annelids/ Arthropods/ Bacteria/ Chelicerates/ Chordates/ Crustaceans/ Eubacteria/ Fish/ Fungi/ Helminths/ Insects/ Invertebrates/ Microorganisms/ Mollusks/ Nonhuman Vertebrates/ Nonvascular Plants/ Plants/ Protozoans/ Vertebrates/ aquatic sediments/ biological interactions/ chemical interactions/ environmental linkages/ food resources/ habitat degradation/ hydrology/ microbial effects/ physical interactions/ shading effects/ species diversity/ structural effects/ terrestrial ecosystems

815. **Linkages in the landscape. The role of corridors and connectivity in wildlife conservation.**
Bennett, A. F.; x, 254 p. (1999);
ISBN: 2-8317-0221-6
This citation is provided courtesy of CAB International/CABI Publishing.

816. **Linking Actions to Outcomes in Wetland Management: An Overview of U.S. State Wetland Management.**
La Peyre, M. K.; Reams, M. A.; and Mendelssohn, I. A.
Wetlands 21 (1): 66-74. (2001)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: Wetlands / Government policy/ Surveys/ Environment management/ Planning/ Ecology/

Ecosystem management/ Regional planning/ Mapping/ Nature conservation/ Resource conservation/ Environmental protection/ Policies/ Management/ United States/ Government policies/ Resource management/ Land Management/ Environmental Quality/ Resources Management/ State Jurisdiction/ United States/ Assessments/ Resource conservation/ Environmental Law, Regulations & Policy/ Conservation, wildlife management and recreation/ Management / Environmental action/ Evaluation process
Abstract: Despite a national focus on saving wetland systems in the U.S., evaluations of wetland resources and management outcomes have been limited. A fifty-state survey of wetland managers was conducted in order to collect information on (1) wetland resources, (2) management actions taken, and (3) management impact on the resources (wetlands). An overview of the general status of state knowledge of the quantity and quality of their wetland resources is presented. Results indicate that most states have a rough estimate of the resources and most have wetland conservation plans and intend to develop better databases of wetland resources. However, few states track management actions relevant to wetlands and fewer have any idea of the success or impact of past management actions. The ability to assess program effectiveness is key to implementing adaptive management frameworks. A number of lessons learned suggest a basic framework for future wetland management that includes state planning, better quantification (mapping) of wetlands, development of methods to measure wetland quality, and tracking of wetland management actions and outcomes. This framework could also be used as an outline for the development of a more adaptive approach to wetland management.

817. **Linking landscape and water quality in the Mississippi river basin for 200 years.**
Turner, R. E. and Rabalais, N. N.
Bioscience 53 (6): 563-572. (June 2003)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Number of References: 66
Descriptors: Biology/ Mississippi River/ water quality/ agriculture / sustainability/ environmental history/ Gulf of Mexico/ United States/ nitrogen/ nitrate/ hypoxia/ eutrophication/ consequences/ soil/ land
Abstract: Two centuries of land use in the Mississippi River watershed are reflected in the water quality of its streams and in the continental shelf ecosystem receiving its discharge. The most recent influence on nutrient loading-intense and widespread farming and especially fertilizer use-has had a more significant effect on water quality than has land drainage or the conversion of native vegetation to cropland and grazing pastures. The 200-year record of nutrient loading to offshore water is reflected in the paleoreconstructed record of plankton in dated sediments. This record illustrates that the development of fair, sustained management of inland ecosystems is linked to the management of offshore systems. Land use in this fully occupied watershed is under the strong influence of national policies affecting all aspects of the human ecosphere. These policies can be modified for better or worse, but water quality will probably change only gradually because of the strong buffering capacity of the soil ecosystem.

818. **Linking the hydrologic and biogeochemical controls of nitrogen transport in near-stream zones of temperate-forested catchments: A review.**
Cirmo, C. P. and McDonnell, J. J.
Journal of Hydrology 199 (1/2): 88-120. (Dec. 1997)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7]
Descriptors: watersheds/ nitrogen cycle/ forest soils/ transport processes
Abstract: We review the status of research concerning the links between hydrologic flowpaths and the biogeochemical environment controlling Nitrogen cycling and transport in near-stream saturated zones, centering on stream environments of the northern, temperate-forested zone. N retention, transformation and mobilization occur in streamside wetlands, floodplains, riparian zones, seepage faces, and the hyporheic zone. These areas are the focal point in non-point source loading of N to stream channels. They also represent areas where rapid changes in water-table and hydrologic flowpaths occur during rainfall-runoff events. It is the combination of an abrupt change in biogeochemical environment, encountering a hydrologic boundary (the terrestrial/aquatic interface or ecotone), that make the near-stream/saturated zone critical for elucidating controls of N transport and transformation. We review published studies concerning the hydrologic controls of N transport in near-stream zones, and subsequently present several geomorphic and hydrodynamic scenarios relating N biogeochemistry and its response to hydrologic events (of both varying magnitude and seasons). It is at the critical junction between temporal and spatial conditions affecting N cycling in the near-stream zone, that research priorities must now be focused.

819. **Liquid manure application systems conference: Design, management, and environmental assessment (Held December 1-2, 1994 at Rochester, New York.).**
Ithaca, NY: Northeast Regional Agricultural Engineering Service, 1994. iv, 220 p.: ill. NRAES 79.
NAL Call #: S675.N72-no.79
Descriptors: Manure handling/ Manures/ Animal waste/ Organic fertilizers
Abstract: This is the proceedings from the Liquid Manure Application Systems conference that was held in December 1994. It includes twenty-six papers and is divided into five categories: livestock manure systems for the 21st century, design of liquid manure systems, planning environmentally compatible systems, custom application, and managing for economic and environmental sustainability.

820. **Liquid manure application systems design manual.**
Dougherty, Mark.
Ithaca, N.Y. Northeast Regional Agricultural Engineering Service; Series: NRAES 89; 168 p. (1998)
Notes: Includes bibliographical references (p. 162-167).
NAL Call #: S675-.N72-no.89;
ISBN: 0935817247
Descriptors: liquid manure/ fertilizer

application/ application methods/ animal manure management/ manure storage/ odor control
Abstract: The comprehensive guide discusses basic design components -- such as a variety of pumps, pipes, hoses, and irrigation nozzles -- of commonly used liquid manure application systems. Field application methods covered include tankers, hard-hose reel systems, drag hose/soft hose ground application, and center pivot irrigation. The design manual also discusses such management issues as environmental assessment, nutrient management, liquid manure storage and handling, application rate strategies, environmental assessment, odor control, and safety. Included are 69 illustrations and 20 tables, plus work sheets, suggested readings, and a list of manufacturers.
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821. **A literature review on the environmental effects of postfire logging.**
McIver, J. D. and Starr, L.
Western Journal of Applied Forestry 16 (4): 159-168. (Oct. 2001)
NAL Call #: SD388.W6;
ISSN: 0885-6095
Descriptors: forest fires/ salvage felling and logging/ forest ecology/ environmental impact/ fire effects/ slash/ soil/ disturbed land/ erosion/ runoff/ establishment/ growth/ botanical composition/ insect pests/ infestation/ dead trees/ wildlife/ habitats/ forest management/ literature reviews
Abstract: Literature on logging after wildfire is reviewed, with a focus on environmental effects of logging activity and the removal of large woody structure. As in unburned stands, log retrieval systems vary considerably in their immediate effect on soils in the postfire environment, with ground-based systems generally causing more disturbance than aerial systems. Timber harvest methods used by managers can mitigate erosion effects--for example, logging residue can decrease erosion by impeding overland flow. Ground disturbance from postfire logging can encourage establishment of different plant species (including nonnatives) and can influence the growth of trees. The removal of large woody structures typical in postfire logging operations can change plant species composition, reduce plant species richness, and increase conifer growth in the first years after logging, but can also reduce the probability that insect pest populations will build up and infest adjacent stands. Removal of large woody structures can cause declines in the abundance of several cavity-nesting bird species, including mountain bluebird, and black-backed, hairy, and three-toed woodpeckers; Lewis' woodpecker tends to increase after postfire logging. Overall, studies on the environmental effects of postfire logging are limited, arguing for the use of adaptive management to monitor effects of logging and to adjust practices accordingly.
This citation is from AGRICOLA.

822. **Literature review: Possible funding sources for proper closure of abandoned water wells on private lands in the South Central Region.**
National Water Management Center (U.S.).
Washington, D.C.: USDA-NRCS, National Water Management Center. (1998)
Notes: Title from caption. Includes bibliographical references.
NAL Call #: aTD223.5-.L58-1998
http://wmc.ar.nrcs.usda.gov/technical/GW/litreviewfunding.html
Descriptors: Wells---Abandonment---Southern States/ Wells---Abandonment---Economic aspects---Southern States
Abstract: Summarizes research the staff at the National Water Management Center has conducted to document possible sources of funding for proper abandonment of water wells on private lands. Included are sections discussing background information on abandoned well hazards, ground-water use, the theory behind proper well plugging, the agencies regulating water well abandonment and their responsibilities, possible sources of assistance for decommissioning abandoned water wells, selected references with a brief description, a listing of State agencies and their addresses, and a glossary of related terminology.
This citation is from AGRICOLA.

823. **Livestock impacts on the herbaceous components of sage grouse habitat: A review.**
Hockett, Glenn A
Intermountain Journal of Sciences 8 (2): 105-114. (2002);
ISSN: 1081-3519
Descriptors: Artemisia spp. [sagebrush] (Compositae)/ Centrocercus urophasianus [sage grouse] (Galliformes)/ forb (Angiospermae): food/ grass (Gramineae)/ insect (Insecta): food, prey/ livestock (Mammalia)/ Angiosperms/ Animals/ Arthropods/ Birds/ Chordates/ Dicots/ Insects/ Invertebrates/ Mammals/ Monocots/ Nonhuman Mammals/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ climax vegetation/ cover composition/ feeding sites/ food supply/ grazing intensity/ herbaceous understories/ livestock impacts/ riparian meadows: habitat/ seasonality/ springs/ streams
Abstract: Sage grouse are a bird of climax vegetation. Productive sage grouse habitat is more than a "sea of sagebrush." The grass/forb understory supplies food and cover components seasonally. Within the sagebrush community, a dense, residual herbaceous understory increases the likelihood of sage grouse nest success. Forbs and insects are essential foods for sage grouse from early spring to early fall. Although riparian areas typically make up less than 2 percent of the sagebrush landscape, interspersed springs, streams, and meadows offer watering and feeding sites for sage grouse during summer and early fall. Livestock selectively remove grasses and forbs within the sagebrush landscape while showing a strong preference for riparian meadows once upland vegetation cures. Livestock use can impact the amount and composition of herbaceous understory depending on the class of livestock, season of use, and grazing intensity. I reviewed the literature regarding sage grouse habitat and livestock impacts to the herbaceous understory. Ungrazed comparison areas, based on the seasonal needs of sage grouse, are lacking. Controls are recommended to advance our understanding of grazing impacts.
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824. **Livestock influences on riparian zones and fish habitat: Literature classification.**
Larsen, R. E.; Krueger, W. C.; George, M. R.; Barrington, M. R.; Buckhouse, J. C.; and Johnson, D. E.
Journal of Range Management 51 (6): 661-664. (1998)
NAL Call #: 60.18 J82;
ISSN: 0022-409X
This citation is provided courtesy of CAB International/CABI Publishing.

825. **Livestock manure: Foe or fertilizer?**
Glover, T.
Agricultural Outlook (AO) (AO-230): 30-35. (1996)
NAL Call #: aHD1751.A422
This citation is provided courtesy of CAB International/CABI Publishing.

826. **Livestock manure production and disposition: South Dakota feedlots-farms-ranches.**
Taylor, Donald C. and South Dakota State University. Economics Dept.
Brookings, S.D.: Economics Dept., South Dakota State University; 70 p.: ill.; 28 cm.; Series: Research report (South Dakota State University. Economics Dept. no. 94-4. (1994)
Notes: "November 1994." Includes bibliographical references (p. 54-62).
NAL Call #: HD1775.S8R47--no.94-4
Descriptors: Animal waste---South Dakota/ Agricultural waste---South Dakota/ Feedlots---South Dakota/ Waste disposal in the ground---South Dakota
This citation is from AGRICOLA.

827. **Livestock nutrient management concerns: Regulatory and legislative overview.**
Meyer, D. and Mullinax, D. D.
Journal of Animal Science 77 (suppl.2): 51-62. (1999)
NAL Call #: 49-J82;
ISSN: 0021-8812 [JANSAG].
Notes: Paper presented at the 1998 ADSA-ASAS Joint Meeting, July 27-31, Fort Collins, CO.
Includes references.
Descriptors: animal manures/ feedlot wastes/ livestock numbers/ application to land/ environmental legislation/ federal government/ agricultural law/ waste disposal/ pollution control/ heavy metals/ water pollution/ literature reviews
Abstract: A greater focus on manure nutrient disposition from concentrated animal-feeding operations has developed from environmentalists, concerned citizens, and regulatory agencies. The establishment and enforcement of manure nutrient regulations will alter the future of livestock production. Proposed legislation and strategies may provide a false sense of security regarding environmental preservation or restoration and may impose monitoring and record keeping on the livestock operators. Existing regulations and proposed regulations and strategies are presented. Implications of legislation and proposed strategies, policies, and regulations are discussed. Livestock operations will need to comply with regulations to remain in business and to minimize environmental liability.
This citation is from AGRICOLA.

828. **Livestock waste facilities handbook.**
Midwest Plan Service. Livestock Wastes Subcommittee.
Ames, Iowa: Midwest Plan Service, Iowa State University; 112 p. (1993)
Notes: 3rd edition; Cover title.
NAL Call #: TD930-.L58-1993;
ISBN: 0893730890 (pbk.)
Descriptors: Animal waste/ Livestock Housing/ Animal waste---Recycling
Abstract: Recommendations, federal regulations, and design procedures for almost all manure handling and management alternatives for livestock today are discussed in this handbook, including scrape systems, gravity drain gutters, gravity flow channels, infiltration areas, and waste transfer to storage.
© Midwest Plan Service (MWPS)

829. **The long-term effects of manures and fertilisers on soil productivity and quality: A review.**
Edmeades, D. C.
Nutrient Cycling in Agroecosystems 66 (2): 165-180. (June 2003)
NAL Call #: S631.F422;
ISSN: 1385-1314.
Notes: Number of References: 62
Descriptors: Agriculture/ Agronomy/ environment/ fertilisers/ manures/ organic/ productivity/ quality/ soils/ organic matter/ new zealand/ superphosphate fertilizer/ microbial biomass/ field experiments/ poultry litter/ phosphorus/ pasture/ runoff/ management
Abstract: The results from 14 field trials comparing the long-term (20 to 120 years) effects of fertilisers and manures (farmyard manure, slurry, and green manure) on crop production and soil properties are reviewed. In total there were 24 paired comparisons of the effects of manure and fertiliser. Some of the trials also contained a control (no nutrient inputs) treatment. The input of nutrients as either fertilisers or manures had very large effects (150-1000%) on soil productivity as measured by crop yields. Manured soils had higher contents of organic matter and numbers of microfauna than fertilised soils, and were more enriched in P, K, Ca and Mg in topsoils and nitrate N, Ca and Mg in subsoils. Manured soils also had lower bulk density and higher porosity, hydraulic conductivity and aggregate stability, relative to fertilised soils. However, there was no significant difference ($P < 0.05$) between fertilisers and manures in their long-term effects on crop production. In the context of this set of international trials, the recent evidence from the Rothamsted classical long-term trials appears to be exceptional, due to the larger inputs of manures and larger accumulation of soil OM in these trials. It is suggested therefore that manures may only have a benefit on soil productivity, over and above their nutrient content, when large inputs are applied over many years. The evidence from these trials also shows that, because the ratio of nutrients in manures is different from the ratio of nutrients removed by common crops, excessive accumulation of some nutrients, and particularly P and N, can arise from the long-term use of manures, relative to the use of fertilisers. Under these conditions greater runoff of P, and leaching of N may result, and for soils with low P retention and/or in situations where organic P is leached, greater P leaching losses may occur. The use of manures, relative to fertilisers, may also contribute to poor water quality by increasing its chemical oxygen demand. It is concluded therefore that it cannot generally be assumed that the long-term use of manures will enhance soil quality - defined in terms of productivity and potential to adversely affect water quality - in the long term, relative to applying the same amounts of nutrients as fertiliser.
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830. **Long-term potential of conservation tillage on the Canadian prairies.**
Lafond, G. P. and Derksen, D. A.
Canadian Journal of Plant Pathology 18 (2): 151-158. (1996)
NAL Call #: SB599.C35;
ISSN: 0706-0661
This citation is provided courtesy of CAB International/CABI Publishing.

831. **A long-term, watershed-scale, evaluation of the impacts of animal waste BMPs on indicator bacteria concentrations.**
Inamdar SP; Mostaghimi S; Cook MN; Brannan KM; and McClellen PW
Journal of the American Water Resources Association 38 (3): 819-833; 35 ref. (2002)
NAL Call #: GB651.W315
This citation is provided courtesy of CAB International/CABI Publishing.

832. **Luminescence methods in pesticide analysis. Applications to the environment.**
Aaron, J J and Coly, A
Analusis 28 (8): 699-709. (2000)
NAL Call #: QD71.A52;
ISSN: 0365-4877
Descriptors: pesticides: analysis, detection/ environmental samples: chemical analysis/ photochemistry: applications
Abstract: Current luminescence-based methods for determining pesticides in different sample matrices are reviewed. The paper is devoted mainly to fluorimetric techniques with emphasis on the description of direct and indirect fluorimetric methods, including chemical and photochemical derivatization. The use of fluorescence detection in TLC, HPLC and FIA as well as applications to environmental samples is described. The potential of phosphorimetry for pesticide analysis is also presented. The main advantages and draw-backs of luminescence detection for pesticide determination are discussed.
© Thomson

833. **Major Herbicides in Ground Water: Results From the National Water-Quality Assessment.**
Barbash, J. E.; Thelin, G. P.; Kolpin, D. W.; and Gilliom, R. J.
Journal of Environmental Quality 30 (3): 831-845. (2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: USA/ Pollutant Identification/ Data Collections/ Databases/ Data Interpretation/ Groundwater Pollution/ Herbicides/ Spatial Distribution/ Water Quality Standards/ Hydrology/ Atrazine/ Agrochemicals/ Water sampling/ Basins/ cyanazine/ simazine/ alachlor/ acetochlor/ metolachlor/ Water quality/ Pollution surveys/ Pollutant persistence/ Agricultural pollution/ Public health/ Water supply/ United States/ Identification of pollutants/ Freshwater pollution/ Behavior and fate characteristics/ Public health/ medicines/ dangerous organisms
Abstract: To improve understanding of the factors affecting pesticide occurrence in ground water, patterns of detection were examined for selected herbicides, based primarily on results from the National Water-Quality Assessment (NAWQA) program. The NAWQA data were derived from 2227 sites (wells and springs) sampled in 20 major hydrologic basins across the USA from 1993 to 1995. Results are presented for six high-use herbicides--atrazine (2-chloro-4-ethylamino-6-isopropylamino-s-triazine), cyanazine (2-[4-chloro-6-ethylamino- 1,3,5-triazin-2-yl]amino]-2-methylpropionitrile), simazine (2-chloro-4,6-bis-[ethylamino]-s-triazine), alachlor (2-chloro-N-[2,6-diethylphenyl] -N-[methoxymethyl]acetamide), acetochlor (2-chloro-N-[ethoxymethyl]-N- [2-ethyl-6-methylphenyl]acetamide), and metolachlor (2-chloro-N-[2-ethyl-6-methylphenyl] -N-[2-methoxy-1-methylethyl]acetamide)--as well as for prometon (2,4-bis[isopropylamino]-6-methoxy-s-triazine), a nonagricultural herbicide detected frequently during the study. Concentrations were <1 mu g L super(-1) at 98% of the sites with detections, but exceeded drinking-water criteria (for atrazine) at two sites. In urban areas, frequencies of detection (at or above 0.01 mu g L super(-1)) of atrazine, cyanazine, simazine, alachlor, and metolachlor in shallow ground water were positively correlated with their nonagricultural use nationwide ($P < 0.05$). Among different agricultural areas, frequencies of detection were positively correlated with nearby agricultural use for atrazine, cyanazine, alachlor, and metolachlor, but not simazine. Multivariate analysis demonstrated that for these five herbicides, frequencies of detection beneath agricultural areas were positively correlated with their agricultural use and persistence in aerobic soil. Acetochlor, an agricultural herbicide first registered in 1994 for use in the USA, was detected in shallow ground water by 1995, consistent with previous field-scale studies indicating that some pesticides may be detected in ground water within 1 yr following application. The NAWQA results agreed closely with those from other multistate studies with similar designs.
© Cambridge Scientific Abstracts (CSA)

834. **Mammalian toxicology of organophosphorus pesticides.**
Sultatos, L. G.
Journal of Toxicology and Environmental Health 43 (3): 271-289. (Nov. 1994)
NAL Call #: RA565.A1J6;
ISSN: 0098-4108 [JTEHD6]
Descriptors: organophosphorus pesticides/ toxicity/ adverse effects/ acetylcholinesterase/ enzyme activity/ inhibition/ metabolism/ metabolites/ mammals/ toxicology/ carcinogenesis/ literature reviews/ metabolic activation
This citation is from AGRICOLA.

835. **Management and utilization of poultry wastes.**
Williams CM; Barker JC; and Sims JT
Reviews of Environmental Contamination and Toxicology 162: 105-157. (1999).
Notes: 16 pp. of ref
This citation is provided courtesy of CAB International/CABI Publishing.

836. **Management for butterflies in the northern Great Plains: A literature review and guidebook for land managers.**
Moffat, Mary.; McPhillips, Nell.; and U.S. Fish and Wildlife Service. Ecological Services. South Dakota State Office.
Pierre, S.D.: U.S Fish and Wildlife Service, Ecological Services, South Dakota State Office; i, 19 p. (1993)
Notes: Cover title. Shipping list no.: 93-0394-P. "March 1993." "SD-ES-93-05." Includes bibliographical references (p. 18-19). SUDOCS: I 49.6/2:B 97.
NAL Call #: QL551.A14M64--1993
Descriptors: Butterflies---Great Plains---Ecology---Handbooks, manuals, etc/ Butterflies---Great Plains---Effect of habitat modification on---Handbooks, manuals, etc/

Prairie ecology---Great Plains---Handbooks, manuals, etc
This citation is from AGRICOLA.

837. **Management guide for estimating nitrate and pesticide leaching potential.**
Illinois. Dept. of Agriculture; Illinois. Environmental Protection Agency; and United States. Soil Conservation Service.
Illinois: Illinois Dept. of Agriculture: Illinois Environmental Protection Agency; 17 p. (1997)
Notes: Cover title. "This project is a cooperation effort between the Illinois Department of Agriculture and the Illinois Environmental Protection Agency. Technical information and assistance provided by the USDA Soil Conservation Service"--P. 17.
NAL Call #: S592.6.P43-M36-1997
Descriptors: Soils---Pesticide content---Illinois---Measurement/ Soils---Nitrate content---Illinois---Measurement/ Soil management---Illinois
This citation is from AGRICOLA.

838. **Management of agricultural drainage water quality.**
Madramootoo, Chandra Alastair; Johnston, William R.; Willardson, Lyman S.; International Commission on Irrigation and Drainage; and Food and Agriculture Organization of the United Nations.
Rome: International Commission on Irrigation and Drainage; Food and Agriculture Organization of the United Nations; xii, 94 p.: ill.; Series: Water reports 1020-1203 (13). (1997)
Notes: Includes bibliographical references (p. 85-94).
NAL Call #: NBU TC812-M366-1997; TC812.M366-1997;
ISBN: 9251040583
http://www.fao.org/docrep/W7224E/W7224E00.htm
Descriptors: Irrigation---Management/ Drainage---Management/ Water quality
This citation is from AGRICOLA.

839. **Management of agricultural insects with physical control methods.**
Vincent, C.; Hallman, G.; Panneton, B.; and Fleurat Lessard, F.
Annual Review of Entomology 48: 261-281. (2003)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: insect pests/ pest management/ integrated pest management/ insect control/ physical control/ control methods/ plant protection/ literature reviews/ passive-vs-active control methods
This citation is from AGRICOLA.

840. **Management of agricultural landscapes for the conservation of neotropical migratory birds.**
Koford, R. R. and Best, L. B.
In: Management of Midwestern landscapes for the conservation of neotropical migratory birds, General Technical Report NC-781/ Thompson, F. R. United States Department of Agriculture, Forest Service, North Central Experiment Station, 1996. pp. 68-88.
http://www.npwrc.usgs.gov/resource/othrdata/landscap/landscap.htm
Descriptors: Supporting science
Abstract: Discussed management strategies for the management of avian habitat in agricultural landscapes.

841. **Management of agroforestry for the conservation and utilization of land and water resources.**
Kiepe, P. and Rao, M. R.
Outlook on Agriculture 23 (1): 17-25. (1994)
NAL Call #: 10 Ou8;
ISSN: 0030-7270
This citation is provided courtesy of CAB International/CABI Publishing.

842. **Management of animal waste: Environmental health problems and technological solutions.**
El Ahraf, Amer. and Willis, William V.
Westport, Conn.: Praeger; xv, 185 p. (1996)
Notes: Includes bibliographical references (p. [145]-180) and index.
NAL Call #: TD932.E42--1996;
ISBN: 0275935299 (alk. paper)
Descriptors: Animal waste---Management/ Animal waste---Health aspects
This citation is from AGRICOLA.

843. **Management of excretion of phosphorus, nitrogen and pharmacological level minerals to reduce environmental pollution from animal production.**
Paik IK
Asian Australasian Journal of Animal Sciences 14 (3): 384-394; 39 ref. (2001)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

844. **Management of irrigation and drainage systems: A service approach.**
Malano, Hector M. and Hofwegen, Paul J. M. van.
Rotterdam; Brookfield, Vt.: A. A. Balkema; viii, 149 p.: ill.; Series: IHE monograph 3. (1999)
Notes: Includes bibliographical references (p. [145]-149).;
ISBN: 9054104821; 905410483X (pbk.)
Descriptors: Irrigation---Management/ Drainage---Management
This citation is from AGRICOLA.

845. **Management of livestock in riparian areas.**
Winward, A. H.
Natural Resources and Environmental Issues 1: 49-52. (1994);
ISSN: 1069-5370.
Notes: Proceedings of the symposium on riparian resources, 18-19 April 1991, Eccles Conference Center, Utah State University, Logan, Utah, USA
This citation is provided courtesy of CAB International/CABI Publishing.

846. **Management of phosphorus, potassium, and sulfur in intensive, irrigated lowland rice.**
Dobermann, A.; Cassman, K. G.; Mamaril, C. P.; and Sheehy, J. E.
Field Crops Research 56 (1/2): 113-138. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: oryza sativa/ lowland areas/ irrigation/ intensive cropping/ crop management/ phosphorus/ potassium/ sulfur/ soil fertility/ crop yield/ agricultural production/ nutrient requirements/ nutrient deficiencies/ cultivars/ nutrient-nutrient interactions/ sustainability/ literature reviews
This citation is from AGRICOLA.

847. **Management of soil-borne plant pathogens with organic soil amendments: A disease control strategy salvaged from the past.**
Lazarovits G
Canadian Journal of Plant Pathology 23 (1): 1-7; 23 ref. (2001)
NAL Call #: SB599.C35
This citation is provided courtesy of CAB International/CABI Publishing.

848. **Management of threatened bird species: Evaluation of the hands-on approach.**
Cade, T. J. and Temple, S. A.
Ibis 137 (Supplement 1): S161-S172. (1995);
ISSN: 0963-0856.
Notes: Conference: British Ornithologists' Union Conference on Bird Conservation: The Science and the Action, Shuttleworth College, Bedford (UK), 6-10 Apr 1994
Descriptors: Aves/ endangered species/ resource management/ methodology/ Methodology general/ Conservation/ Birds
Abstract: Intensive manipulations of rare birds can be important conservation tools when traditional management practices, such as legal protection and habitat preservation, are insufficient to halt population declines and save endangered species from extinction. Nonetheless, this "hands-on" methodology has been criticized as scientifically unsound, ineffective, costly and a diversion from preservation of habitats and ecosystems. We consider the effectiveness of manipulative management by reviewing 30 presentations at the Symposium on Management Techniques for Preserving Endangered Birds in 1977. Examination of the outcome of these efforts in 1993 indicates that 43% have contributed to improved population viability through an increase in breeding numbers, another 23% have helped to stabilize numbers or to slow the rate of population decline, while the outcome of five others (17%) is inconclusive, and the same number ended in failure. Our evaluation of these and other similar projects is that the hands-on approach has proved to be a justified and effective stopgap procedure to help critically endangered species through a crisis, to reintroduce species into previously occupied range and to reinforce locally diminished populations. As such, it often needs to be part of an integrated program for avian conservation.
© Cambridge Scientific Abstracts (CSA)

849. **Management of water and nitrogen in high density apple orchards.**
Neilsen, D.; Neilsen, G. H.; Guak, S.; Parchomchuk, P.; and Hogue, E. J.
Compact Fruit Tree 35 (3): 92-96. (2002)
This citation is provided courtesy of CAB International/CABI Publishing.

850. **Management options to limit nitrate leaching from grassland.**
Cuttle, S P and Scholefield, D
Journal of Contaminant Hydrology 20 (3-4): 299-312. (1995);
ISSN: 0169-7722
Descriptors: clover (Leguminosae)/ livestock (Mammalia Unspecified)/ Bovidae (Bovidae)/ Gramineae (Gramineae)/ angiosperms/ animals/ artiodactyls/ chordates/ dicots/ mammals/ monocots/ nonhuman mammals/ nonhuman vertebrates/ plants/ spermatophytes/ vascular plants/ vertebrates/ nitrate/ nitrogen/ nitrogen fixation/ fertilizer/ grazing/ manure production/ mineralization
Abstract: Nitrate leaching can be reduced by the adoption of less intensive grassland systems which, though requiring a greater land area to achieve the same agricultural output, result in less nitrate leaching per unit of production than do intensively managed grasslands. The economic penalties associated with reductions in output can be partly offset by greater reliance on symbiotic nitrogen fixation and the use of clover-based swards in place of synthetic N fertilisers. Alternatively, specific measures can be adopted to improve the efficiency of nitrogen use in intensively managed systems in order to maintain high outputs but with reduced losses. Controls should take account of other forms of loss and flows of nitrogen between grassland and other components of the whole-farm system and, in most instances, should result in an overall reduction in nitrogen inputs. Removing stock from the fields earlier in the grazing season will reduce the accumulation of high concentrations of potentially leachable nitrate in the soil of grazed pastures but will increase the quantity of manure produced by housed animals and the need to recycle this effectively. Supplementing grass diets with low-nitrogen forages such as maize silage will reduce the quantity of nitrogen excreted by livestock but may increase the potential for nitrate leaching elsewhere on the farm if changes to cropping patterns involve more frequent cultivation of grassland. Improved utilisation by the sward of nitrogen in animal excreta and manures and released by mineralisation of soil organic matter will permit equivalent reductions to be made in fertiliser inputs, provided that adequate information is available about the supply of nitrogen from these non-fertiliser sources.
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851. **Management practices and soil biota.**
Roper, M M and Gupta, V V S R
Australian Journal of Soil Research 33 (2): 321-339. (1995)
NAL Call #: 56.8 Au7;
ISSN: 0004-9573
Descriptors: bacteria (Bacteria General Unspecified)/ fungi (Fungi Unspecified)/ microbes (Microorganisms Unspecified)/ protozoa (Protozoa Unspecified)/ Animalia (Animalia Unspecified)/ Protozoa (Protozoa Unspecified)/ animals/ bacteria/ eubacteria/ fungi/ invertebrates/ microorganisms/ nonvascular plants/ plants/ protozoans/ disease/ ecosystem function/ macro fauna/ meso fauna/ organic matter decomposition/ pesticide use/ soil structure/ tillage
© Thomson

852. **The Management Systems Evaluation Areas Program: Tillage and water quality research.**
Ward, A. D.; Hatfield, J. L.; Lamb, J. A.; Alberts, E. E.; Logan, T. J.; and Anderson, J. L.
Soil and Tillage Research 30 (1): 49-74. (1994)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

853. **Managing diffuse environmental contamination from agricultural pesticides: An economic perspective on issues and policy options, with particular reference to Europe.**
Falconer, K E
Agriculture, Ecosystems and Environment 69 (1): 37-54. (1998)
NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: agricultural pesticide/ diffuse environmental contamination/ economics/ pest control/ policy options/ resource management
Abstract: There are widely held

concerns over environmental contamination from agricultural pesticide applications, and a current policy objective in many Western European countries is to reduce usage levels. However, it appears that existing arrangements to control usage, and thence contamination, are inadequate to achieve the levels of environmental quality currently demanded; policy innovation and reform are needed. This review examines some of the problems of controlling pesticide contamination, and the potential policy instruments for achieving pesticide use reduction for environmental improvement. Particular attention is given to the role of market mechanisms to achieve environmental policy aims, especially through the introduction of financial incentives for producers to switch to integrated pest management practices involving the use of less pesticides. Instruments such as input taxes seem administratively and politically feasible, but need careful design and implementation if environmental objectives with regard to pesticides are to be achieved. Environmental economics can make an important contribution to practical agri-environmental resource management if linked with more explicit acknowledgement of the characteristics of agro-ecosystems.
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854. **Managing drinking water supplies.**
Cooke, G Dennis and Kennedy, Robert H
Lake and Reservoir Management 17 (3): 157-174. (2001)
NAL Call #: TC401.L3;
ISSN: 1040-2381
Descriptors: algal toxins: pollutant, toxin/ disinfection by products [DBPs]: formation, pollutant, toxin/ drinking water supplies: management/ ecotoxicology/ eutrophication/ odor problems/ reservoir management/ source water quality/ trophic conditions/ water taste/ watershed management
Abstract: Efforts to provide safe drinking water cannot begin at the treatment plant. Processes occurring in the watershed can adversely influence drinking water reservoirs, and understanding linkages between these processes and reservoir water quality provides the basis for protecting or improving source water quality. Since the presence of molecules responsible for taste, odor and algal toxin problems, and for the formation of disinfection by-products (DBP) is often related to reservoir trophic conditions, sound and cost-effective water treatment approaches must include considerations for reservoir management. Source water management efforts should include both watershed management, as a means to reduce the loading of materials to the reservoirs, and in-reservoir treatments that ameliorate or minimize the symptoms of eutrophication. Discussed here are considerations for maintaining safe drinking water, water, quality assessment approaches, and common methods for managing reservoir water quality.
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855. **Managing farming systems for nitrate control: A research review from management systems evaluation areas.**
Power, J. F.; Wiese, R.; and Flowerday, D.
Journal of Environmental Quality 30 (6): 1866-1880. (2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

856. **Managing for biodiversity conservation in native grasslands on farms.**
Dorrough, J.; Turner, V.; Yen, A.; Clark, S.; Crosthwaite, J.; and Hirth, J.
Wool Technology and Sheep Breeding 50 (4): 760-765. (2002);
ISSN: 0043-7875
This citation is provided courtesy of CAB International/CABI Publishing.

857. **Managing high selenium in agricultural drainage water by agroforestry systems: Role of selenium volatilization.**
Terry, Norman.; Lin, Zhiqing.; and University of California, Berkeley. Dept. of Plant and Microbial Biology. California. Office of Water Conservation.
Berkeley, CA: Dept. of Plant and Microbial Biology, University of California, Berkeley; 59, 9 p.: ill., maps. (1999)
Notes: Cover title. "March 1999." "State of California, Department of Water Resources, Division of Local Assistance, Water Conservation Office." Includes bibliographical references. DWR B-80665.
NAL Call #: TD224.C2-T47-1999
Descriptors: Water---Pollution---California/ Selenium/ Agroforestry systems---California
This citation is from AGRICOLA.

858. **Managing large-scale application of pesticides to prevent contamination of drinking water.**
United States. Environmental Protection Agency. Office of Water.
Washington, D.C.: Environmental Protection Agency, Office of Water; Series: Source water protection practices bulletin. (2001)
Notes: Title from web page. "July 2001." "EPA 916-F-01-030." Description based on content viewed July 10, 2002. Includes bibliographical references.
NAL Call #: TD370-.M362-2001
http://www.epa.gov/safewater/protect/pdfs/lspesticides.pdf
Descriptors: Water quality management/ Wellhead protection/ Pesticides---Environmental aspects/ Drinking water---Contamination---Prevention
This citation is from AGRICOLA.

859. **Managing livestock, poultry, and horse waste to prevent contamination of drinking water.**
U.S. Environmental Protection Agency, Office of Water.
U.S. Environmental Protection Agency [Also available as: EPA 916-F-01-026], 2001 (application/pdf)
NAL Call #: TD930.2 .M36 2001
http://www.sonoma-horse-council.com/ACRSD%20docs/epa_swp_livestock.pdf
Descriptors: Animal waste---United States---Management/ Animal industry---Waste disposal---United States/ Feedlot runoff---United States---Management/ Wellhead protection---United States/ Water quality management---United States/ Water---Pollution---United States
This citation is from AGRICOLA.

860. **Managing manure nutrients through multi-crop forage production.**
Newton, G. L.; Bernard, J. K.; Hubbard, R. K.; Allison, J. R.; Lowrance, R. R.; Gascho, G. J.; Gates, R. N.; and Vellidis, G.
Journal of Dairy Science 86: 2243-2252. (2003)
NAL Call #: 44.8 J822;
ISSN: 0022-0302.
Notes: Number of References: 66
Descriptors: Food Science/ Nutrition/

manure/ forages/ water quality/ riparian buffers/ water quality/ dairy manure/ agricultural watersheds/ management strategies/ riparian forest/ nitrogen/ impacts/ wetland/ compost/ farms

Abstract: Concentrated sources of dairy manure represent significant water pollution potential. The southern United States may be more vulnerable to water quality problems than some other regions because of climate, typical farm size, and cropping practices. Dairy manure can be an effective source of plant nutrients and large quantities of nutrients can be recycled through forage production, especially when multi-cropping systems are utilized. Linking forage production with manure utilization is an environmentally sound approach for addressing both of these problems. Review of two triple-crop systems revealed greater N and P recoveries for a corn silage-bermudagrass hay-rye haylage system, whereas forage yields and quality were greater for a corn silage-corn silage-rye haylage system, when manure was applied at rates to supply N. Nutrient uptake was lower than application during the autumn-winter period, and bermudagrass utilized more of the remaining excess than a second crop of corn silage. Economic comparison of these systems suggests that the added value of the two corn silage crop system was not enough to off-set its increased production cost. Therefore, the system that included bermudagrss demonstrated both environmental and economic advantages. Review of the N and P uptake and calculated crop value of various single, double, and triple crop forage systems indicated that the per hectare economic value as well as the N and P uptakes tended to follow DM yields, and grasses tended to out-perform broadleaf forages. Taken across all systems, systems that included bermudagrass tended to have some of the highest economic values and uptakes of N and P. Manure applied at rates to supply N results in application of excess P, and production will not supply adequate quantities of forage to meet the herd's needs. Systems that lower manure application and supply supplemental N to produce all necessary forage under manure application will likely be less economically attractive due to additional costs of moving manure further and applying it to greater land areas, but will be environmentally necessary in most cases. Intensive forage systems can produce acceptable to high quality forage, protect the environment, and be economically attractive. The optimal manure-forage system will depend on the farm characteristics and specific local conditions. Buffers and nutrient sinks can protect streams and water bodies from migrating nutrients and should be included as a part of crop production systems.

861. **Managing nitrogen for water quality: Lessons from management systems evaluation area.**

Power, J. F.; Wiese, R.; and Flowerday, D.

Journal of Environmental Quality 29 (2): 355-366. (Mar. 2000-Apr. 2000)

NAL Call #: QH540.J6;

ISSN: 0047-2425 [JEVQAA]

Descriptors: nitrate/ nitrate nitrogen/ leaching/ water quality/ water management/ water pollution/ pollution control/ north central states of USA/ fertilizer management

Abstract: The Management Systems Evaluation Area (MSEA) project was initiated in 1990 to evaluate existing and develop new N management technologies to reduce the potential adverse impacts of agricultural practices on surface and ground water quality. Field research sites were established in nine Midwestern states. Results from MSEA research showed that nitrate leaching was greatly reduced by changing from furrow to sprinkler irrigation. At least 95% of the nitrate N percolating through tiled soils was intercepted and discharged into surface waters. Computer models indicated that routing tile discharge through wetlands would greatly reduce the nitrate load. Nitrate losses also were reduced by establishing controlled water tables using drainage lines for subirrigation. Preplant and presidedress soil nitrate tests were effective in determining proper N fertilizer rates and reducing nitrate losses. Banding ammoniated fertilizers slowed nitrification rates and nitrate leaching, especially if soil over the bands was packed. A major new technology was proof that crop greenness can be used to monitor crop N sufficiency, and that N deficiencies after the V8 stage can be corrected by sidedressing or fertigation (reactive N management). Inexpensive sensors or aerial photographs can be used to assess crop greenness. Using Global Positioning Systems (GPS), N-deficient areas of the field can be managed differently from the remainder of the field. These results point to the need to develop site-specific or precision farming systems to control nitrate losses to water resources and reduce the impact of natural variability in both soils and weather.

This citation is from AGRICOLA.

862. **Managing North American waterfowl in the face of uncertainty.**

Nichols, J. D.; Johnson, F. A.; and Williams, B. K.

Annual Review of Ecology and Systematics 26: 177-199. (1995)

NAL Call #: QH540.A55;

ISSN: 0066-4162 [ARECBC]

Descriptors: waterfowl/ anatidae/ population dynamics/ wildlife conservation/ wildlife management/ hunting/ reviews/ decision making/ objectives/ North America/ adaptive management

This citation is from AGRICOLA.

863. **Managing nutrients across regions of the United States.**

Nelson, C J

Journal of Animal Science 77 (2 [supplement]): 90-101. (1999)

NAL Call #: 49 J82;

ISSN: 0021-8812

Descriptors: nitrogen / phosphorus/ livestock (Mammalia)/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ climate variation/ geographic differences/ nutrient management guidelines/ soil/ watershed/ Clean Water Action Plan

Abstract: Nutrient balance in the ecosystem involves profitability of the agricultural enterprise and commitments to resource management to maintain quality of air, water, and land resources. Phosphorus and N are the two nutrients of major concern, and they behave differently in soils. Most P adheres strongly to soil particles and moves laterally with the soil during erosion processes, but with high concentrations more P remains in soluble forms and moves in the water fraction. Most N is soluble and moves laterally or downward with soil water. Soil scientists and agronomists have researched soil processes, plant

nutrition, cropping systems, and water quality issues mainly on a field and farm level, but now the movement is to management and regulation of nonpoint problems on a watershed basis as proposed in the Clean Water Action Plan. The plan recognizes the vast diversity of soil parent materials and climates among geographic areas, even among and within watersheds, that determine crop adaptation and cropping systems, the role of states in regulatory processes, and the need for local citizens to have operational involvement. This process insures that nutrient management guidelines will be more site-specific and solutions can be focused on the direct problem. Directed efforts will be needed to educate local citizens, landowners, and caretakers of agricultural enterprises, and regulatory agencies. Several factors, including economic and social incentives for implementation must be considered along with the technologies available. The solutions are multidisciplinary, will require long-term research to accommodate climate variation, and should be associated with a strong commitment to education. Public funding will be needed to support the effort.

864. **Managing nutrients in manure: General principles and applications to dairy manure in New York.**
Bouldin, D. R. and Klausner, S. D.
In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A., 1998; pp. 65-88
NAL Call #: S655.A57 1998
This citation is provided courtesy of CAB International/CABI Publishing.

865. **Managing runoff following manure application.**
Gilley, J. E.; Risse, L. M.; and Eghball, B.
Journal of Soil and Water Conservation 57 (6): 530-533. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: animal manures/ application to land/ pollution control/ runoff/ losses from soil/ contour cultivation/ grass strips/ ponds/ sediment/ crop management/ terraces/ terracing/ strip cropping/ sediment trapping ponds
This citation is from AGRICOLA.

866. **Managing Saskatchewan rangeland.**
Saskatchewan. Agriculture and Food.
Saskatchewan, Canada: Saskatchewan Agriculture and Food; 99 p.: ill. (some col.), col. map. (1995)
Notes: Rev. ed.; Cover title. "Saskatchewan Agriculture and Food ... [et al.]"--Cover p. [4]. Includes bibliographical references.
NAL Call #: SF84.4.M36--1995
Descriptors: Range management---Saskatchewan
This citation is from AGRICOLA.

867. **Managing soil biophysical properties for environmental protection.**
Stepniewski, W.; Horn, R.; and Martyniuk, S.
Agriculture, Ecosystems and Environment 88 (2): 175-181. (Feb. 2002)
NAL Call #: S601-.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Soil health as an indicator of sustainable management / edited by J.W. Doran and S.I. Stamatiadis. Paper presented at a workshop held June 24-25, 1999, Athens/Kifissia, Greece.
Includes references.
Descriptors: soil/ environmental protection/ soil physical properties/ soil biology/ quality/ soil management/ soil chemistry/ biochemistry/ movement in soil/ permeability/ diffusivity/ methane/ soil air/ oxygen/ nitrogen/ nitrous oxide/ temporal variation/ clay fraction/ sesquioxides/ solubility/ nutrient availability/ literature reviews
Abstract: The aim of the paper is to show a possibility of management of soil physical properties for environmental protection. In order to do this a proposal for classification of soil properties into such groups as: physical, chemical, biological, physicochemical, biochemical, and biophysical has been presented. A special emphasis was placed on the physical and biophysical properties. The physical properties were subdivided into capacity and intensity parameters. The capacity parameters cannot be used for the definition of any soil or site specific process since they only define, e.g. the amount of soil mass per volume as the bulk density, but not the arrangement of the mass in the volume. Biophysical soil properties are related to the links between physical and biological fluxes. These fluxes are the consequence of gradients caused by biological sources/sinks and by the transport parameters (conductivity, permeability, diffusivity). In addition, it is also necessary to consider the various phases existing in the soil. Thus, in the gas phase, the biophysical fluxes concern CH4, CO2, O2, N2, N2O, etc. They are described by the Fick's law, in which the driving force of the flux is the concentration change in space and time (deltaC/deltax, t) and by the Darcy's law, where the driving force is the pressure change in space and time (deltap/deltax, t). In the liquid phase, there are such flux phenomena as advection and diffusion, described by Darcy's and Fick's laws with pressure (deltap/deltax, t) and concentration (deltaC/deltax, t) gradients as the driving forces. The biophysical phenomena in the solid phase are related, e.g. migration of organic matter, clay particles, sesquioxides, solubility and. re-precipitation of minerals, etc. A special group of biophysical phenomena is related to the heat transfer driven by the temperature gradient variable in time (deltaT/deltax, t) and described by the Fourier's law. The biophysical soil properties are important from the environmental point of view, as they are decisive for absorption/emission of oxygen, carbon dioxide, methane, nitrous oxide, NO(x), etc. in the soil. Biophysical processes are also essential for functioning of a soil as a biofilter for solids, liquids, and gases. A general example of the role of soil biophysical processes in determination of efficiency of methane oxidation in soil layers, usually, covering re-cultivated municipal landfills, is presented. The example shows a great potential for management of these properties for the protection of the environment.
This citation is from AGRICOLA.

868. **Managing soil denitrification.**
Mosier, A. R.; Doran, J. W.; and Freney, J. R.
Journal of Soil and Water Conservation 57 (6): 505-512. (2002)
NAL Call #: 56.8-J822;

ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: denitrification/ denitrifying microorganisms/ nitrous oxide/ emission/ losses from soil/ nitrification/ soil bacteria/ soil biology/ soil pore system/ soil water/ soil water filled pore space
This citation is from AGRICOLA.

869. **Managing soil fertility decline.**
Campbell, L. C.
Journal of Crop Production 1 (2): 29-52. (1998)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Nutrient Use in Crop Production / edited by Z. Rengel. Includes references.
Descriptors: soil fertility/ soil degradation/ plants/ production/ overgrazing/ immobilization/ volatilization/ leaching/ erosion/ intensive husbandry/ fertilizers/ liming/ acidification/ fallow/ rotations/ agricultural policy/ sustainability/ literature reviews
This citation is from AGRICOLA.

870. **Managing soils to achieve greater water use efficiency: A review.**
Hatfield, J. L.; Sauer, T. J.; and Prueger, J. H.
Agronomy Journal 93 (2): 271-280. (Mar. 2001-Apr. 2001)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT].
Notes: Paper presented at the symposium "Improving crop water use efficiency and yield: Management influences" held November 2, 1999, Salt Lake City, Utah.
Includes references.
Descriptors: soil management/ water use efficiency/ water availability/ irrigation/ farming systems/ evapotranspiration/ soil water content/ air/ soil fertility/ nitrogen/ phosphorus/ plant physiology/ tillage/ literature reviews
Abstract: Water use efficiency (WUE) represents a given level of biomass or grain yield per unit of water used by the crop. With increasing concern about the availability of water resources in both irrigated and rainfed agriculture, there is renewed interest in trying to develop an understanding of how WUE can be improved and how farming systems can be modified to be more efficient in water use. This review and synthesis of the literature is directed toward understanding the role of soil management practices for WUE. Soil management practices affect the processes of evapotranspiration by modifying the available energy, the available water in the soil profile, or the exchange rate between the soil and the atmosphere. Plant management practices, e.g., the addition of N and P, have an indirect effect on water use through the physiological efficiency of the plant. A survey of the literature reveals a large variation in measured WUE across a range of climates, crops, and soil management practices. It is possible to increase WUE by 25 to 40% through soil management practices that involve tillage. Overall, precipitation use efficiency can be enhanced through adoption of more intensive cropping systems in semiarid environments and increased plant populations in more temperate and humid environments. Modifying nutrient management practices can increase WUE by 15 to 25%. Water use efficiency can be increased through proper management, and field-scale experiences show that these changes positively affect crop yield.
This citation is from AGRICOLA.

871. **Managing water in plant nurseries: A guide to irrigation, drainage and water recycling in containerised plant nurseries.**
Rolfe, Chris; Yiasoumi, William.; Keskula, Edda.; and NSW Agriculture.
New South Wales: NSW Agriculture; vii, 279 p.: ill. (some col.). (2000)
Notes: 2nd ed.; Includes bibliographical references (p. 265-266) and index.
NAL Call #: SB118.5-.M35-2000;
ISBN: 0734711808
Descriptors: Nursery stock---Irrigation/ Plants, Potted---Irrigation/ Drainage---Management/ Water reuse/ Nurseries---Horticulture---Management/ Nurseries---Horticulture---Environmental aspects/ Water in agriculture/ Potted plant industry---Environmental aspects/ Environmental protection
This citation is from AGRICOLA.

872. **Manipulation of animal diets to affect manure production, composition and odor: State of the science.**
Sutton, A.; Applegate, T.; Hankins, S.; Hill, B.; Allee, G.; Greene, W.; Kohn, R; Meyer D; Powers, W. J.; and Kempen, T. van
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

873. **Manure and microbes: Public and animal health problem?**
Pell AN
Journal of Dairy Science 80 (10): 2673-2681; 60 ref. (1997)
NAL Call #: 44.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

874. **Manure and wastewater management for cattle feedlots.**
Sweeten, J. M.
Reviews of Environmental Contamination and Toxicology 167: 121-153. (2000)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: cattle manure/ runoff/ waste utilization/ application to land/ pollution control/ water quality/ water pollution/ literature reviews
This citation is from AGRICOLA.

875. **Manure characteristics.**
Lorimor, Jeffery.
Ames, Iowa: Iowa State University; Series: Manure management systems series MWPS-1; 23 p.: ill. (2000)
Notes: Includes bibliographical references (p. [24]).
NAL Call #: S655-.M35-2000
Descriptors: Farm manure/ Farm manure---Composition
Abstract: The publication provides up-to-date information about all aspects of solid, semi-solid, slurry, and liquid manure handling characteristics. It also contains extensive information about sampling and testing manure and about nutrient content.
© Midwest Plan Service (MWPS)

876. **Manure management: A systems approach.**
Grusenmeyer, D. C. and Cramer, T. N.
Journal of Dairy Science 80 (10): 2651-2654. (1997)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

877. **Manure management alternatives: A supplemental manual.**
Kittelson, John.; Woodward Clyde Consultants; and Minnesota. Dept. of Agriculture
St. Paul, Minn.: Minnesota Dept. of Agriculture; iv, 52 p.: ill. (1995)
Notes: Cover title. "June 1995"--P. [iv]. Prepared by Woodward-Clyde Consultants: John Kittelson ... [et al.]; with assistance from Robert Mensch of Mensch Engineering; Contents note: Composting -- Vegetative filter strips -- Mechnical separation -- Anaerobic digestion -- Gasification -- Order prevention, reduction and control alternatives.
NAL Call #: TD811.M37--1995
Descriptors: Farm manure---Minnesota/ Farm manure---Environmental aspects---Minnesota
This citation is from AGRICOLA.

878. **Manure management for minor classes of livestock in the United States.**
Power, J. F. and Eghball, B.
Journal of Soil and Water Conservation 49 (2): 123-125. (1994)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

879. **Manure management in harmony with the environment and society: Manure Management 1998.**
Manure Management in Harmony with the Environment and Society and Soil and Water Conservation Society (U.S.).
Ankeny, Iowa: Soil and Water Conservation Society; v, 417 p.: ill. (1998)
Notes: Extended abstracts of papers and posters presented at Manure Management in Harmony with the Environment and Society held in 1998 at Ames, Iowa.
NAL Call #: S655-.M363-1998
Descriptors: Manure handling---Environmental aspects---Congresses/ Manures---Environmental aspects---Congresses/ Agricultural wastes---Environmental aspects---Congresses/ Animal waste---Environmental aspects---Congresses
This citation is from AGRICOLA.

880. **Manure management strategies/ technologies.**
Lorimore, J.; Fulhage, C.; Zhang, R. H.; Funk, T; Sheffield, R.; Sheppard, D. C.; and Newton, G. L.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

881. **Manure management system design strategies: How and why.**
Moore, J. A. and Hart, J. M.
Journal of Dairy Science 80 (10): 2655-2658. (1997)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

882. **Manure management: Treatment strategies for sustainable agriculture.**
Burton, C. H.; xiv, 181 p. (1997)
NAL Call #: S655.M362-1997;
ISBN: 0-9531282-0-2
This citation is provided courtesy of CAB International/CABI Publishing.

883. **Manure storage and treatment alternatives: Environmentally assured.**
McGuire, Kellie. and National Pork Producers Council (U.S.).
Des Moines, Iowa: National Pork Producers Council; 220 p. in various pagings: ill. (1997)
Notes: Cover title. "Environmentally assured"--cover. "Environmental Assurance Program (EAP)." Includes bibliographical references.
NAL Call #: TD930-.M363-1997
Descriptors: Swine---Manure---Handling/ Swine---Manure---Environmental aspects/ Animal waste---Environmental aspects/ Farm manure, liquid---Environmental aspects/ Compost
This citation is from AGRICOLA.

884. **Manure Storages.**
Fulhage, C.; Hoehne, J.; Jones, D.; and Koelsch, R.
Ames, Iowa: Midwest Plan Service, Iowa State University; Series: MWPS-18, S2; 117 p. (2001);
ISBN: 0-89373-080-7
Descriptors: animal manures/ animal manure management/ manure storage/ runoff/ waste lagoons
Abstract: Chapters include: Selecting a Manure Storage; Sizing Storages and Runoff Control; Siting and Site Preparation; Constructing Earthen Impoundments; Monitoring and Managing; and Abandonment and Closure of Earthen Impoundment Storages. The publication provides up-to-date information on manure storage facilities and considerations for their design. It is a valuable resource for livestock and poultry producers, engineers, cooperative extension agents, consultants working on manure management systems, and employees of regulatory agencies.
© Midwest Plan Service (MWPS)

885. **Mass reduction of standing and flat crop residues by selected tillage implements.**
Wagner, L. E. and Nelson, R. G.
Transactions of the ASAE 38 (2): 419-427. (Mar. 1995-Apr. 1995)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: zea mays / wheat/ crop residues/ disc harrows/ tillage/ plows/ literature reviews/ erosion control
Abstract: Field data were collected to determine the mass reduction of standing residue by selected tillage operations and to develop a set of coefficients that could represent changes in mass between standing, flat, and buried residue pools caused by those tillage operations. Tillage implements used in this study were tandem-disk harrows, chisel plows, and wide-sweep plows. A range of pre-tillage corn and wheat residue conditions were studied, with standing and flat residue pools sampled separately before and after each tillage operation. The data show that 7% of standing corn residue was flattened with a wide-sweep plow, 89 to 100% with tandem-disk harrows, 29% with a straight-shank chisel plow, and 76% with a twisted-point chisel plow. Wheat residue data indicated that 53 to 55% of the standing residue was flattened with the wide-sweep plows, 86% for a wide-sweep plow

outfitted with a rolling harrow treader attachment, and 86 to 95% for the tandem-disk harrows. The two straight-shanked chisel plows, one outfitted with a drag harrow attachment using coil-spring wire teeth and one without an attachment, flattened 90% and 22% of the standing wheat residue, respectively. A set of transfer equations also was developed to represent changes in mass between standing, flat, and buried residue pools from tillage operations. Only three coefficients (flattening, burial, and surfacing) are necessary to describe the transfer of mass from one residue pool to another. Coefficient values, determined via a constrained optimization procedure, are presented for each tillage implement on both corn and wheat residues.
This citation is from AGRICOLA.

886. **Mass transfer of pesticides into the atmosphere by volatilization from soils and plants: Overview.**
Bedos, Carole; Cellier, Pierre; Calvet, Raoul; Barriuso, Enrique; and Gabrielle, Benoit
Agronomie 22 (1): 21-33. (2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627
Descriptors: fonofos: volatilization/ pesticides: physico chemical characteristics, volatilization/ prometon: volatilization/ plant (Plantae): crop / Plants/ atmosphere/ crop management practices/ environmental conditions/ mass transfer/ soil
Abstract: Volatilization may represent a major dissipation pathway for pesticides applied to soils or crops, accounting for up to 90% of the application dose in some cases. This paper collects and discusses recent data in the literature about this process. On the day of application, pesticide volatilization rates ranged from 0.1 gcntdotha-1cntdoth-1 for prometton compound to 80 gcntdotha-1cntdoth-1 for fonofos, for example. In general, pesticides are volatilized from plant surfaces to a greater extent and faster than from the soil. Volatilization continues for from a few days to several weeks (or sometimes even more), occasionally displaying a diurnal cycle. According to the experimental studies reported in the literature, the main factors affecting this process during the first few days after treatment have been identified as follows: the physico-chemical characteristics of the compound and the environmental conditions (temperature, soil moisture, nature of the soil or the crop) are key parameters, along with management practices.
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887. **Materials for subsurface land drainage systems.**
Stuyt, L. C. P. M.; Dierickx, W.; Martinez Beltran, J.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; xiv, 183 p.: ill.; Series: FAO irrigation and drainage paper 0254-5284 (60). (2000)
Notes: Includes bibliographical references (p. 119-130).
NAL Call #: S612-.I754-no.-60;
ISBN: 9251044260
Descriptors: Subsurface drainage---Materials
This citation is from AGRICOLA.

888. **Maximising water-use efficiency for sustainable crop production in arid ecosystem.**
Singh, Y. V.
In: Recent advances in management of arid ecosystem: Proceedings of a symposium held in India, March 1997. Faroda, A. S.; Joshi, N. L.; Kathju, S.; and Amal, K. (eds.); pp. 427-434; 1999.
Notes: Other number: 81-901024-0-0181-7233-217-3
This citation is provided courtesy of CAB International/CABI Publishing.

889. **Maximizing the economic and environmental benefit of land application of animal manures: Final report.**
University of Saskatchewan. Canada Saskatchewan Agri Food Innovation Fund.
Saskatchewan: Agri-Food Innovation Fund; 1 v. (unpaged): ill. (2001)
Notes: Cover title. "June 2001." "102-03852"--Mounted on label. "19960131."
NAL Call #: S655-.M39-2001
Descriptors: Cattle Manure---Saskatchewan/ Swine---Manure---Saskatchewan/ Manure handling---Saskatchewan
This citation is from AGRICOLA.

890. **The Measurement of River Bank Erosion and Lateral Channel Change: A Review.**
Lawler, D. M.
Earth Surface Processes and Landforms 18 (9): 777-821. (1993);
ISSN: 0197-9337
Descriptors: rivers/ bank erosion/ erosion rates/ river mechanics/ channel morphology/ meanders/ river banks/ fluvial morphology/ channels/ Erosion and sedimentation/ Topography and morphology
Abstract: A detailed review and chronological survey is presented of the various techniques which have been used for the measurement of river bank erosion and channel change. The techniques are classified according to the time scales involved (long, intermediate and short) and each is discussed with respect to accuracy and repeatability. The methods covered include sedimentological evidence, botanical evidence, historical sources, planimetric resurvey, repeated cross-profiling, erosion pins and terrestrial photogrammetry. Prospects for future developments are also discussed.
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891. **Measuring biodiversity value for conservation.**
Humphries, C. J.; Williams, P. H.; and Vane Wright, R. I.
Annual Review of Ecology and Systematics 26: 93-111. (1995)
NAL Call #: QH540.A55;
ISSN: 0066-4162 [ARECBC]
Descriptors: species diversity/ wildlife/ wildlife conservation/ zoogeography/ reviews/ species richness
This citation is from AGRICOLA.

892. **Mechanisms, rates and assessment of N2O in groundwater, riparian zones and rivers.**
Groffman, P. M.; Gold, A. J.; Kellogg, D. Q.; and Addy, K.
In: Non-CO2 greenhouse gases: Scientific understanding, control options and policy aspects: Proceedings of the Third International Symposium. (Held 21 Jan 2002-23 Jan 2002 at Maastricht, Netherlands.) Ham, J. van; Baede, A. P. M.; Guicherit, R.; and Williams-Jacobse, J. G. (eds.)

Rotterdam, Netherlands: Millpress Science Publishers; pp. 159-166; 2002. *ISBN:* 90-77017-70-4
This citation is provided courtesy of CAB International/CABI Publishing.

893. **Mechanistic models of ammonia release from liquid manure: A review.**
Ni JiQin and Ni JQ
Journal of Agricultural Engineering Research 72 (1): 1-17; 44 ref. (1999)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

894. **Mediating mutualisms: Farm management practices and evolutionary changes in symbiont co-operation.**
Kiers, E. T.; West, S. A.; and Denison, R. F.
Journal of Applied Ecology 39 (5): 745-754. (2002)
NAL Call #: 410 J828;
ISSN: 0021-8901
This citation is provided courtesy of CAB International/CABI Publishing.

895. **A Meta-Analysis of Forest Cover, Edge Effects, and Artificial Nest Predation Rates.**
Hartley, MJ and Hunter, ML Jr
Conservation Biology 12 (2): 465-469. (1998)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
Descriptors: forests/ predation/ edge effect/ Aves/ Birds
Abstract: Landscape fragmentation has been among the most intensely studied topics in conservation biology for decades. The influence of habitat edge has often been investigated as an important feature in fragmented areas, especially with respect to bird nesting success, as evidenced by three recent reviews. Paton (1994) concluded that "current evidence, although equivocal, suggests that predation and parasitism rates are often significantly greater within 50 m of an edge." Andren (1995) examined edge (or patch size) effects in a review of 40 papers and concluded that "edge-related increase in predation seems to be most commonly found inside forests surrounded by farmland and was rarely found in forest mosaics." Major and Kendal (1996) showed that a preponderance of studies "demonstrated a positive correlation between predation rate and the degree of habitat fragmentation," but found "more variable results" regarding edge effects. We believe that none of these papers adequately addressed the issue of whether or not predation rates and edge effects differ between deforested versus forested landscapes. Thus, we decided to evaluate relationships between degree of forest cover in a landscape and (1) avian nest success rates and (2) the existence of elevated predation rates near habitat edges. We combined data from 13 previous studies in 33 U.S. landscapes to explore patterns of nest predation and landscape composition.
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896. **Meteorological modeling for air-quality assessments.**
Seaman, Nelson L
Atmospheric Environment 34 (12-14): 2231-2259. (2000)
NAL Call #: TD881.A822;
ISSN: 1352-2310
Descriptors: North American Research Strategy for Tropospheric Ozone [NARSTO]/ air pollution/ air quality assessment meterological modeling: dynamical models, four dimensional data assimilation/ environmental pollution
Abstract: Meteorological fields are required inputs for air-quality models, but they can contain significant errors which contribute to uncertainties in simulations of airborne chemical species, aerosols and particulate matter. Atmospheric states can be diagnosed from observations or simulated by dynamical models (with or without four-dimensional data assimilation, FDDA). In general, diagnostic models are straightforward to operate, but obtaining sufficient observations to analyze regional-scale features is costly, may omit key variables and often lack sufficient spatial or temporal density to describe the fields adequately. Dynamical models, although still imperfect, have improved in recent years and are now widely accepted for many air-quality modeling applications. Examination of the current state of dynamical models used as meteorological pre-processors indicates that useful simulations for real cases are feasible for scales at least as fine as 1 km. Introduction of faster computers and practical FDDA techniques already allow simulations of regional episodes lasting up to 5-10 d with fine resolutions (5 km or less). As technology has improved, however, a need has developed for better parameterizations to represent vital physical processes, such as boundary layer fluxes, deep convection and clouds, at these finer grid scales. Future developments in meteorological modeling for air-quality applications will include advanced model physics and data assimilation, better coupling between meterological and chemical models, and could lead eventually to widespread use of fully integrated meteorological-chemical models for simulating and predicting air quality.
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897. **Methane and nitrous oxide emission from irrigated rice fields: Proposed mitigation strategies.**
Majumdar, D.
Current Science 84 (10): 1317-1326. (May 2003)
NAL Call #: 475 SCI23;
ISSN: 0011-3891.
Notes: Number of References: 126
Descriptors: Multidisciplinary/ encapsulated calcium carbide/ flooded rice/ nitrification inhibitors/ Louisiana rice/ N2O emissions/ paddy fields/ Nitrosomonas europaea/ fertilizer management/ agricultural fields/ water management
Abstract: Rice fields are major sources of CH4 and N2O. A number of practices have been suggested to minimize the emission of either of these gases, but simultaneous mitigation of these gases are not widely discussed. Mitigating CH4 emission may increase N2O emissions and vice versa. Reducing their emission and making the cumulative radiative forcing a minimum is a priority. The strategies should be effective, applicable on a large scale, technically feasible, economic, less time-consuming, environment friendly and should be easily acceptable. On the basis-of the available literature on CH4 and N2O mitigation, the following measures are suggested by the author to mitigate the emissions of these two gases simultaneously from irrigated rice fields: (1) Application of mid-season drainage which does not coincide with high ammonium in soil, (2) application of urea and NH4+-based fertilizers in 4 splits with nitrification inhibitors to increase N use efficiency, (3) replacement of ammonium sulphate with other sulphate sources to minimize CH4 and N2O emissions,

(4) replacement of N broadcasting by foliar-N spray application, (5) sub-surface application of urea supergranules, (6) incorporation or deep placement of prilled urea instead of surface application, (7) application of well-composted organic matter in place of fresh organic matter and green manure, (8) use of single superphosphate (SSP) basally, which in addition to supplying phosphorus, could mitigate CH4 production by supplying sulphur to soil and (9) cultivation of rice varieties with low gas transport capacities and low exudate formation. These practices can be taken up without much difficulty in irrigated rice fields and can reduce CH4 and N2O emission simultaneously.

898. **Methane emission from natural wetlands.**
Wang, Zhengping; Zeng, Dong; and Patrick, William H.
Environmental Monitoring and Assessment 42 (1-2): 143-161. (1996)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: methane/ carbon/ air pollution/ global carbon cycle/ greenhouse gas/ methanogenesis/ northern wetlands/ temperate wetlands/ tropical wetlands
Abstract: Methane is considered one of the most important greenhouse gases in the atmosphere. Because of the strict anaerobic conditions required by CH-4-generating microorganisms, natural wetland ecosystems are one of the main sources of biogenic CH-4. The total natural wetland area is estimated to be 5.3 to 5.7 times 10-12 m-2, making up less than 5% of the Earth's land surface. However, natural wetland plays a disproportionately large role in CH-4 emissions. Wetlands are likely the largest natural sources of CH-4 to the atmosphere, accounting for about 20% of the current global annual emission. Out of the total amount of CH-4 emitted, northern wetlands contribute 34%, temperate wetlands 5%, and tropical systems about 60%. Because of the unique characteristics and high productivity, wetland ecosystems are important in the global carbon cycle. Natural wetlands are permanently or temporarily saturated. Strict anaerobic conditions consequently develop, which allows methanogenesis to occur. But the thin oxic layer and the oxic plant rhizosphere promote activity of CH-4-oxidizing bacteria or methanotrophs. Thus, both CH-4 formation and consumption in wetland systems are microbiological processes and are controlled by many factors. Eight of the controlling factors, including carbon supply, soil oxidation-reduction status, pH, temperature, vegetation, salinity and sulfate content, soil hydrological conditions and CH-4 oxidation are discussed in this paper.

899. **Methane oxidation in non-flooded soils as affected by crop production.**
Hutsch, B. W.
European Journal of Agronomy 14 (4): 237-260. (July 2001)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: crops/ methane/ oxidation/ soil biology/ climatic change/ soil bacteria/ uptake/ arable soils/ grasslands/ land use/ forests/ tillage/ ammonium/ urea/ soil management/ inhibition/ crop residues/ carbon nitrogen ratio/ slurries/ animal manures/ pH/ conservation tillage/ growth/ pesticides/ literature reviews/ methanotrophic bacteria
Abstract: Methane is an important greenhouse gas, which contributes approximately 20% to global warming. The atmospheric CH4 concentration is increasing rapidly, resulting from an imbalance between CH4 production and consumption. The only known biological CH4 sinks are soils where methanotrophic bacteria consume CH4 by oxidizing it. For several reasons the CH4 uptake potential, particularly of arable soils and grassland, is only partly exploited, as several agricultural practices have adverse impacts on the activity of the CH4 oxidizing bacteria. The kind of land use in general has a remarkable influence with much higher oxidation rates under forest than under grassland or arable soil. Regular soil cultivation by ploughing and fertilization with ammonium or urea have been identified as main factors. Immediately after ammonium application the methanotrophic enzyme system is blocked, resulting in an inhibition of CH4 oxidation. In addition to this short-term effect a long-term effect exists after repeated ammonium fertilization, which is most likely caused by a shift in the population of soil microbes. Crop residues affect CH4 oxidation differently, depending on their C/N ratio: with a wide C/N ratio no effects are expected, whereas with a narrow C/N ratio strong inhibition was observed. Animal manure, particularly slurry, can cause CH4 emission immediately after application, whereas in the long run farmyard manure does not seem to have adverse impacts on CH4 oxidation. The methanotrophic activity decreased markedly with soil pH, although in many cases liming of acidified soils did not show a positive effect. Arable soils have a rather small pH range which allows CH4 oxidation, and the inhibitory effect of ammonium can partly result from a concomitant decrease in soil pH. Reduced tillage was identified as a measure to improve the methanotrophic activity of arable land, set aside of formerly ploughed soil points into the same direction. Plant growth itself is not primarily responsible for observed effects on CH4 oxidation, but secondary factors like differential pesticide treatments, changes in pH, or cultivation effects are more likely involved. Although for the overall CH4 fluxes the oxidation processes in agricultural soils are of minor importance, all available possibilities should be exhausted to improve or at least preserve their ability to oxidize CH4.
This citation is from AGRICOLA.

900. **Methane Production and Methane Consumption: A Review of Processes Underlying Wetland Methane Fluxes.**
Segers, R.
Biogeochemistry 41 (1): 23-51. (1998)
NAL Call #: QH345.B564;
ISSN: 0168-2563
Descriptors: Methane/ Wetlands/ Fluctuations/ Atmosphere/ Atmospheric gases/ Atmospheric chemistry/ Peat/ Oxidation/ Methanogenesis/ Greenhouse effect/ Climatic changes/ Soils/ Anoxic conditions/ Biogeochemical cycle/ soil microorganisms/ greenhouse gases/ Microorganisms/ General/ Atmospheric chemistry/ Ecosystems and energetics/ General/ Physiology, biochemistry, biophysics/ Habitat community studies
Abstract: Potential rates of both methane production and methane consumption vary over three orders of

magnitude and their distribution is skew. These rates are weakly correlated with ecosystem type, incubation temperature, in situ aeration, latitude, depth and distance to oxic /anoxic interface. Anaerobic carbon mineralisation is a major control of methane production. The large range in anaerobic CH sub(4):CO sub(2) production rates indicate that a large part of the anaerobically mineralised carbon is used for reduction of electron acceptors, and, hence, is not available for methanogenesis. Consequently, cycling of electron acceptors needs to be studied to understand methane production. Methane and oxygen half saturation constants for methane oxidation vary about one order of magnitude. Potential methane oxidation seems to be correlated with methanotrophic biomass. Therefore, variation in potential methane oxidation could be related to site characteristics with a model of methanotrophic biomass.
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901. **Methane recovery from animal manures: A current opportunities casebook.**
Regional Biomass Energy Program.
Washington, D.C.: Regional Biomass Energy Program, U.S. Dept. of Energy; viii, 90 p.: ill. (1995)
Notes: "August 1995." "DOE/EE-0062." Includes bibliographical references.
NAL Call #: TP359.M4-M47-1995
Descriptors: Farm manure in methane production---United States---Case studies/ Methane---Recycling---United States---Case studies
This citation is from AGRICOLA.

902. **Methodologies for interrill soil erosion studies.**
Agassi, M and Bradford, J M
Soil and Tillage Research 49 (4): 277-287. (1999)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: interrill soil erosion/ natural rainstorms/ rainfall intensity/ soil loss/ study methodology
Abstract: Due to wide range of experimental techniques reported in the literature for determining interrill erodibility and soil loss values, meaningful comparisons between experiments often cannot be made. Furthermore, inaccurate concepts are developed because erosion processes are dependent upon methodologies. The purpose of this paper is to discuss problems related to both laboratory and field rainfall simulator experiments. Rainfall simulators cannot duplicate a wide range of rainfall intensities and, at the same time, have similar energies as natural rainstorms, unless several different nozzles are used. Rainfall intensity in most simulators is created by varying the frequency of spray oscillation. This intermittent spray characteristic of most simulators, and the constant drop size characteristic of other simulators, greatly affects results. Erosion pan design for laboratory studies and preparation of soil samples placed in the pans also can influence erosion results. We conclude that standardization of rainfall simulator design and test procedures will allow better comparison of erosion results to be made among researchers.
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903. **Methods for evaluating wetland condition: Wetland biological assessment case studies.**
Danielson, T. J. and Hoskins, D. G.
U.S. Environmental Protection Agency, Office of Water [Also available as: EPA-822-R-03-013], 2003.
Notes: 104 pp.; #14 in series (application/pdf)
http://www.epa.gov/waterscience/criteria/wetlands/14Casestudies.pdf
Descriptors: wetlands / environmental assessment/ nutrient enrichment/ monitoring/ water quality analysis/ water quality standards/ Florida/ Maine/ Maryland/ Massachusetts/ Michigan/ Minnesota/ Montana/ North Dakota/ Ohio/ Oregon/ Pennsylvania/ Vermont/ Washington/ Wisconsin

904. **Methods for the examination of organismal diversity in soils and sediments.**
Hall, G. S.; Lasserre, Pierre.; Hawksworth, D. L.; C.A.B. International; UNESCO; and International Union of Biological Sciences
Wallingford, Oxon, UK; New York, NY, USA: CAB International in association with United Nations Educational, Scientific, and Cultural Organization and the International Union of Biological Sciences; xii, 307 p.: ill. (1996)
NAL Call #: S593.M44525--1996;
ISBN: 0851991491
Descriptors: Soils---Analysis/ Sediments---Geology---Analysis/ Soil microbiology
This citation is from AGRICOLA.

905. **Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory: Determination of pesticides in water by graphitized carbon-based solid-phase extraction and high-performance liquid chromatography/mass spectrometry.**
Furlong, Edward T.; Geological Survey (U.S.); and National Water Quality Laboratory (U.S.).
Denver, Colo.: U.S. Dept. of the Interior, U.S. Geological Survey; vii, 73 p.: ill.; Series: Water-resources investigations report 01-4134. (2001)
Notes: Shipping list no.: 2002-0081-P. Includes bibliographical references (p. 72-73). SUDOCS: I 19.42/4:01-4134.
NAL Call #: GB701 .W375 no. 2001-4134
Descriptors: Pesticides---Environmental aspects---United States/ Water quality management---United States---Methodology/ Liquid chromatography/ Mass spectrometry/ Water Pesticide content---Measurement
This citation is from AGRICOLA.

906. **Methods of analysis of dithiocarbamate pesticides: A review.**
Malik, Ashok Kumar and Faubel, Werner
Pesticide Science 55 (10): 965-970. (1999)
NAL Call #: SB951.P47;
ISSN: 0031-613X
Descriptors: dithiocarbamate: pesticide/ commercial samples/ environmental samples
Abstract: This review incorporates a brief introduction to methods for the analysis of dithiocarbamate pesticides followed by a more detailed discussion of individual methods. Determination of dithiocarbamate residues from foodstuffs, water and commercial samples and in various environmental samples using different techniques is a key feature.
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907. **Methods to estimate forest health.**
Innes, J. L.
Silva Fennica 27 (2): 145-157. (1993);
ISSN: 0037-5330
This citation is provided courtesy of CAB International/CABI Publishing.

908. **Metolachlor, S-metolachlor and their role within sustainable weed-management.**
O'Connell, Peter J; Harris, Christian T; and Allen, James R F
Crop Protection 17 (3): 207-212. (1998)
NAL Call #: SB599.C8;
ISSN: 0261-2194
Descriptors: metolachlor: herbicide/ S metolachlor: herbicide/ crops (Angiospermae)/ weeds (Tracheophyta): pest/ Angiosperms/ Plants/ Spermatophytes/ Vascular Plants/ crop tolerance/ half life/ residual activity/ sustainable weed management
Abstract: The herbicide metolachlor has been widely used for over 20 years for selective weed control in more than 70 crops worldwide. Its favourable soil behaviour and low risk for developing weed resistance means that metolachlor integrates well into sustainable weed-management practices, such as conservation tillage. Metolachlor consists of four stereoisomers, with herbicidal activity coming mainly from the S-isomer pair. A new catalyst system developed allows the commercial production of enantiomerically-enriched S-metolachlor (ISO draft common name). In field trials carried out 1995-1996 S-metolachlor demonstrated equivalent efficacy on major grass weeds and tolerance to different maize cultivars at 65% the use rate of metolachlor. In laboratory studies in different soils degradation half-lives were similar for metolachlor and S-metolachlor. The mean half life of S-metolachlor was 23 days in dissipation studies at different European field sites. At the lower use rates and with highly concentrated formulations containing up to 96% (w/v) active ingredient, the use of S-metolachlor will result in a substantial reduction of risk to applicators, consumers and the environment and the herbicide will continue to play an important role in sustainable weed-management.
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909. **Microbes as a source of earthy flavours in potable water: A review.**
Wood, S; Williams, S T; and White, W R
International Biodeterioration and Biodegradation 48 (1-4): 26-40. (2001)
NAL Call #: QH301.I54;
ISSN: 0964-8305
Descriptors: geosmin: production/ methylisoborneol: production/ actinomycetes (Actinomycetes and Related Organisms)/ cyanobacteria (Cyanobacteria) / fungi (Fungi)/ microbe (Microorganisms)/ Bacteria/ Cyanobacteria/ Eubacteria/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants/ earthy flavors/ marginal vegetation/ potable water taint/ sediment/ soil/ water
Abstract: The possible significance of various microbes, including actinomycetes, cyanobacteria and fungi, in the production of earthy tastes and odours in potable water is discussed. Emphasis is placed on those which have been shown to produce geosmin and methylisoborneol in culture. Evidence for the production of these compounds in water, sediment, marginal vegetation and soil is considered. The potential of these sites as sources of taints in potable water is assessed.
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910. **Microbial ecology of organic aggregates in aquatic ecosystems.**
Simon, M.; Grossart, H. P.; Schweitzer, B.; and Ploug, H.
Aquatic Microbial Ecology 28 (2): 175-211. (2002);
ISSN: 0948-3055
This citation is provided courtesy of CAB International/CABI Publishing.

911. **Microbial management for restoring soil fertility.**
Raghubanshi, A. S. and Singh, H.
Restoration of Degraded Land: Concepts and Strategies: 49-63. (1993)
This citation is provided courtesy of CAB International/CABI Publishing.

912. **Microbial pathogens within aquifers: Principles and protocols.**
Pillai, Suresh D.
Berlin; New York: Springer; 154 p.: ill.; Series: Environmental intelligence unit. (1998)
NAL Call #: QR105.5.M527-1998;
ISBN: 1570595208 (alk. paper); 3540638911 (alk. paper)
Descriptors: Groundwater---Microbiology/ Groundwater---Microbiology---Laboratory manuals
This citation is from AGRICOLA.

913. **Microbial source tracking: State of the science.**
Simpson, J. M.; Domingo, J. W. S.; and Reasoner, D. J.
Environmental Science and Technology 36: 5279-5288. (2002)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG].
Notes: Publisher: American Chemical Society
Descriptors: water quality
This citation is from AGRICOLA.

914. **Microbiological safety of drinking water: United States and global perspectives.**
Ford, Timothy Edgcumbe
Environmental Health Perspectives 107 (1 [supplement]): 191-206. (1999)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
Descriptors: human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ drinking water microbial safety: global perspectives/ water pollution/ waterborne disease statistics: pathogen identification, underreporting
Abstract: Waterborne disease statistics only begin to estimate the global burden of infectious diseases from contaminated drinking water. Diarrheal disease is dramatically underreported and etiologies seldom diagnosed. This review examines available data on waterborne disease incidence both in the United States and globally together with its limitations. The waterborne route of transmission is examined for bacterial, protozoal, and viral pathogens that either are frequently associated with drinking water (e.g., Shigella spp.), or for which there is strong evidence implicating the waterborne route of transmission (e.g., Leptospira spp.). In addition, crucial areas of research are discussed, including risks from selection of treatment-resistant pathogens, importance of environmental reservoirs, and new methodologies for pathogen-specific monitoring. To accurately assess risks from waterborne disease, it is necessary to understand pathogen distribution and survival strategies within water distribution systems and

to apply methodologies that can detect not only the presence, but also the viability and infectivity of the pathogen.

915. **Microbiological tests of the effects of plant protection products in soil: Experience and proposals to improve ecotoxicological significance.**
Malkomes, H P
Bulletin OEPP 31 (2): 159-167. (2001);
ISSN: 0250-8052
Descriptors: dehydrogenase activity/ nitrogen/ applied microbiological test parameters/ sensitivity/ significance/ biomass related microbial activities/ dehydrogenase activity/ substrate induced respiration/ ecotoxicological significance experience/ improvement proposals/ nitrogen transformation mineralization/ nitrification/ plant protection products/ dose dependent effects/ ecotoxicological testing/ soil microorganism risk potential/ test design parameters/ dosage/ ecological conditions/ incubation time/ mode of application/ reference compounds/ soils
Abstract: One objective of ecotoxicological testing of plant protection products within authorization procedures is to assess, under standardized conditions, potential risks for soil microorganisms. This is only possible if some essential conditions are considered. In the past 10 years, experience has been obtained, either from authorization procedures or ecotoxicological research, which may stimulate discussion of existing or planned test methods. This includes applied microbiological test parameters (e.g. sensitivity, significance), design of the tests (e.g. dosage, mode of application, reference compounds, soils, ecological conditions, incubation time) as well as the interpretation of results. The size of tests is necessarily reduced in routine authorization procedures as compared with those within ecotoxicological research and these tests must therefore be optimized and updated to reach sufficient efficiency. From our experience, the combination of biomass-related microbial activities (e.g. substrate-induced respiration, dehydrogenase activity) with nitrogen transformation (mineralization followed by nitrification) is especially useful to identify dose-dependent effects.

916. **Micrometeorologic methods for measuring the post-application volatilization of pesticides.**
Majewski, M S
Water, Air and Soil Pollution 115 (1-4): 83-113. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: pesticides: pollutant, toxin/ aerodynamic profile/ atmospheric science/ ecotoxicology/ eddy correlation/ energy balance/ environmental disturbance/ integrated horizontal flux/ micrometeorological measurements/ post volatilization flux/ relaxed eddy accumulation/ steady state conditions/ surficial characteristics/ temperature gradients/ theoretical profile shape/ trajectory simulations/ wind speed
Abstract: A wide variety of micrometeorological measurement methods can be used to estimate the postapplication volatilization of pesticides from treated fields. All these estimation methods require that the entire study area have the same surficial characteristics, including the area surrounding the actual study site, and that the pesticide under investigation be applied as quickly and as uniformly as possible before any measurements are made. Methods such as aerodynamic profile, energy balance, eddy correlation, and relaxed eddy accumulation require a large (typically 1 or more hectare) study area so that the flux measurements can be made in a well developed atmospheric boundary-layer and that steady-state conditions exist. The area surrounding the study plot should have similar surficial characteristics as the study plot with sufficient upwind extent so the wind speed and temperature gradients are fully developed. Mass balance methods such as integrated horizontal flux and trajectory simulations do not require a large source area, but the area surrounding the study plot should have similar surficial characteristics. None of the micrometeorological techniques for estimating the postapplication volatilization fluxes of pesticides disturb the environment or the soil processes that influence the gas exchange from the surface to the atmosphere. They allow for continuous measurements and provide a temporally averaged flux value over a large area. If the behavior of volatilizing pesticides and the importance of the volatilization process in redistributing pesticides in the environment are to be fully understood, it is critical that we understand not only the processes that govern pesticide entry into the lower atmosphere, but also how much of the millions of kilograms of pesticides that are applied annually are introduced into, and redistributed by, the atmosphere. We also must be aware of the assumptions and limitations of the estimation techniques used, and adapt the field of pesticide volatilization flux measurements to advances in atmospheric science.

917. **Mineralization of manure nutrients.**
Eghball, B.; Wienhold, B. J.; Gilley, J. E.; and Eigenberg, R. A.
Journal of Soil and Water Conservation 57 (6): 470-473. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: animal manures/ composts/ mineralization/ nutrients/ macronutrients/ nitrogen/ phosphorus/ trace elements/ soil fertility/ nutrient availability/ ammonium nitrogen/ nitrate nitrogen/ soil flora/ biological activity in soil/ soil biology/ composted manure
This citation is from AGRICOLA.

918. **Minerals and Mine Drainage.**
Turney, W. R. and Thomson, B. M.
Water Environment Research 65 (6): 410-413. (1993)
NAL Call #: TD419.R47
Descriptors: Acid mine drainage/ Literature review/ Mine drainage/ Mine wastes/ Reviews/ Wastewater treatment/ Water pollution control/ Water pollution prevention/ Drilling fluids/ Environmental protection/ Management planning/ Mineral industry/ Regulations/ Rehabilitation/ Remediation/ Soil contamination/

Waste disposal/ Water reuse/ Wastewater treatment processes/ Water quality control
Abstract: The environmental challenges facing the mining industry are summarized in a case study which found that a company must evaluate the environmental, social, and economic consequences of a proposed operation and attempt to mitigate these impacts during the planning process. Increasing pressure from regulatory agencies has generated interest in developing processes for the treatment of mining and milling wastes. When considering remediation in areas with high mining activity, naturally occurring background levels of metals should be identified before establishing cleanup standards. The causes and potential control strategies for managing acid mine drainage (AMD) continue to be heavily investigated. Iron oxidation and AMD stream interception have been proposed to reduce the effects of AMD. Criminalization of the environmental regulatory process presents serious consequences to independent oil and gas producers who use a variety of substances in drilling and production and who generate a number of waste streams. Surface disposal of spent drilling fluid used in petroleum and natural gas exploration causes surface soil contamination that severely inhibits plant succession and artificial revegetation efforts. Metal contamination of soils from mine tailings has caused elevated trace metals in forage and cattle. A successful strategy aimed at minimizing contamination levels of effluents through optimization of reagent selection and reduction of effluent volumes by maximizing water reuse was achieved at a gold mine in Ontario, Canada. Strategies for management and remediation of cyanide contamination continue to be developed. (Geiger-PTT) 35 012614019

919. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 66 (4): 417-432. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ environmental effects/ mine drainage/ mine wastes/ mineral industry/ acid mine drainage/ toxicity/ bioindicators/ heavy metals/ regulations/ monitoring/ water pollution/ groundwater pollution/ reclamation/ indicator species/ mine tailings/ Sources and fate of pollution/ Behavior and fate characteristics

920. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 67 (4): 527-529. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ minerals/ mine drainage/ regulations/ water quality/ acid mine drainage/ industrial wastes/ model studies/ artificial wetlands/ mine tailings/ drainage water/ environmental impact/ acidification/ wetlands/ wastewater treatment/ Sources and fate of pollution/ Behavior and fate characteristics

921. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 68 (4): 542-545. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: literature review/ minerals/ mine wastes/ environmental effects/ national parks/ regulations/ remediation/ dusts/ environmental protection/ public health/ nuisance/ mine drainage/ Water quality control
Abstract: Cleanup standards for abandoned mines must consider the local geology and historic mining activity (Anon. 1995). An illustration of these factors was presented in the context of developing remediation alternatives for the abandoned Summitville open-pit gold mine Colorado. There are two steps involved in evaluating potential impacts of mine wastes on ground and surface water: characterization of the mine waste and assessment of potential impacts. General guidelines for a mine waste characterization strategy were provided by (Herzog and Forsgren, 1995). The environmental and regulatory conflicts associated with constructing a new gold mine near Yellowstone National Park were described (Maxwell, 1995; Anon., 1995b; Anon. 1995c). The U.S. Forest Service is expected to make a decision regarding approval of the mine sometime in 1996. Excess dust, produced and blown from quarries and surface mines, is often perceived as a potential environmental problem (Merefield et al. 1995). The Environmental Protection Act of 1990 allows regulatory action to be taken by local authorities to control other dusts considered to pose nuisance or health risks. The overall intention is to provide site operators and regulators with the means to eliminate dusts nuisance from disputes over planning and license applications before it becomes a serious hazard.

922. **Minerals and Mine Drainage.**
Smith, D. P.; Young, L. G.; and Holtzen, M. L.
Water Environment Research 69 (4): 631-637. (1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Minerals/ Mine Drainage/ Mine Wastes/ Leachates/ Acid Mine Drainage/ Soil Contamination/ Metals/ Analytical Methods/ Toxicity/ Effects of pollution

923. **Minimizing Agricultural Nonpoint-Source Impacts: A Symposium Overview.**
Sharpley, A. and Meyer, M.
Journal of Environmental Quality 23 (1): 1-3. (1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425.
Notes: Conference: Symp. "Minimizing Agricultural Nonpoint-Source Impacts", at American Society of Agronomy Annu. Meet., Minneapolis, MN (USA), 2 Nov 1992
Descriptors: agricultural runoff/ nonpoint pollution/ environmental impact/ water quality/ Freshwater pollution/ groundwater contamination/ groundwater pollution/ water quality control/ nonpoint pollution sources/ environmental effects / environmental policy/ agricultural pollution/ pollution control/ chemical pollution / watersheds/ pollution legislation/ Freshwater pollution/ Water quality control/ Prevention and control
Abstract: Increased public awareness of the role of agriculture and associated chemical use in nonpoint-source pollution has prompted an urgency in obtaining information on the impact of current and proposed

agricultural management practices on water quality. Because of easier identification and control of point sources of pollution, agricultural nonpoint sources now account for a larger share of all discharges than a decade ago. Consequently, there is a need to identify critical sources for control; target specific controls for different water quality objectives within different watersheds; and evaluate and implement cost-effective management practices that minimize the potential loss of agricultural chemicals to surface and groundwaters. This paper provides a brief overview of agricultural nonpoint-source issues and options presented at a special symposium, "Minimizing Agricultural Nonpoint-Source Impact," held during the American Society of Agronomy meetings in November 1992. Several papers that were given at this symposium and presented in this issue are introduced.

924. **Mixing and Transport.**
Mossman, D. J. and Roig, L. C.
Water Environment Research 66 (4): 477-489. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: Special issue: Literature review
Descriptors: surface water/ literature review/ fluid mechanics/ solute transport/ sediment transport/ flow/ model studies/ water currents/ data acquisition/ transport processes/ pollution dispersion/ groundwater pollution/ Sources and fate of pollution/ Characteristics, behavior and fate
Abstract: Papers reviewed herein are limited to surface water flow phenomena and fluid mechanics relating to the mixing and transport of pollutants. The American Society of Civil Engineers Hydraulics Division Research Committee identified the following research needs relating to surface water mixing and transport issues: density-stratified flows, secondary currents, interactions of flows with beds and banks, model development, data acquisition for field data, and the transport of solutes and sediments.

925. **Mobility Assessment of Agrichemicals: Current Laboratory Methodology and Suggestions for Future Directions.**
Cleveland, C. B.
Weed Technology 10 (1): 157-168. (1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: fate of pollutants/ agricultural chemicals/ laboratories/ pesticides/ literature review/ Sources and fate of pollution
Abstract: The current state of registration requirements for mobility assessments of pesticides is described and the various uses for mobility estimates are outlined. A survey of recent literature on mobility assessments is presented along with a suggestion for a refocus on K sub(d) rather than K sub(F). A proposal for a different, yet standard, more efficient approach as a replacement for the current requirements is outlined. The suggested approach could fit well within a registration package or a limited research budget as well as provide more information for model input.

926. **Modeling erosion by water and wind.**
Rose, C. W.
In: Methods for assessment of soil degradation/ Lal, R.; Blum, W. H.; Valentine, C.; and Stewart, B. A. Boca Raton, Fla.: CRC Press, 1998; pp. 57-88.
ISBN: 084937443X
NAL Call #: S623.M435-1998
Descriptors: wind erosion/ water erosion/ simulation models/ computer simulation/ mathematical models/ reviews
This citation is from AGRICOLA.

927. **Modeling excessive nutrient loading in the environment.**
Reckhow, K H and Chapra, S C
Environmental Pollution 100 (1-3): 197-207. (1999)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: organic carbon/ environmental pollution/ error propagation/ excessive environmental nutrient loading modeling/ generalized sensitivity analysis/ hydrodynamics/ model confirmation/ sediment diagenesis/ surface water modeling
Abstract: Models addressing excessive nutrient loading in the environment originated over 50 years ago with the simple nutrient concentration thresholds proposed by Sawyer (1947. Fertilization of lakes by agricultural and urban drainage. New Engl. Water Works Assoc. 61, 109-127). Since then, models have improved due to progress in modeling techniques and technology as well as enhancements in scientific knowledge. Several of these advances are examined here. Among the recent approaches in modeling techniques we review are error propagation, model confirmation, generalized sensitivity analysis, and Bayesian analysis. In the scientific arena and process characterization, we focus on advances in surface water modeling, discussing enhanced modeling of organic carbon, improved hydrodynamics, and refined characterization of sediment diagenesis. We conclude with some observations on future needs and anticipated developments.

928. **Modeling Mobility and Effects of Contaminants in Wetlands.**
Dixon, K. R. and Florian, J. D. Jr
Environmental Toxicology and Chemistry 12 (12): 2281-2292. (1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: wetlands / contaminants/ transport/ models/ reviews/ ecosystem models/ model studies/ sediment transport/ solute transport/ pollutants/ pollution dispersion/ mathematical models/ spatial models/ Modeling/ mathematics/ computer applications/ Wetlands/ Toxicity testing/ Sources and fate of pollution/ Freshwater pollution/ Behavior and fate characteristics/ Pollution/ Organisms/ Ecology/ Toxicology
Abstract: Early efforts at modeling wetland ecosystems were aimed primarily at reflecting biomass or nutrient dynamics. A number of models have been developed for different wetland types, including coastal salt marshes, mangrove wetlands, freshwater marshes, swamps, and riparian wetlands. The early ecosystem models were mostly simple compartment models with linear, constant-coefficient differential equations used to simulate biomass or nutrient dynamics. Practically no contaminant flux was incorporated into these models. With few exceptions, the ecosystems were considered spatially homogeneous. At

the same time that the ecosystem models were being developed, considerable effort was given to modeling various wetland processes, such as circulation and sediment transport. Other process-level modeling included plant and animal uptake and elimination of both organic chemicals and heavy metals. The level of detail in these process models, however, has not been applied to most ecosystem models. There has been a recent trend, however, to increase the complexity of ecosystem-level models and to incorporate spatial dynamics. These developments should greatly enhance the ability to simulate contaminant transport and effects in wetlands.
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929. **Modeling phosphorus transport in agricultural watersheds: Processes and possibilities.**
Sharpley, A. N.; Kleinman, P. J. A.; McDowell, R. W.; Gitau, M.; and Bryant, R. B.
Journal of Soil and Water Conservation 57 (6): 425-439. (Nov. 2002-Dec. 2002)
NAL Call #: 56.8 J822;
ISSN: 0022-4561 [JSWCA3]
Descriptors: phosphorus/ transport processes/ losses from soil/ water erosion/ animal manures/ watersheds/ agricultural land/ water pollution/ soil fertility/ phosphorus fertilizers/ overland flow/ subsurface runoff/ simulation models/ mathematical models
This citation is from AGRICOLA.

930. **Modeling post-tillage soil structural dynamics: A review.**
Or, D. and Ghezzehei, T. A.
Soil and Tillage Research 64 (1/2): 41-59. (2002)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

931. **Modelling land use and cover as part of global environmental change.**
Riebsame, William E; Meyer, William B; and Turner, B L II
Climatic Change 28 (1-2): 45-64. (1994)
NAL Call #: QC980 .C55;
ISSN: 0165-0009
Descriptors: Plantae (Plantae Unspecified)/ plants/ agriculture/ biodiversity/ forests/ range land/ resource management
© Thomson

932. **Modelling of atmospheric transport and deposition of pesticides.**
Jaarsveld, J. A. van and Pul, W. A. J. van.
Water, Air and Soil Pollution 115 (1/4): 167-182. (Oct. 1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979 [WAPLAC].
Notes: Special section: Fate of pesticides in the atmosphere: Implications for environmental risk assessment. Proceedings of a workshop held April 22-24, 1998, Driebergen, The Netherlands. Includes references.
Descriptors: pesticides/ pesticide residues/ dispersal/ dispersion/ deposition/ wind/ simulation models/ mathematical models/ atmosphere/ air pollution/ air pollutants/ emission/ polluted soils/ literature reviews
This citation is from AGRICOLA.

933. **Modelling of rainfall, flow and mass transport in hydrological systems: An overview.**
O'Connell, P. E. and Todini, E.
Journal of Hydrology 175 (1/4): 3-16. (Feb. 1996)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7].
Notes: In the special issue: Modelling of rainfall, flow and mass transport in hydrological systems / edited by P.E. O'Connell and E. Todini. Includes references.
Descriptors: hydrology/ rain/ overland flow/ water flow/ macropore flow/ groundwater flow/ catchment hydrology/ flooding/ watersheds/ simulation models/ computer simulation/ literature reviews
Abstract: Contemporary themes and research directions in hydrological modelling are reviewed in brief, to provide a suitable backcloth against which the Special Issue can be viewed. Some leading modelling issues are discussed and future research directions contemplated.
This citation is from AGRICOLA.

934. **Modelling Pollution Dispersion, the Ecosystem and Water Quality in Coastal Waters: A Review.**
James, I. D.
Environmental Modelling and Software with Environment Data News 17 (4): 363-385. (2002);
ISSN: 1364-8152
Descriptors: Reviews/ Water quality/ Coastal waters/ Pollution dispersion/ Sediment pollution/ Oil spills/ Mathematical models/ Path of Pollutants/ Model Studies/ Ecosystems/ Water Pollution/ Modelling (Pollution)/ Water quality (Natural waters)/ Ecology/ Oil spills/ Contaminated sediments/ Literature reviews/ Petroleum hydrocarbons/ Oil pollution/ Dissolved chemicals/ Environmental impact/ Fate/ Marine pollution/ Sources and fate of pollution/ Water Quality/ Behavior and fate characteristics/ Environmental Modeling
Abstract: 4This review is intended as a comprehensive but concise summary of present capabilities in coastal pollutant, ecosystem and water quality modelling. It reflects the recent rapid developments in multidisciplinary modelling in shelf seas. The behaviour of conservative pollutants that act as passive tracers is contrasted with those that have more complex behaviours, including oil spills. The importance of sediment modelling is emphasised, since contaminants commonly exist in both a dissolved and a particulate state, or adhere to sediments. Recently developed ecological models can have great complexity, reflecting the complexity of the real ecosystem. These models are now being linked to physical models of coastal waters and run with the same resolution. This has become possible only recently because of increases in computer power, particularly the availability of parallel systems at reasonable cost. The main advances in physical modelling are likely to come through greater understanding of turbulence and other sub-grid-scale processes as well as increased resolution. In the coastal seas there is often a lack of oceanographic data, which is even greater for the many biological and chemical variables than it is for physical variables. This is probably

the single most important factor limiting the progress of operational water quality models.

935. **Modelling soil water dynamics under trickle emitters: A review.**
Lubana, P. P. S. and Narda, N. K.
Journal of Agricultural Engineering Research 78 (3): 217-232. (Mar. 2001)
NAL Call #: 58.8-J82;
ISSN: 0021-8634 [JAERA2]
Descriptors: trickle irrigation/ soil water/ infiltration/ spatial distribution/ water uptake/ mathematical models/ literature reviews
Abstract: Information on moisture distribution patterns under point-source trickle emitters is a pre-requisite for the design and operation of trickle-irrigation systems. The distribution pattern is influenced by the properties and the manner water is applied and withdrawn from the soil profile. Flow from a point-source trickle emitter, because of its multi-dimensional nature and high frequency of water application, leads to complexities in modelling soil moisture dynamics. In addition, the plant rooting patterns under such conditions also exhibit drastic variations in withdrawal patterns from those in conventional irrigation practice, thereby making the prediction of the behaviour of moisture patterns quite difficult. An extensive review is presented of research work pertaining to modelling of various processes associated with moisture distribution patterns under point-source trickle emitters. This review promotes better understanding, facilitates a more rational analysis of the soil water dynamics processes under point-source trickle emitters and helps to identify topics for more emphasis in future modelling activity.
This citation is from AGRICOLA.

936. **Modelling the Interaction Between Buffer Zones and the Catchment.**
Merot, P. and Durand, P.
In: Buffer Zones: Their Processes and Potential in Water Protection. Haycock, N. E.; Burt, T. P.; Goulding, K. W. T.; and Pinay, G. (eds.) Hertfordshire, UK: Quest Environmental; pp. 208-217; 1997.
Notes: Conference: International Conference on Buffer Zones, [np], Sep 1996; Source: Buffer Zones: Their Processes and Potential in Water Protection., Quest Environmental, PO Box 45, Harpenden, Hertfordshire, AL5 5LJ (UK); *ISBN:* 0-9530051-0-0
Descriptors: model studies/ zones/ catchment areas/ water quality control/ biogeochemistry/ reviews/ hydrologic cycle/ vegetation/ buffer zones/ hedges/ Water quality control
Abstract: The classical agricultural non-point source pollution models, such as ANSWERS or AGNPS, usually do not explicitly use the buffer zone concept, although their modular, or distributed, conception allows it in theory. In practice, the main obstacle is that hydrology and biogeochemistry are much more complex and less understood in buffer zones than in cultivated fields. Attempts to model this concept, usually in relation to the riparian area functioning, can be classified in two ways. (1) Empirical models. Some descriptors of buffer zones are linked by stochastic relationships with biological or biogeochemical functions. For example, relationships have been established between the relative area of forested riparian zones and the streamwater chemical or biological quality; and between the hydrological regimes of the wetlands and their productivity. Furthermore, the seasonal or inter-annual variability of the stream discharge can be related to the functioning of the wetlands. (2) Deterministic models. These are essentially hydrological models based on the concept of variable contributing area. These models are distributed or semi-distributed (e.g. based on distribution functions of spatial variables). Some of them are mechanistic models (e.g., IHDM), but the most widely used and developed, currently, are conceptual models of the TOPMODEL type. In this case, a simple description of the topographic control on the extension of the saturated area generally allows an adequate simulation of the hydrology of the saturated zone and of the catchment. Some attempts have been made to couple these models with water quality descriptions, but usually in a very crude way that does not actually describe the specific biogeochemistry of the saturated zone. The main reason for this is probably the important heterogeneity of this zone, in terms of soils, biogeochemistry and water pathways. Other landscape structures that could act as buffer zones, such as hedges, have been very rarely considered in the models. Some studies have tried to describe the role of hedges in modifying the surface flow route and enhancing infiltration. A few models simulate the water cycle in hedges. The role of hedges as pollutant sinks is not yet modelled, and actually very little investigated. The main conclusion of this review is that the interactions between the catchment and buffer zones have mostly been seen by modellers as the hydrological control of the catchment via the variable saturated area concept. They have not yet fully taken into account the control of water quality within a catchment by the different potential buffer zones.

937. **Modelling water relations of horticultural crops: A review.**
Jones, H. G. and Tardieu, F.
Scientia Horticulturae 74 (1/2): 21-46. (Apr. 1998)
NAL Call #: SB13.S3;
ISSN: 0304-4238 [SHRTAH].
Notes: Special issue: Crop models in horticulture / edited by L.F.M. Marcelis and E.P. Heuvelink.
Includes references.
Descriptors: horticultural crops/ plant water relations/ simulation models/ growth models/ growth/ crop quality/ crop yield/ water content/ irrigation/ water uptake/ evaporation/ water stress/ root hydraulic conductivity/ plant height/ leaves/ water deficit/ xylem/ stomata/ literature reviews/ transpiration
This citation is from AGRICOLA.

938. **Models for evaluating water quality and BMP (Best Management Practice) effectiveness at the watershed scale.**
Whittemore R; Ice G; and Heathwaite L.
In: Impact of land-use change on nutrient loads from diffuse sources: Proceedings of an International Symposium. (Held 18 Jul 1999-30 Jul 1999 at Birmingham, UK.); pp. 265-271; 1999.
Notes: IAHS Publication No. 257; Symposium held during IUGG 99: The XXII General Assembley of the International Union of Geodesy and Geophysics.
This citation is provided courtesy of CAB International/CABI Publishing.

939. **Models of 'appropriate' practice in private dam safety assurance.**
Pisaniello, J. D. and McKay, J. M.
Water Policy 5: 525-550. (1998);
ISSN: 1366-7017.
Notes: Publisher:
Elsevier Science Inc.
Descriptors: Dams/ Dam Failure/ Hydraulic Structures/ Safety/ Environmental Policy/ Legislation/ Structural engineering/ Government policies/ safety regulations/ safety engineering/ Hydraulics/ Legislation (on industry and trade)/ Structures/ Civil/ Structural Engineering/ Underground Services and Water Use
Abstract: Large dams are generally built and managed by governments and private dams are built by individual owners. A number of horrific failures of both types have triggered serious concerns over the safety of dams in each country. For the larger dams, the response has been to spend vast amounts on structural upgrading works. Unfortunately, only a few countries have developed mature dam safety assurance schemes for smaller private dams as identified here. Dam safety legislation is often considered too "extreme" and alternative action is proposed but rarely follows. This is largely because there are no uniform systematic guidelines on determining the level of assurance policy that is "appropriate" for varying circumstances. This paper establishes such guidelines together with eclectic policy models of "appropriate" practice, based on a comprehensive review and analysis of international best practice.

940. **The modular soil erosion system (MOSES).**
Meyer, C. R.; Wagner, L. E.; Yoder, D. C.; and Flanagan, D. C.
In: Soil erosion research for the 21st century: Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough, J. C. and Flanagan, D. C. (eds.)
St Joseph, Mo.: American Society of Agricultural Engineers; pp. 358-361; 2001. *ISBN:* 1-892769-16-6
This citation is provided courtesy of CAB International/CABI Publishing.

941. **Molecular strategies for improving waterlogging tolerance in plants.**
Dennis, E. S.; Dolferus, R.; Ellis, M.; Rahman, M.; Wu, Y.; Hoeren, F. U.; Grover, A.; Ismond, K. P.; Good, A. G.; and Peacock, W. J.
Journal of Experimental Botany 51 (342): 89-97. (Jan. 2000)
NAL Call #: 450-J8224;
ISSN: 0022-0957 [JEBOA6].
Notes: Special issue: Molecular physiology: Engineering crops for hostile environments / edited by M. Parry, C. Foyer, and B. Forde. Paper presented at a conference held December 14-16, 1998, Rothamsted. Includes references.
Descriptors: crops/ waterlogging/ tolerance/ genetic resistance/ anaerobic conditions/ survival/ oxygen/ rain/ flooding/ weather/ soil air/ irrigation/ genes/ plant proteins/ promoters/ transcription factors/ genetic regulation/ literature reviews
Abstract: Plants, like animals, are obligate aerobes, but due to their inability to move, have evolved adaptation mechanisms that enable them to survive short periods of low oxygen supply, such as those occurring after heavy rain or flooding. Crop plants are often grown on soils subject to waterlogging and many are sensitive to waterlogging of the root zone. The combination of unfavourable weather conditions and suboptimal soil and irrigation techniques can result in severe yield losses. The molecular basis of the adaptation to transient low oxygen conditions has not been completely characterized, but progress has been made towards identifying genes and gene products induced during low oxygen conditions. Promoter elements and transcription factors involved in the regulation of anaerobically induced genes have been characterized. In this paper an account is presented of the molecular strategies that have been used in an attempt to increase flooding tolerance of crop plants.
This citation is from AGRICOLA.

942. **The Molecularly-Uncharacterized Component of Nonliving Organic Matter in Natural Environments.**
Hedges, J. I.; Eglinton, G.; Hatcher, P. G.; Kirchman, D. L.; Arnosti, C.; Derenne, S.; Evershed, R. P.; Koegel-Knabner, I.; De Leeuw, J. W.; Littke, R.; Michaelis, W.; and Rullkoetter, J.
Organic Geochemistry 31 (10): 945-958. (2000);
ISSN: 0146-6380
Descriptors: Biogeochemistry/ Organic Matter/ Organic Carbon/ Molecular Structure/ Reviews/ Research Priorities/ Molecules/ Particulate organic matter/ Water analysis/ Sediment chemistry/ Chemical processes/ Water Quality/ Organic compounds
Abstract: Molecularly-uncharacterized organic matter comprises most reduced carbon in soils, sediments and natural waters. The origins, reactions and fates of these ubiquitous materials are relatively obscure, in large part because the rich vein of geochemical information that typically derives from detailed structural and stereochemical analysis is yet to be tapped. This discussion highlights current knowledge about the origins and characteristics of molecularly uncharacterized organic matter in the environment and outlines possible means by which this structurally uncharted frontier might best be explored.

943. **Monitoring environmental quality at the landscape scale.**
O'Neill, Robert V; Hunsaker, Carolyn T; Jones, K Bruce; Riitters, Kurt H; Wickham, James D; Schwartz, Paul M; Goodman, Iris A; Jackson, Barbara L; and Baillargeon, William S
Bioscience 47 (8): 513-519. (1997)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: biodiversity/ biotic integrity/ conservation/ environmental quality/ geographic information systems/ landscape ecology/ landscape stability/ watershed integrity

944. **Monitoring for ecological assessment.**
Wiersma, G. B. and Bruns, D. A.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems = Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City, Mexico.)

Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 31-38; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: environmental assessment/ monitoring/ ecosystems/ ecological balance/ models/ biological indicators/ environmental protection/ databases/ information systems/ literature reviews
This citation is from AGRICOLA.

945. **Monitoring soil quality of arable land: Microbiological indicators.**
Stenberg, B.
Acta Agriculturae Scandinavica: Section B, Soil and Plant Science 49 (1): 1-24. (1999)
NAL Call #: S3.A272;
ISSN: 0906-4710
This citation is provided courtesy of CAB International/CABI Publishing.

946. **Monitoring the vegetation resources in riparian areas.**
Winward, Alma H. and Rocky Mountain Research Station, USDA
Ogden, UT: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station; 49 p.: ill. (some col.); Series: General technical report RMRS GTR-47. (2000)
Notes: Cover title. Shipping list no.: 2000-0226-P. "April 2000." Includes bibliographical references (p. 33). SUDOCS: A 13.88:RMRS-GTR-47.
NAL Call #: aSD144.A14-G46-no.-47
Descriptors: Riparian plants---Monitoring---United States/ Riparian ecology---United States---Management
This citation is from AGRICOLA.

947. **Movement and persistence of fecal bacteria in agricultural soils and subsurface drainage water: A review.**
Jamieson, R. C.; Gordon, R. J.; Sharples, K. E.; Stratton, G. W.; and Madani, A.
Canadian Biosystems Engineering 44: 1.1-1.9. (2002);
ISSN: 1492-9058
This citation is provided courtesy of CAB International/CABI Publishing.

948. **Movement of nonionic organic chemicals in agricultural soils.**
Beck, Angus J; Johnston, A E Johnny; and Jones, Kevin C
Critical Reviews in Environmental Science and Technology 23 (3): 219-248. (1993)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: human (Hominidae)/ livestock (Mammalia Unspecified)/ Bovidae (Bovidae)/ Plantae (Plantae Unspecified)/ animals/ artiodactyls/ chordates/ humans/ mammals/ nonhuman mammals/ nonhuman vertebrates/ plants/ primates/ vertebrates/ crop residues/ groundwater/ leaching/ pesticides/ pollution/ sludge/ weather
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949. **Multi-function agricultural biodiversity: Pest management and other benefits.**
Gurr, G. M.; Wratten, S. D.; and Luna, J. M.
Basic and Applied Ecology 4 (2): 107-116. (2003);
ISSN: 1439-1791
Descriptors: Biological diversity/ Pest control/ Natural enemies/ Agricultural practices/ Agricultural & general applied entomology/ Control
Abstract: This paper reviews two aspects of agricultural biodiversity. 1. The ways in which agricultural biodiversity may be increased to favour pest management are examined. At the simplest level, the structure within a monoculture may be altered by changing management practices to benefit natural enemies. At the other extreme, annual and perennial non-crop vegetation may be integrated with cropping, and biodiversity increased at the landscape level. 2. The existence of a hierarchy for the types of benefits of increased biodiversity is discussed. Vegetational diversity can lead to suppression of pests via 'top-down' enhancement of natural enemy populations and by resource concentration and other 'bottom-up' effects acting directly on pests. Whilst such low-input pest management mechanisms are attractive in their own right, other (non-pest management related) benefits may simultaneously apply. These range from short-term benefits in crop yield or quality, longer term benefits for sustainability of the farming system and, ultimately, broad societal benefits including aesthetics, recreation and the conservation of flora and fauna. Examples are given of such multi-function agricultural biodiversity.
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950. **A multi-scale system approach to nutrient management research in the Netherlands.**
Neeteson, J. J.; Schröder, J. J.; and Berge, H. F. M. ten
Netherlands Journal of Agricultural Science 50 (2): 141-151. (2002)
NAL Call #: 12 N3892;
ISSN: 0028-2928
This citation is provided courtesy of CAB International/CABI Publishing.

951. **Multiresidue methods using solid-phase extraction techniques for monitoring priority pesticides, including triazines and degradation products, in ground and surface waters.**
Sabik, Hassan; Jeannot, Roger; and Rondeau, Bernard
Journal of Chromatography A 885 (1-2): 217-236. (2000)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: pesticides: pollutant/ triazine degradation products: pollutant/ triazines: herbicide, pollutant/ ground water/ surface water
Abstract: The review describes the use of solid-phase extraction (SPE) techniques for monitoring priority pesticides in ground and surface waters. The focus is on triazine herbicides and their degradation products. Data concerning the fate, occurrence, properties and extraction of triazines and their degradation products using different SPE techniques are tabulated and discussed.
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952. **N-fertilization of nursery crops in the field: A review, Part II.**
Alt, D
Gartenbauwissenschaft 63 (5): 237-242. (1998);
ISSN: 0016-478X
Descriptors: nitrogen: nutrient/ Viburnum plicatum (Caprifoliaceae): ornamental crop/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants
© Thomson

953. **N-fertilization of nursery crops in the field: A review, Part III.**
Alt D
Gartenbauwissenschaft 63 (6): 278-282. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

954. **N:P balance in wetland forests: Productivity across a biogeochemical continuum.**
Lockaby, B G and Conner, W H
Botanical Review 65 (2): 171-185. (1999)
NAL Call #: 450 B6527 DNAr;
ISSN: 0006-8101
Descriptors: nitrogen: nutrient/ phosphorus: nutrient/ net primary productivity/ nitrogen:phosphorus balance: biogeochemical continuum, productivity/ nutrient transformation/ wetland forest
Abstract: The nature of and driving forces behind variation among wetland forests in terms of biogeochemistry and vegetation production are not well understood. We suggest that insight into biogeochemical and productivity differences may be gained by examining the degree to which nitrogen and phosphorus are balanced within wetland vegetation. On the basis of examinations of data related to N:P balance and nutrient use efficiencies, vegetation productivity in both depressional and riverine forests appears to be primarily N limited. In contrast to some current theories of wetland biogeochemistry, these data suggest that when P deficiency occurs at all, it represents a secondary productivity constraint in comparison to N. Similarly, a biogeochemical continuum is suggested for wetland forests based on the relationship between N:P ratios in senesced foliage vs. annual litterfall mass. We theorize that the position of a particular wetland forest on this continuum reflects the integration of its geomorphic position and biogeochemical history. In addition, the position of a particular system on the continuum may have predictive value with regard to net primary productivity and nutrient transformation capabilities.

955. **National biosolids overview.**
Goldstein, N. and Block, D.
Biocycle 40 (12): 48-52. (Dec. 1999)
NAL Call #: 57.8-C734;
ISSN: 0276-5055
Descriptors: sewage sludge/ waste utilization/ application to land/ regulations/ surveys/ United States/ waste management
This citation is from AGRICOLA.

956. **National guidance: Water quality standards for wetlands.**
United States. Environmental Protection Agency. Office of Water Regulations and Standards and United States. Environmental Protection Agency. Office of Wetlands Protection.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Water Regulations and Standards (Rev. Aug. 21, 1997). (1997)
Notes: Alternate titles: Water quality standards for wetlands guidance, Water quality standards for wetlands, Water quality standards handbook; "July 1990." "This document is designated as appendix B to chapter 2 - General program guidance of the water quality standards handbook, December 1983." Includes bibliographical references.
NAL Call #: TD223.N355-1997
http://www.epa.gov/OWOW/wetlands/regs/quality.html
Descriptors: Wetland conservation/ Water quality management---United States/ Water quality---Standards---United States
This citation is from AGRICOLA.

957. **A national look at nitrate contamination of ground water.**
Nolan, B. T.; Ruddy, Barbara C.; Hitt, Kerie J.; and Helsel, Dennis R.
U.S. Dept. of the Interior, U.S. Geological Survey [Also available as: Water Conditioning and Purification (January 1998) 39 (12): 76-79], 1998.
Notes: Contamination of ground waters: A national look at nitrate contamination of ground water; By Bernard T. Nolan, Barbara C. Ruddy, Kerie J. Hitt, and Dennis R. Helsel [This is an electronic version of an article that appeared in the January 1998 issue of Water Conditioning and Purification, v. 39, no. 12, pages 76-79. This article replaces USGS Fact Sheet FS-092-96]. (text/html)
NAL Call #: TD427.N5-N37-1998
http://water.usgs.gov/nawqa/wcp/
Descriptors: Water---Nitrogen content---United States/ Groundwater---Pollution---United States
Abstract: Title from web page.

958. **National management measures to control nonpoint source pollution from agriculture.**
Buck, S.; Townsend, G.; United States. Environmental Protection Agency. Office of Water; United States. Environmental Protection Agency. Nonpoint Source Control Branch.; Tetra Tech, Inc.; and North Carolina State University. Water Quality Group.
United States Environmental Protection Agency, 2000
http://www.epa.gov/owow/nps/agmm/index.html
Descriptors: Agriculture---Environmental aspects/ Nonpoint source pollution/ Best management practices (Pollution prevention)/ Agricultural conservation

959. **The National Park Service integrated pest management manual: Integrated pest management manual.**
United States. National Park Service.
Washington, D.C.: National Park Service. (1999)
Notes: IPM manual; Title from home page (viewed on July 2, 2003; last updated Feb. 13, 1999).
NAL Call #: SB950.2.A1-N372
http://www.nature.nps.gov/biology/ipm/manual/ipmmanual.htm
Descriptors: Pests---Integrated control---United States
Abstract: Provides descriptions of the biology and management of 21 species or categories of pests in both text and graphic versions.
This citation is from AGRICOLA.

960. **National projections of forest and rangeland condition indicators: A technical document supporting the 1999 USDA Forest Service RPA assessment.**
Hof, John G. and Pacific Northwest Research Station
Portland, OR: U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station; Series: General technical report PNW 442; 57 p.: col. maps. (1999)
Notes: Cover title. "April 1999"--P. [4] of cover. Includes bibliographical references (p. 53-57).
NAL Call #: aSD11-.A46-no.442
Descriptors: Natural resources surveys---United States/ Multiple use management areas---United States/ Forest management---United States/ Range management---United States
This citation is from AGRICOLA.

961. **National standards and guidelines for pesticides in water, sediment, and aquatic organisms: Application to water-quality assessments.**
Nowell, L. H. and Resek, E. A.
Reviews of Environmental Contamination and Toxicology 140 (1994)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4].
Notes: Special issue: 164 p.; In the series analytic: Reviews of environmental contamination and toxicology / edited by G.W. Ware
Descriptors: water quality/ pesticides/ quality standards/ guidelines/ water/ sediment/ fish/ shellfish/ tissues/ aquatic organisms/ lakes/ environmental protection/ toxicity/ contamination/ concentration/ adverse effects/ regulation/ health protection/ who/ databases/ public agencies/ literature reviews/ Canada/ United States
This citation is from AGRICOLA.

962. **National water summary of wetland resources.**
Fretwell, J. D.; Williams, John S.; Redman, Phillip J.; and Geological Survey (U.S.).
Washington, D.C.: U.S. G.P.O.; viii, 431 p.: ill. (some col.), maps (some col.); Series: U.S. Geological Survey water-supply paper 2425. (1996)
NAL Call #: 407--G29W-no.2425;
ISBN: 0607856963
Descriptors: Wetlands---United States/ Water resources development---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

963. **Native plant material sources for wetland establishment: Freshwater case studies.**
United States. Army. Corps of Engineers; U.S. Army Engineer Waterways Experiment Station; and Wetlands Research Program (U.S.).
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; x, 76 p.: ill., maps; Series: Wetlands Research Program technical report WRP-RE-5. (1995)
Notes: "August 1995." Includes bibliographical references (p. 74-76).
NAL Call #: QK938.M3N38--1995
Descriptors: Wetland plants/ Wetland conservation/ Wetland ecology/ Freshwater ecology
This citation is from AGRICOLA.

964. **Natural and Constructed Wetlands in Canada: An Overview.**
Kennedy, G. and Mayer, T.
Water Quality Research Journal of Canada 37 (2): 295-325. (2002);
ISSN: 1201-3080
Descriptors: Reviews/ Freshwater environments/ Hydrology/ Wildlife / Climate/ Sustainable development/ Environment management/ Wastewater treatment/ artificial wetlands/ Canada/ Wetlands/ Ecosystems/ Environmental Protection/ Water Pollution Control/ Technology/ Research Priorities/ Ecology/ Pollution control (Environmental)/ Canada/ Environmental action/ Water quality control/ Water Treatment/ Water & Wastewater Treatment
Abstract: A review of freshwater wetland research in Canada was conducted to highlight the importance of these ecosystems and to identify wetland research needs. Both natural and constructed wetland systems are discussed. Natural wetlands are an important part of the Canadian landscape. They provide the habitat for a broad variety of flora and fauna and contribute significantly to the Canadian economy. It is estimated that the total value derived from consumptive and nonconsumptive activities exceeds $10 billion annually. The past decades have witnessed the continued loss and degradation of wetlands in Canada. In spite of recent protection, Canadian wetlands remain threatened by anthropogenic activities. This review shows that more research on fate and transport of pollutants from urban and agricultural sources in wetland systems is needed to better protect the health and to assure the sustainability of wetlands in Canada. Furthermore, improved knowledge of hydrology and hydrogeochemistry of wetlands will assure more effective management of these ecosystems. Lastly, better understanding of the effect of climate change on wetlands will result in better protection of these important ecosystems. Constructed wetlands are man-made wetlands used to treat non-point source pollution. The wetland treatment technology capitalizes on the intrinsic water quality amelioration function of wetlands and is emerging as a cost-effective, environmentally friendly method of treating a variety of wastewaters. The use of wetland technology in Canada is, however, less common than in the U.S.A. A number of research needs has to be addressed before the wetland treatment technology can gain widespread acceptance in Canada. This includes research pertaining to cold weather performance, including more monitoring, research on design adaptation and investigation of the effects of constructed wetlands on wildlife.

965. **Natural background concentrations of nutrients in streams and rivers of the conterminous United States.**
Smith, R. A.; Alexander, R. B.; and Schwarz, G. E.
Environmental Science and Technology 37 (14): 3039-3047. (2003)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: Environment/ Ecology/ Environmental Engineering & Energy/ nitrogen/ phosphorus/ watersheds/ transport/ export/ yields/ cycle/ size
Abstract: Determining natural background concentrations of nutrients in watersheds in the developed world has been hampered by a lack of pristine sampling sites covering a range of climatic conditions and basin sizes. Using data from 63 minimally impacted U.S. Geological Survey reference basins, we developed empirical models of the background yield of total nitrogen (TN) and total phosphorus (TP) from small watersheds as functions of annual runoff, basin size, atmospheric nitrogen deposition rate, and region-specific factors. We applied previously estimated in-stream loss rates to yields from the small watershed models to obtain estimates of background TN and TP yield and concentration throughout the stream/river network in 14 ecoregions of the conterminous United States. Background TN concentration varies from less than 0.02 mg L-1 in the xeric west to more than 0.5 mg L-1 along the southeastern coastal plain. Background TP concentration varies from less than 0.006 mg L-1 in the xeric west to more than 0.08 mg L-1 in the great plains. TN concentrations in U.S. streams and rivers currently exceed natural background levels by a much larger factor (6.4) than do TP concentrations (2.0). Because of local variation in runoff and other factors, the range of background nutrient

concentrations is very large within some nutrient ecoregions. It is likely that background concentrations in some streams in these regions exceed proposed nutrient criteria.
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966. **Natural channel systems: An approach to management and design.**
Ontario. Ministry of Natural Resources.
Toronto, ON: Ministry of Natural Resources; 103 p. (1994)
Notes: "June 1994."
NAL Call #: TC529.N37--1994;
ISBN: 0777826690
Descriptors: Water supply---Management/ Channels---Hydraulic engineering---Canada
This citation is from AGRICOLA.

967. **Natural emissions of non-methane volatile organic compounds, carbon monoxide, and oxides of nitrogen from North America.**
Guenther, Alex; Geron, Chris; Pierce, Tom; Lamb, Brian; Harley, Peter; and Fall, Ray
Atmospheric Environment 34 (12-14): 2205-2230. (2000)
NAL Call #: TD881.A822;
ISSN: 1352-2310
Descriptors: carbon monoxide: natural emissions, pollutant/ hydrocarbons: pollutant/ isoprenes: pollutant/ monoterpenes: pollutant/ nitric oxide: natural emissions, pollutant/ nitrogen oxides: natural emissions, pollutant/ non methane volatile organic compounds: natural emissions, pollutant/ North American Research Strategy for Tropospheric Ozone [NARSTO]/ environmental pollution
Abstract: The magnitudes, distributions, controlling processes and uncertainties associated with North American natural emissions of oxidant precursors are reviewed. Natural emissions are responsible for a major portion of the compounds, including non-methane volatile organic compounds (NMVOC), carbon monoxide (CO) and nitric oxide (NO), that determine tropospheric oxidant concentrations. Natural sources include soil microbes, vegetation, biomass burning, and lightning. These sources are strongly influenced by human activities that have led to significant changes in the magnitude and distribution of natural emissions in the past two centuries. The total NMVOC flux of about 84 X 1012 g of carbon (Tg C) is comprised primarily of isoprene (35%), 19 other terpenoid compounds (25%) and 17 non-terpenoid compounds (40%). Vegetation is predicted to contribute about 98% of the total annual natural NMVOC emission. The estimated annual natural NO emission of 2.1 X 1012 g of nitrogen (Tg N) from North America is primarily due to soils and lightning, while the estimated 10 Tg C of CO arises from biomass burning and vegetation. Field measurements of ambient concentrations and above canopy fluxes have validated emission estimates for a few compounds from some important landscapes. The uncertainty associated with natural emission estimates ranges from less than 50% for midday summer isoprene emission from some locations to about a factor of 10 for some compounds and landscapes.
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968. **Natural product chemistry and its part in the defence against insects and fungi in agriculture.**
Crombie, Leslie
Pesticide Science 55 (8): 761-774. (1999)
NAL Call #: SB951.P47;
ISSN: 0031-613X
Descriptors: avenacins: fungicides/ cordifines: antifeedant, natural product/ mammeins: antifeedant, natural product/ nicandra steroids: antifeedant, natural product/ pyrethrins: insecticide, natural product/ rotenoids: insecticide, natural product/ unsaturated amides: insecticide, natural product/ fungi (Fungi): plant pathogen/ insects (Insecta): pest/ Alternaria (Fungi Imperfecti or Deuteromycetes): H S toxins/ Animals/ Arthropods/ Fungi/ Insects/ Invertebrates/ Microorganisms/ Nonvascular Plants/ Plants
Abstract: This paper surveys our work on natural products as potential models for defensive substances against insect and fungal predators. Insecticides and repellents included are pyrethrins, rotenoids, lipid amides, phorbol esters, cordifolia germacranolides, nicandrenoids, mammeins, dihydroagarofuran esters, and cembrene diols. The fungal H-S toxins from Alternaria, and avenacins from oat roots are briefly considered. The avenacins provide an in-situ defence of oat roots against the destructive 'Take-all' fungus disease.
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969. **Natural protection of spring and well drinking water against surface microbial contamination: Indicators and monitoring parameters for parasites.**
Edberg, S. C.; LeClerc, H.; and Robertson, J.
Critical Reviews in Microbiology 23 (2): 179-206. (1997)
NAL Call #: QR1.C7;
ISSN: 1040-841X.
Notes: Subtitle: [Part] II.
This citation is provided courtesy of CAB International/CABI Publishing.

970. **Natural systems agriculture: A truly radical alternative.**
Jackson, W.
Agriculture, Ecosystems and Environment 88 (2): 111-117. (Feb. 2002)
NAL Call #: S601-.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Soil health as an indicator of sustainable management / edited by J.W. Doran and S.I. Stamatiadis. Paper presented at a workshop held June 24-25, 1999, Athens/Kifissia, Greece.
Includes references.
Descriptors: agriculture/ sustainability/ alternative farming/ erosion/ soil pollution/ agricultural chemicals/ petroleum/ ecology/ ecosystems/ evolution/ insect pests/ plant pathogens/ weeds/ pest management/ disease control/ weed control/ domestication/ perennials/ seed output/ literature reviews
Abstract: The natural systems agriculture (NSA) idea was developed at The Land Institute in 1977 and was published in 1978. Less than 20 years later, research efforts at The Land Institute and by other researchers familiar with research questions had satisfactorily answered the difficult biological questions launching the possibility of a new agricultural paradigm toward fruition. This new paradigm features an ecologically sound perennial food-grain-producing system where soil erosion goes to near zero, chemical contamination from agrochemicals plummets, along with agriculture's dependence on fossil fuels. NSA is predicated on an evolutionary-ecological view of the world in which the essentials for sustainable living have been sorted

out and tested in nature's ecosystems over millions of years. From numerous studies, evolutionary biologists and ecologists have learned much about how ecological bills are paid by ecosystems which hold and build soil, manage insects, pathogens and weeds. A primary feature of NSA is to sufficiently mimic the natural structure to be granted the function of its components. Domesticating wild perennials and increasing seed yield and at the same time perennializing the major crops to be planted as domestic prairies is a major goal. For the first time in 10,000 years, humans can now build an agriculture based on nature's ecosystems. As a prototype this means we explore in-depth how the never-plowed native prairie works and then develop a diverse, perennial vegetative structure capable of producing desirable edible grains in abundance including perennializing the major grain crops. A paradigm shift of relatively easily manageable proportions is. available to solve the problem of agriculture and is antithetical to solving problems in agriculture.
This citation is from AGRICOLA.

971. **Natural systems as models for the design of sustainable systems of land use.**
Ewel, J. J.
Agroforestry Systems 45 (1/3): 1-21. (1999)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366 [AGSYE6].
Notes: Special issue: Agriculture as a mimic of natural ecosystems / edited by E.C. Lefroy, R.J. Hobbs, M.H. O'Connor and J.S. Pate. Paper presented at a workshop held September 2-6, 1997, Williams, Western Australia, Australia. Includes references.
Descriptors: land use/ ecosystems/ agriculture/ soil fertility/ climatic factors/ plant succession/ stress/ natural selection/ evapotranspiration/ environmental temperature/ water availability/ livestock/ species diversity/ land management/ animal husbandry/ erosion/ literature reviews
This citation is from AGRICOLA.

972. **Natural Treatment and on-Site Processes.**
Kruzic, A. P. and White, K. D.
Water Environment Research 68 (4): 498-503. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: wastewater treatment/ septic tanks/ infiltration/ wetlands/ overland flow/ literature review/ Wastewater treatment processes
Abstract: Natural treatment systems for wastewater can be divided into two broad categories: soil-based systems, which include subsurface infiltration, rapid infiltration/soil aquifer treatment, overland flow, and slow rate systems; and aquatic systems, which include pond, floating aquatic plant, and constructed wetland systems. Many, but not all, on-site wastewater treatment systems are natural systems using septic tanks as a pretreatment.
© Cambridge Scientific Abstracts (CSA)

973. **Natural Treatment Processes and on-Site Processes.**
Kruzic, A. P.
Water Environment Research 67 (4): 470-475. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ wastewater treatment/ infiltration/ soil disposal fields/ overland flow/ ponds/ aquatic plants/ artificial wetlands/ Wastewater treatment processes/ sewage & wastewater treatment
Abstract: Natural treatment systems for wastewater can be divided into two broad categories: soil-based systems, which include subsurface infiltration, rapid infiltration/soil aquifer treatment, overland flow, and slow rate systems; and aquatic systems, which include pond, floating aquatic plant, and constructed wetland systems. Many, but not all, on-site wastewater treatment systems are natural systems using septic tanks as a pretreatment.
© Cambridge Scientific Abstracts (CSA)

974. **A naturalist's guide to wetland plants: An ecology for eastern North America.**
Cox, Donald D.
Syracuse, N.Y.: Syracuse University Press; xvii, 194 p.: ill. (2002)
Notes: 1st ed.; Includes bibliographical references (p. 181-187) and index.
NAL Call #: QK115-.C72-2002;
ISBN: 0815607407 (pbk.)
Descriptors: Wetland plants---East---United States---Identification/ Wetland plants---North America---Identification/ Wetland plants---Ecology---East---United States/ Wetland plants---Ecology---North America
This citation is from AGRICOLA.

975. **Nematode and insect management in transitional agricultural systems.**
McSorley, R.
HortTechnology 12 (4): 597-600. (Oct. 2002-Dec. 2002)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: ecosystems/ plant parasitic nematodes/ insect pests/ organic farming/ cropping systems/ integrated pest management/ sustainability/ efficacy/ crops/ crop yield/ literature reviews
Abstract: As an agroecosystem makes the transition from conventional to organic practices, changes in the pest management tactics used are often apparent. Despite varying degrees of efficacy among tactics, the issue of whether or not numbers of insect and nematode pests and their damage will become more severe in an organic system depends on the specifics of the pests and crops involved. Although many conventional systems rely on reactive strategies to deal with pest problems, an alternative approach is to redesign systems so that plant health is maximized, regardless of pest numbers, although this approach takes planning and time. An abrupt transition from conventional to organic may be risky if pest numbers are high and alternative practices are not yet in place. Hybrid systems, involving decreasing levels of conventional tactics and increasing levels of organic tactics, may be needed before the transitional period begins, in order to bridge the gap and lessen the impact of crop losses during the transitional period. The design of cropping systems with minimal pest impact requires a much more extensive and specific knowledge base than needed for reactive strategies.
This citation is from AGRICOLA.

976. **Neuroptera in agricultural ecosystems.**
Stelzl, M. and Devetak, D.
Agriculture, Ecosystems and Environment 74 (1/3): 305-321. (June 1999)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Invertebrate biodiversity as bioindicators of

sustainable landscapes / edited by M.G. Paoletti. Includes references.
Descriptors: neuroptera/ agricultural land/ ecosystems/ integrated pest management/ biological control/ agriculture/ habitats/ beneficial insects/ predation/ communities/ endangered species/ field crops/ orchards/ literature reviews/ indicator species/ predators of insect pests
Abstract: Due to their well known environmental needs, Neuroptera serve as valuable indicator species for assessing the ecology of natural and semi-natural habitats. In agricultural ecosystems some species of the families Chrysopidae, Hemerobiidae, and Coniopterygidae are known as beneficial predators of plant-sucking insect pests. Mass rearing and mass release of Chrysopids therefore, have become standard methods of biological pest control. The present paper summarizes information on biology and ecology of these three most important Neuropteran families, followed by a description of Neuropteran communities found in different natural and semi-natural ecosystems, with special reference to agroecosystems. Two separate sections deal with red lists of endangered species and integrated control programs. Literature lists are provided for those who want to study Neuroptera in more detail.
This citation is from AGRICOLA.

977. **New and versatile optical-immunoassay instrumentation for water monitoring.**
Willard, D.; Proll, G.; Reder, S.; and Gauglitz, G.
Environmental Science and Pollution Research 10 (3): 188-191. (2003);
ISSN: 0944-1344
This citation is provided courtesy of CAB International/CABI Publishing.

978. **New strategies for America's watersheds.**
National Research Council. Committee on Watershed Management
Washington DC: National Academies Press; 328 p. (1999);
ISBN: 0-309-08373-7
http://www.nap.edu/books/0309064171/html/
Descriptors: watersheds/ water quality/ watershed management

979. **Nitrate and selected pesticides in ground water of the Mid-Atlantic region.**
Ator, Scott W.; Ferrari, Matthew J.; Geological Survey (U.S.); and United States. Environmental Protection Agency.
Baltimore, Md.: U.S. Geological Survey; 8 p.: col. ill., col. maps; Series: Water-resources investigations report 97-4139. (1997)
Notes: Caption title. Includes bibliographical references (p. [8]).
NAL Call #: GB701.W375—no.97-4139
Descriptors: Groundwater---Pollution---Middle Atlantic States/ Nitrates---Environmental aspects---Middle Atlantic States/ Pesticides---Environmental aspects---Middle Atlantic States
This citation is from AGRICOLA.

980. **Nitrate in the ground waters of the United States: Assessing the risk.**
Nolan, B. T.; Ruddy, B. C.; and National Water Quality Assessment Program (U.S.).
Reston, Va.: U.S. Geological Survey, 1997.
Notes: USGS NAWQA fact sheet 092-96; At head of title: National Water-Quality Assessment Program.
NAL Call #: TD427.N5N65-1997
http://water.usgs.gov/nawqa/FS-092-96.html
Descriptors: Water---Nitrogen content---United States/ Groundwater---Pollution---United States/ Water quality---United States
This citation is from AGRICOLA.

981. **Nitrate removal in stream riparian zones.**
Hill, A. R.
Journal of Environmental Quality 25 (4): 743-755. (July 1996-Aug. 1996)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Abstract: This review considers the role of stream riparian zones in regulating the transport of nitrate (NO3(-)) in groundwater flow from uplands to streams. The current consensus is that most riparian zones effectively remove NO3(-) from subsurface water. However, research has not focused on the relationship between hydrology and chemistry within the context of the riparian zone hydrogeologic setting. Most riparian zones that remove NO3(-) occur in landscapes with impermeable layers near the ground surface. In this setting, small amounts of groundwater follow shallow horizontal flow paths that increase water residence time and contact with vegetation roots and organic-rich riparian soils. Limited research suggests that riparian zones have less effect on NO3(-) transport in hydrogeologic settings where groundwater has little interaction with vegetation and sediments because flow occurs mainly across the surface, or at depth beneath the riparian zone before discharging to the stream. Considerable uncertainty surrounds the relative importance of vegetation uptake and microbial denitrification in NO3(-) removal from subsurface water in riparian zones. Plant NO3(-) uptake requires the presence of the root zone below the water table. Information is lacking on the vertical distribution and seasonal dynamics of fine root biomass in relation to water table fluctuations. High denitrification rates have been reported in 0 to 10 cm surface soils of riparian zones in the USA, France, and New Zealand. However, rapid NO3(-) removal from groundwater also occurs in riparian locations where the water table is always > 0.5 m below the surface. Denitrification at depth within the saturated zone has been studied to a limited extent and has been found not to occur at some sites. An interdisciplinary approach in which patterns of NO3(-) depletion and the role of NO3(-) removal processes are related to groundwater flow paths is needed to provide a better understanding of NO3(-) regulation in riparian zones.
This citation is from AGRICOLA.

982. **Nitrates in groundwater in the southeastern USA.**
Hubbard, R. K. and Sheridan, J. M.
In: Contamination of groundwaters/ Adriano, D. C.; Iskandar, A. K.; and Murarka, I. P.
Northwood, UK: Science Reviews, 1994; pp. 303-345.
ISBN: 0-905927-44-3
This citation is provided courtesy of CAB International/CABI Publishing.

983. **Nitrogen and phosphorus consumption, utilisation and losses in pig production: Denmark.**
Fernandez, J A; Poulsen, H D; Boisen, S; and Rom, H B
Livestock Production Science 58 (3): 225-242. (1999)
NAL Call #: SF1.L5;
ISSN: 0301-6226

Descriptors: ammonia: emission/ nitrogen: consumption, loss, utilization/ phosphorus: consumption, utilization, loss/ pig (Suidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ legislation/ manure environmental pollution/ pig production

Abstract: Swine production in Denmark has increased by more than 50% in the past 20 years and in this time the structure of production has changed markedly towards larger units. This has resulted in a serious threat to the local environment. Consequently, legislative measures with a progressive degree of restriction have been introduced. The annual production of slurry from pigs amounted to about 12.5 million tons in 1995, containing about 104 000 tons of N and 25 000 tons of P. Ammonia emission from pig buildings in 1996 was about 16 000 tons. Production of one standard pig (about 100-kg live weight) generated a total excretion of about 5 kg N and 1.2 kg P in 1997. Sows, weaners and growing pigs contributed 22, 13 and 63% to N excretion and 26, 15 and 59% to P excretion, respectively. Nitrogen and phosphorus losses from pig production in Denmark are discussed in relation to legislative and nutritional measures.

984. **Nitrogen and phosphorus consumption, utilisation and losses in pig production: France.**
Dourmad, J Y; Guingand, N; Latimier, P; and Seve, B
Livestock Production Science 58 (3): 199-211. (1999)
NAL Call #: SF1.L5;
ISSN: 0301-6226
Descriptors: ammonia/ nitrogen: consumption, feces, urine/ phosphorus: consumption, urine, feces/ pig (Suidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ manure pollution/ pig production

Abstract: Although pig density in France (80 pigs produced/year/km2) is lower than on average in the European Union (140 pigs/year/km2), some regions with intensive animal production (720 pigs/year/km2) have to face environmental problems related to a surplus of animal manure. According to the legislation, the amount of nitrogen from animal manure should not exceed 170 kg/ha. The actual situation for nitrogen and phosphorus consumption, utilisation and losses in pig production in France is described in this paper. It was calculated that on average 67% of the N and 66% of the P consumed by the pigs is excreted in faeces and urine. Improvements in feeding techniques could reduce by 15 to 30% N and P excretion by the animals, and ammonia losses in the atmosphere. The nutritional basis for these improvements is described.

985. **Nitrogen and the industry processing of pig manure.**
Have PJ.
In: Nitrogen flow in pig production and environmental consequences: Proceedings of the First International Symposium. (Held 8 Jun 1993-11 Jun 1993 at Wageningen, The Netherlands.) Verstegen, MW; Hartog, LA; Kempen, GJ; and Metz, JH (eds.); pp. 386-397; 1993.
This citation is provided courtesy of CAB International/CABI Publishing.

986. **Nitrogen biomarkers and their fate in soil.**
Amelung, W.
Journal of Plant Nutrition and Soil Science / Zeitschrift fur Pflanzenernahrung und Bodenkunde 166 (6): 677-686. (2003)
NAL Call #: 384 Z343A;
ISSN: 1436-8730.
Notes: Number of References: 83; Publisher: Wiley-V C H Verlag Gmbh
Descriptors: Agriculture/ Agronomy/ soil organic nitrogen/ amino sugars/ amino acid enantiomers/ microbial residues/ cell aging/ racemization/ amino acid racemization/ Conservation Reserve Program/ dissolved organic matter/ South African highveld/ microbial residues/ aspartic acid/ murchison meteorite/ marine sediments/ North America/ sandy soils

Abstract: More than 90 % of the nitrogen (N) in soils can be organically bound, but the mechanisms and rates by which it is cycled have eluded researchers. The objective of this research was to contribute to a better understanding of the origin and transformation of soil organic N (SON) by using amino sugars and the enantiomers of amino acids as markers for microbial residues and/or aging processes. Studied samples presented here comprised (1) soil transects across different climates, (2) arable soils with different duration of cropping, and (3) radiocarbon-dated soil profiles. The results suggested that increased microbial alteration of SON temporarily results in a sequestration of N in microbial residues, which are mineralized at later stages of SON decomposition. Microorganisms increasingly sequestered N within intact cell wall residues as frost periods shortened. At a mean annual temperature above 12-15 degreesC, these residues were mineralized, probably due to limitations in additional substrates. Breaking the grassland for cropping caused rapid SON losses. Microbial residues were decomposed in preference to total N, this effect being enhanced at higher temperatures. Hence, climate and cultivation interactively affected SON dynamics. Nevertheless, not all SON was available to soil microorganisms. In soil profiles, L-aspartic acid and L-lysine slowly converted into their D-form, for lysine even at a similar rate in soils of different microbial activity. Formation of D-aspartate with time was, therefore, induced by microorganisms while that of D-lysine was not. The racemization of the two amino acids indicates that SON not available to microorganisms ages biotically and abiotically. In native soils, the latter is conserved for centuries, despite N deficiency frequently occurring in living terrestrial environments. Climate was not found to affect the fate of old protein constituents in surface soil. When native grassland was broken for cropping, however, old SON constituents had become available to microorganisms and were degraded.

987. **Nitrogen cycling under different soil management systems.**
Martens, D. A.
Advances in Agronomy 70: 143-192. (2001)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
This citation is provided courtesy of CAB International/CABI Publishing.

988. **Nitrogen Dynamics and Buffer Zones.**
Gilliam, J. W.
In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 30 Aug 1996-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 17; 1996.
Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: riparian land/ nitrogen removal/ dynamics/ groundwater movement/ nitrates/ denitrification/ literature review/ water quality control/ organic carbon/ buffer zones/ Water quality control
Abstract: Riparian buffer areas are very effective in removal of nitrate from groundwater moving through them as shown by research in several countries. Reductions of greater than 90% have frequently been measured. However, removals are greatly affected by hydrologic conditions present in the riparian areas and complete hydrologic information is usually missing in riparian studies. Most authors attribute the changes in nitrate concentration to denitrification although many measurements of concentration changes along apparent ground-water flow paths have occurred in soil layers with low levels of organic carbon. This has lead some to question whether the concentration changes are a result of denitrification or simply dilution by water from other sources. The current ideas on this topic, information on nitrous oxide loss in riparian areas and opinions of the author will be presented.

989. **Nitrogen excess in North American ecosystems: Predisposing factors, ecosystem responses, and management strategies.**
Fenn, Mark E; Poth, Mark A; Aber, John D; Baron, Jill S; Bormann, Bernard T; Johnson, Dale W; Lemly, A Dennis; McNulty, Steven G; Ryan, Douglas F; and Stottlemyer, Robert
Ecological Applications 8 (3): 706-733. (1998)
NAL Call #: QH540.E23;
ISSN: 1051-0761
Descriptors: nitrate: leaching, pollutant/ nitrogen: atmospheric deposition, cycling, limitation/ soil organic matter/ ecosystem responses/ eutrophication/ fertilization/ forest ecosystem/ management strategies/ soil acidification/ vegetation uptake
Abstract: Most forests in North America remain nitrogen limited, although recent studies have identified forested areas that exhibit symptoms of N excess, analogous to overfertilization of arable land. Nitrogen excess in watersheds is detrimental because of disruptions in plant/soil nutrient relations, increased soil acidification and aluminum mobility, increased emissions of nitrogenous greenhouse gases from soil, reduced methane consumption in soil, decreased water quality, toxic effects on freshwater biota, and eutrophication of coastal marine waters. Elevated nitrate (NO3-) loss to groundwater or surface waters is the primary symptom of N excess. Additional symptoms include increasing N concentrations and higher N:nutrient ratios in foliage (i.e., N:Mg, N:P), foliar accumulation of amino acids or NO3-, and low soil C:N ratios. Recent nitrogen-fertilization studies in New England and Europe provide preliminary evidence that some forests receiving chronic N inputs may decline in productivity and experience greater mortality. Long-term fertilization at Mount Ascutney, Vermont, suggests that declining and slow N-cycling coniferous stands may be replaced by fast-growing and fast N-cycling deciduous forests. Symptoms of N saturation are particularly severe in high-evaluation, nonaggrading spruce-fir ecosystems in the Appalachian Mountains and in eastern hardwood watersheds at the Fernow Experimental Forest near Parsons, West Virginia. In the Los Angeles Air Basin, mixed conifer forests and chaparral watersheds with high smog exposure are N saturated and exhibit the highest streamwater NO3- concentrations for wildlands in North America. High-elevation alpine watersheds in the Colorado Front Range and a deciduous forest in Ontario, Canada, are N saturated, although N deposition is moderate (apprx 8 kgcntdotha-1cntdotyr-1). In contrast, the Harvard Forest hardwood stand in Massachusetts has absorbed > 900 kg N/ha during 8 yr of N amendment studies without significant NO3- leaching, illustrating that ecosystems vary widely in the capacity to retain N inputs. Overly mature forests with high N deposition, high soil N stores, and low soil C:N ratios are prone to N saturation and NO3- leaching. Additional characteristics favoring low N retention capacity include a short growing season (reduced plant N demand) and reduced contact time between drainage water and soil (i.e., porous coarse-textured soils, exposed bedrock or talus). Temporal patterns of hydrologic fluxes interact with biotic uptake and internal cycling patterns in determining ecosystem N retention. Soils are the largest storage pool for N inputs, although vegetation uptake is also important. Recent studies indicate that nitrification may be widespread in undisturbed ecosystems, and that microbial assimilation of NO3- may be a significant N retention mechanism, contrary to previous assumptions. Further studies are needed to elucidate the sites, forms, and mechanisms of N retention and incorporation into soil organic matter, and to test potential management options for mitigating N losses from forests. Implementation of intensive management practices in N-saturated ecosystems may only be feasible in high-priority areas and on a limited scale. Reduction of N emissions would be a preferable solution, although major reductions in the near future are unlikely in many areas due to economic, energy-use, policy, and demographic considerations.

990. **Nitrogen fate and transport in agricultural systems.**
Follett, R. F. and Delgado, J. A.
Journal of Soil and Water Conservation 6 (57): 402-408. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: nitrogen fertilizers/ nitrogen/ losses from soil/ nitrate/ leaching/ nitrous oxide/ nitric oxide/ emission/ ammonia/ volatilization/ denitrification/ agricultural land/ agricultural soils/ water erosion/ soil flora/ soil biology
This citation is from AGRICOLA.

991. **Nitrogen fertilization management for no-till cereal production in the Canadian Great Plains: A review.**
Malhi, S. S.; Grant, C. A.; Johnston, A. M.; and Gill, K. S.
Soil and Tillage Research 60 (3/4): 101-122. (2001)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

992. **Nitrogen in the environment: Sources, problems, and management.**
Follett, R. F. and Hatfield, Jerry L.
Amsterdam; New York: Elsevier; xviii, 520 p.: ill. (2001)
Notes: 1st ed.; Includes bibliographical references and index.
NAL Call #: S651-.N59-2001;
ISBN: 0444504869 (alk. paper)
Descriptors: Nitrogen fertilizers/ Nitrogen fertilizers---Environmental aspects
This citation is from AGRICOLA.

993. **Nitrogen losses and fertilizer N use efficiency in irrigated porous soils.**
Aulakh, M. S. and Bijay Singh.
Nutrient Cycling in Agroecosystems 47 (3): 197-212. (1996)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: sandy soils/ sandy loam soils/ coarse textured soils/ irrigated conditions/ flooding/ nitrogen/ losses from soil/ ammonia/ volatilization/ nitrification/ identification/ leaching/ nitrogen fertilizers/ use efficiency/ groundwater pollution/ literature reviews/ loamy sand soils
Abstract: Porous soils are characterized by high infiltration, low moisture retention and poor fertility due to limitation of organic matter and nitrogen (N). However, wherever irrigated and properly managed, these are among the most productive soils in the world. For sustained productivity and prevention of N related pollution problems, fertilizer N management in porous soils needs to be improved by reducing losses of N via different mechanisms. Losses of N through ammonia volatilization are not favoured in porous soils provided fertilizer N is applied before an irrigation or rainfall event. Ammonium N transported to depth along with percolating water cannot move back to soil surface where it is prone to be lost as NH_3. Under upland conditions nitrification proceeds rapidly in porous soils. Due to high water percolation rates in porous soils, continuous flooding for rice production usually cannot be maintained and alternate flood and drained conditions are created. Nitrification proceeds rapidly during drained conditions and nitrates thus produced are subsequently reduced to N_2 and N_2O through denitrification upon reflooding. Indirect N-budget estimates show that up to 50% of the applied N may be lost via nitrification-denitrification in irrigated porous soils under wetland rice. High soil nitrate N levels and sufficient downward movement of rain water to move nitrate N below the rooting depth are often encountered in soils of humid and subhumid zones, to a lesser extent in soils of semiarid zone and quite infrequently, if at all in arid zone soils. The few investigations carried out with irrigated porous soils do not show substantial leaching losses of N beyond potential rooting zone even under wetland rice. However, inefficient management of irrigation water and fertilizer N particularly with shallow rooted crops may lead to pollution of groundwater due to nitrate leaching. At a number of locations, groundwater beneath irrigated porous soils is showing increased nitrate N concentrations. Efficient management of N for any cropping system in irrigated porous soils can be achieved by plugging losses of N via different mechanisms leading to both high crop production and minimal pollution of the environment.
This citation is from AGRICOLA.

994. **Nitrogen management and sustainability.**
Jarvis, S. C.
In: Grass for diary cattle/ Cherney, J. H. and Cherney, D. J., 1998; pp. 161-192
This citation is provided courtesy of CAB International/CABI Publishing.

995. **Nitrogen management in dryland cropping systems.**
Westfall, D. G.; Havlin, J. L.; Hergert, G. W.; and Raun, W. R.
Journal of Production Agriculture 9 (2): 192-199. (Apr. 1996-June 1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524 [JPRAEN].
Notes: Paper presented at the symposium "Cropping Systems of the Great Plains" held during the ASA-CSSA-SSSA annual meetings 1994, Seattle. Includes references.
Descriptors: dry farming/ intensive cropping/ sustainability/ fertilizer requirement determination/ nitrogen fertilizers/ application rates/ crop management/ minimum tillage/ no-tillage/ crop yield/ triticum/ zea mays/ helianthus/ placement/ soil testing/ sampling/ nitrogen/ mineralization/ nutrient sources/ environmental impact/ nitrate/ leaching/ surface water/ water quality/ nitrogen cycle/ literature reviews/ great plains states of USA/ nitrogen fertilizer management/ nutrient management
Abstract: Management of fertilizer N in dryland cropping systems in the semi-arid Great Plains is important to the economic and environmental sustainability of these systems. As producers shift from the traditional tilled winter wheat (Triticum aestivum L.)-fallow (WF) cropping systems to those that include summer crops in the rotation, N management becomes more important because yield losses as a result of underfertilization become greater. Fertilizer N rate is more important in obtaining optimum yields of dryland crops than N placement in drier environments, while placement becomes more important as rainfall increases. Soil testing is an accurate method of quantifying the residual soil nitrate-N level in the root zone. However, a combination of soil testing, fertilizer N experiences of the producer, and projected N requirement (expected yield) are the best factors producers can use in determining fertilizer N rates. If soil testing occurs early in the spring/summer fallow period preceding planting, a correction to the fertilizer N recommendation should be made to account for N mineralization that occurs between soil sampling and planting. This can prevent overfertilization. Dryland systems appear to have a soil-plant N buffer capacity that prevents inorganic N accumulation at fertilizer N rates that exceed optimal N requirements to meet crop needs. Recent research has reported N buffering in the range of 21 to 76 lb N/acre per yr for annually cropped dryland wheat production systems. This means that the application of from 21 to 76 lb N/acre per yr did not result in an accumulation of inorganic N in the soil. This concept should be evaluated on additional datasets, and, if found to

be applicable to a range of conditions it could have an effect on establishing environmentally safe fertilizer N rates for dryland cropping systems.
This citation is from AGRICOLA.

996. **Nitrogen management in irrigated agriculture.**
Rauschkolb, Roy S. and Hornsby, Arthur G.
New York: Oxford University Press; xi, 251 p.: ill. (1994)
Notes: Includes bibliographical references (p. 230-245) and index.
NAL Call #: S619.N57R38--1994;
ISBN: 0195078357 (acid-free paper)
Descriptors: Irrigation farming/ Nitrogen in agriculture---Management/ Crops and nitrogen
This citation is from AGRICOLA.

997. **Nitrogen management strategies to reduce nitrate leaching in tile-drained Midwestern soils.**
Dinnes, D. L.; Karlen, D. L.; Jaynes, D. B.; Kaspar, T. C.; Hatfield, J. L.; Colvin, T. S.; and Cambardella, C. A.
Agronomy Journal 94 (1): 153-171. (Jan. 2002-Feb. 2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT]
Descriptors: soil fertility/ nitrogen/ soil management/ leaching/ tile drainage/ application rates/ groundwater/ groundwater pollution/ water pollution/ surface water/ use efficiency/ water quality/ tillage/ crops/ soil organic matter/ hydrology/ air temperature/ precipitation/ monitoring/ rotations/ cover crops/ conservation tillage/ placement/ nitrification inhibitors/ wetlands/ biological filtration/ literature reviews/ United States
Abstract: Balancing the amount of N needed for optimum plant growth while minimizing the NO3 that is transported to ground and surface waters remains a major challenge for everyone attempting to understand and improve agricultural nutrient use efficiency. Our objectives for this review are to examine how changes in agricultural management practices during the past century have affected N in Midwestern soils and to identify the types of research and management practices needed to reduce the potential for nonpoint NO3 leakage into water resources. Inherent soil characteristics and management practices contributing to nonpoint NO3 loss from Midwestern soils, the impact of NO3 loading on surface water quality, improved N management strategies, and research needs are discussed. Artificial drainage systems can have a significant impact on water quality because they behave like shallow, direct conduits to surface waters. Nonpoint loss of NO3 from fields to water resources, however, is not caused by any single factor. Rather, it is caused by a combination of factors, including tillage, drainage, crop selection, soil organic matter levels, hydrology, and temperature and precipitation patterns. Strategies for reducing NO3 loss through drainage include improved timing of N application at appropriate rates, using soil tests and plant monitoring, diversifying crop rotations, using cover crops, reducing tillage, optimizing N application techniques, and using nitrification inhibitors. Nitrate can also be removed from water by establishing wetlands or biofilters. Research that is focused on understanding methods to minimize NO3 contamination of water resources should also be used to educate the public about the complexity of the problem and the need for multiple management strategies to solve the problem across agricultural landscapes.
This citation is from AGRICOLA.

998. **Nitrogen modeling for soil management.**
Shaffer, M. J.
Journal of Soil and Water Conservation 57 (6): 417-425. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: nitrogen cycle/ nitrate nitrogen/ leaching/ soil fertility/ nitrogen fertilizers/ fertilizer requirement determination/ soil organic matter/ organic nitrogen compounds/ nitrous oxide/ nitrogen/ emission/ soil biology/ soil flora/ geographical information systems/ simulation models/ computer simulation/ literature reviews
This citation is from AGRICOLA.

999. **Nitrogen pollution in the northeastern United States: Sources, effects, and management options.**
Driscoll, C. T.; Whitall, D.; Aber, J.; Boyer, E.; Castro, M.; Cronan, C.; Goodale, C. L.; Groffman, P.; Hopkinson, C.; and Lambert, K.
Bioscience 53 (4): 357-374. (Apr. 2003)
NAL Call #: 500 Am322A;
ISSN: 0006-3568 [BISNAS]
Descriptors: air pollution/ water pollution/ ozone/ forests/ estuaries/ pollution control/ simulation models/ northeastern states of USA
This citation is from AGRICOLA.

1000. **Nitrogen pools and processes in agricultural systems of Coastal British Columbia: A review of published research.**
Kowalenko, C. G.
Canadian Journal of Plant Science 80 (1): 1-10. (2000)
NAL Call #: 450-C16.
Notes: Number of References: 45; From: Nutrient cycling in crop cultural systems: 78th Annual Conference of the Agricultural Institute of Canada / Vancouver, British Colombia, 8 July 1998
This citation is provided courtesy of CAB International/CABI Publishing.

1001. **Nitrogen turnover in soil after application of animal manure and slurry as studied by the stable isotope 15N: A review.**
Dittert K; Goerges T; and Sattelmacher B
Journal of plant nutrition and soil science = Zeitschrift für Pflanzenernährung und Bodenkunde 161 (4): 453-463; 3 ref. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

1002. **Nitrogen use in vegetable crops in temperate climates.**
Schenk, M. K.
Horticultural Reviews 22: 185-223. (1998)
NAL Call #: SB317.5.H6;
ISSN: 0163-7851 [HORED5]
Descriptors: crops/ vegetables/ nitrogen fertilizers/ application rates/ temperate climate/ nitrate/ ammonium/ nutrient uptake/ fertilizer requirement determination/ nutrient requirements/ growth rate/ nutrient transport/ root systems/ soil fertility/ mineralization/ growth period/ nitrogen content/ sap/ application methods/ split dressings/ placement/

nitrification/ inhibition/ slow release fertilizers/ crop management/ organic matter/ irrigation/ chloride/ literature reviews
This citation is from AGRICOLA.

1003. **Nitrous oxide emission from agricultural soils.**
Beauchamp, E. G.
Canadian Journal of Soil Science
77 (2): 113-123. (1997)
NAL Call #: 56.8 C162 .
Notes: Number of References: 82; From: Proceedings of Quebec City Symposium on Greenhouse Gas Emissions from Soil Ecosystems, Quebec, Canada, 1995
This citation is provided courtesy of CAB International/CABI Publishing.

1004. **Nitrous Oxide Emissions and the Anthropogenic Nitrogen in Wastewater and Solid Waste.**
Barton, P. K. and Atwater, J. W.
Journal of Environmental Engineering
128 (2): 137-150. (2002);
ISSN: 0733-9372.
Notes: DOI: 10.1061/(ASCE)0733-9372(2002)128:2(137)
Descriptors: Solid wastes/ Nitrous oxide/ Wastewater/ Emissions/ Greenhouse gases/ Nitrogen cycle/ Air Pollution / Path of Pollutants/ Fate of Pollutants/ Cycling Nutrients/ Nitrogen Compounds/ Atmospheric Chemistry/ Reviews/ Research Priorities/ Waste Management/ Wastewater Treatment/ Waste Disposal/ Pollution (Air)/ Climatic changes/ Air pollution/ Sources and fate of pollution/ Sewage/ Air Pollution: Monitoring, Control & Remediation
Abstract: In the 20th century, human interference in the nitrogen cycle has caused a doubling of the global nitrogen fixation rate (an element critical in the proteins of all organisms), thereby intensifying global nitrous oxide (N sub(2)O) production during microbial nitrification and denitrification. Nitrous oxide is a powerful greenhouse gas, important in climate change, and as well, is a stratospheric ozone-depleting substance. It is likely that much of the Earth's population now relies on anthropogenic nitrogen in its food supplies, resulting in anthropogenic nitrogen contained in wastes requiring management. Food production is considered as a source of global nitrous oxide emissions; however, the nitrogen in wastewater and solid wastes may be a significant fate of much anthropogenic nitrogen. This factor has largely escaped in-depth, critical analysis from the perspective of nitrous oxide emissions. This paper introduces nitrogen cycling and nitrous oxide production and reviews the research currently available on N sub(2)O emissions from wastewater treatment operations, landfilling, composting, and incineration; demonstrating that each process can emit large amounts of this important gas. This is followed by a discussion of the limited research. The relative importance of N sub(2)O in waste management is also estimated, indicating that wastewater treatment may be the most important operation for managing anthropogenic nitrogen in wastes.
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1005. **Nitrous oxide emissions derived from N leaching.**
Groffman, P. M.; Gold, A. J.; Kellogg, D. Q.; and Addy, K.
DIAS Report, Plant Production (81): 143-155. (2002)
NAL Call #: SB187.D4 D54 nr. 81;
ISSN: 1397-9884
This citation is provided courtesy of CAB International/CABI Publishing.

1006. **Nitrous oxide emissions from grazed grassland.**
Oenema, O; Velthof, G L; Yamulki, S; and Jarvis, S C
Soil Use and Management
13 (4 [supplement]): 288-295. (1997)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: nitrous oxide: emission, greenhouse gas/ livestock (Mammalia): grazer/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ agriculture/ climate change/ grazed grassland
Abstract: Grazing animals on managed pastures and rangelands have been identified recently as significant contributors to the global N2O budget. This paper summarizes relevant literature data on N2O emissions from dung, urine and grazed grassland, and provides an estimate of the contribution of grazing animals to the global N2O budget. The effects of grazing animals on N2O emission are brought about by the concentration of herbage N in urine and dung patches, and by the compaction of the soil due to treading and trampling. The limited amount of experimental data indicates that 0.1 to 0.7% of the N in dung and 0.1 to 3.8% of the N in urine is emitted to the atmosphere as N2O. There are no pertinent data about the effects of compaction by treading cattle on N2O emission yet. Integral effects of grazing animals have been obtained by comparing grazed pastures with mown-only grassland. Grazing derived emissions, expressed as per cent of the amount of N excreted by grazing animals in dung and urine, range from 0.2 to 9.9%, with an overall mean of 2%. Using this emission factor and data statistics from FAO for numbers of animals, the global contribution of grazing animals was estimated at 1.55 Tg N2O-N per year. This is slightly more than 10% of the global budget.
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1007. **No-till vegetable production: Its time is now.**
Morse, R. D.
HortTechnology 9 (3): 373-379. (July 1999-Sept. 1999)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198.
Notes: Paper presented at the American Society for Horticultural Science Workshop on Conservation tillage for vegetables held July 11-16, 1998, Charlotte, North Carolina. Includes references.
Descriptors: vegetables/ crops/ no-tillage/ direct sowing/ transplanting/ transplanters/ farm machinery/ weed control/ cover crops/ green manures/ crop residues/ crop management/ literature reviews
Abstract: Advantages of no-till (NT) production systems are acknowledged throughout the world. During the 1990s, production of NT vegetable crops has increased for both direct seeded and transplanted crops. Increased interest in reduced-tillage systems among research workers and vegetable growers is attributed to: 1) development and commercialization of NT transplanters and seeders, 2) advancements in the technology and practice of producing and managing high-residue cover crop mulches, and 3) improvements and acceptance of integrated weed management techniques. Results from research experiments and grower's fields over the years has shown that success with NT transplanted crops is highly dependent on achieving key

production objectives, including: 1) production of dense, uniformly distributed cover crops; 2) skillful management of cover crops before transplanting, leaving a heavy, uniformly distributed killed mulch cover over the soil surface; 3) establishment of transplants into cover crops with minimum disturbance of surface residues and surface soil; and 4) adoption of year-round weed control strategies.
This citation is from AGRICOLA.

1008. **No-tillage visions: Protection of soil, water and climate and influence on management and farm income.**
Tebrügge, F.
In: Conservation agriculture: Environment, farmers experiences, innovations, socio-economy, policy/ García-Torres, L.; Benites, J.; Martínez-Vilela, A.; and Holgado-Cabrera, A.
Dordrecht, The Netherlands: Kluwer Academic, 2003; pp. 327-340
ISBN: 1-4020-1106-7
NAL Call #: S604.5 .C64 2003
This citation is provided courtesy of CAB International/CABI Publishing.

1009. **Non-chemical weed management in organic farming systems.**
Bond, W. and Grundy, A. C.
Weed Research 41 (5): 383-405. (Oct. 2001)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: organic farming/ farming systems/ weed control/ heat/ cultivation/ rotations/ cultivars/ mulching/ ground cover/ competitive ability/ detection/ steam/ literature reviews/ mechanical weed control/ thermal weed control
This citation is from AGRICOLA.

1010. **Nonpoint and point sources of nitrogen in major watersheds of the United States.**
Puckett, L. J. and Geological Survey (U.S.). Reston, Va.:
U.S. Geological Survey, 1994. 9 p.
Notes: Includes bibliographical references (p. 9).
NAL Call #: GB701.W375--no.94-4001
http://water.usgs.gov/nawqa/wri94-4001/wri94-4001main.html
Descriptors: Nonpoint source pollution---United States/ Water---Nitrogen content---United States/ Water---Pollution---United States/ Point source identification
This citation is from AGRICOLA.

1011. **Nonpoint pollution of surface waters with phosphorus and nitrogen.**
Carpenter SR; Caraco NF; Correll DL; Howarth RW; Sharpley AN; and Smith VH
Ecological Applications 8 (3): 559-568; 3 ref. (1998)
NAL Call #: QH540.E23
This citation is provided courtesy of CAB International/CABI Publishing.

1012. **Nonpoint Sources.**
Line, D. E.; Arnold, J. A.; Osmond, D. L.; Coffey, S. W.; and Gale, J. A.
Water Environment Research 65 (6): 558-571. (1993)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature review/ Model studies/ Nonpoint pollution sources/ Path of pollutants/ Reviews/ Water pollution control/ Water pollution sources/ Agricultural runoff/ Economic aspects/ Hydrologic models/ Monitoring/ Nutrients/ Pesticides/ Sediment transport/ Solute transport/ Sources and fate of pollution/ Water quality control
Abstract: Nonpoint source pollution (NSP) originates from generally diffuse land areas that intermittently contribute pollutants to surface and groundwater. The literature is reviewed on several aspects of NSP including policy, economics, and management issues; effects of NSP on surface and groundwater; best management practices (BMPs) for NSP control; and modeling and monitoring NSP. The option of effluent trading, the allocation of pollutant loading reductions for NSP using least cost as the criterion has been evaluated as an economical supplement to traditional regulatory programs addressing water quality problems. NSP control program discussions focus on the effectiveness of federal and state efforts to control NSP and restore or protect water quality. Examples of NSP include agricultural runoff (pesticides and fertilizers), soil erosion, toxic organic chemicals, and nutrients. BMPs studied for control of NSP include erosion control measures (tillage and crop planting practices), terracing, vegetative filter strips, constructed wetlands, and urban runoff and stormwater control. Mathematical modeling of water quality is a useful tool in decision making and evaluating management practices for NSP controls. New erosion and sediment transport models are continuously being developed while the components of established models are constantly being modified. Several studies have been conducted to assess the predictive capabilities of some well-known NSP models. Models may predict the fate of pollutants in surface waters, groundwater, and at the watershed level. The use of sophisticated database management and data acquisition tools has improved and expanded the utility of NSP models. The monitoring of NSP is studied in several papers. Risk-assessment articles which deal with the economic risk to the farmer and environmental risk from NSP are also reviewed. (Geiger-PTT) 35 013011055
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1013. **Nonpoint Sources.**
Line, D. E.; Osmond, D. L.; Coffey, S. W.; Arnold, J. A.; Gale, J. A.; Spooner, J.; and Jennings, G. D.
Water Environment Research 66 (4): 585-594. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: water pollution/ nonpoint pollution sources/ literature review/ surface water/ groundwater pollution/ economic aspects/ water pollution control/ model studies/ monitoring/ water management/ groundwater pollution/ pollution control/ pollution monitoring/ non point pollution sources/ Sources and fate of pollution/ Prevention and control
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1993 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of NPS pollutants in surface and ground water; NPS pollution controls; and modeling an of NPS pollution.
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1014. **Nonpoint sources.**
Line, D. E.; Osmond, D. L.; Arnold, J. A.; Coffey, S. W.; Spooner, J.; and Jennings, G. D.
Water Environment Research 67 (4): 685-700. (1995)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

1015. **Nonpoint Sources.**
Line, D. E.; Osmond, D. L.; Gannon, R. W.; Coffey, S. W.; Jennings, G. D.; Gale, J. A.; and Spooner, J.
Water Environment Research 68 (4): 720-732. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: Sources and fate of pollution/ Secondary publication and distribution/ Freshwater pollution/ Behavior and fate characteristics/ Marine/ Brackish water
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1995 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of pollutants in surface and ground water; pollution controls; and modeling and monitoring. Several publications addressed the broad topic of nonpoint sources. Novotny and Olem (1994) discussed prevention, identification, and management issues related to the control of NPS pollution, including laws, regulations, and policies; hydrologic considerations; atmospheric deposition; erosion and sedimentation; urban pollution; toxic pollution; modeling and monitoring; agricultural issues; wetlands; management and restoration; and integrated planning and control of NPS pollution on a watershed basis. A book examining nitrogen fertilization, fixation, and loss and the environmental implications of alternative nitrogen sources on ecosystems was published (Bacon, 1995). Herricks and Jenkins (1995) edited a book on assessing, controlling, and improving the quality of stormwater runoff from industrial and municipal areas. Proceedings of a conference on surface water quality and ecology (Water Environment Federation, 1995) focused on a wide range of topics, including the Everglades, sediment impacts on water quality, marine and estuarine systems, watershed management, water quality criteria and standards, environmental modeling and monitoring, natural systems, stormwater impacts, and risk assessment. Proceedings of a conference on animal waste management provided an interdisciplinary discussion of animal waste and its interactions with soil and water within a watershed framework (Steele, 1995). The National Agricultural Library published bibliographies on dairy farm manure management (Makuch, 1995a) and NPS pollution issues (Makuch, 1995b).
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1016. **Nonpoint sources.**
Line, D. E.; Osmond, D. L.; Coffey, S. W.; McLaughlin, R. A.; Jennings, G. D.; Gale, J. A.; and Spooner, J.
Water Environment Research 69 (4): 844-860. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

1017. **Nonpoint Sources.**
Line, D. E.; Mclaughlin, R. A.; Osmond, D. L.; Jennings, G. D.; Harman, W. A.; Lombardo, L. A.; and Spooner, J.
Water Environment Research 70 (4): 895-912. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Nonpoint Pollution Sources/ Surface Water/ Groundwater Pollution/ Monitoring/ Environmental Policy/ Water Pollution Control/ Sources and fate of pollution
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1997 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of pollutants in surface and ground water; pollution controls; and modeling and monitoring. Several publications addressed the broad topic of NPS pollution. Osmond, Line, et al. (1997) provided an overview of the Section 319 National Monitoring Program of the Clean Water Act. Under this program, selected watersheds around the country are monitored during a 6- to 10-year period to evaluate how implementation of best management practices (BMPs) leads to improved water quality. Proceedings from a national conference on NPS Pollution Information/Education Programs included papers on various education and outreach efforts aimed at adults and children for protecting water resources.
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1018. **Nonpoint sources.**
Line, D. E.; Jennings, G. D.; McLaughlin, R. A.; Osmond, D. L.; Harman, W. A.; Lombardo, L. A.; Tweedy, K. L.; and Spooner, J.
Water Environment Research 71 (5): 1054-1069. (Aug. 1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED].
Notes: Includes references.
Descriptors: water pollution/ groundwater pollution/ groundwater/ surface water/ water quality/ pollutants/ runoff/ leaching/ agricultural land/ agricultural chemicals/ pollution control/ literature reviews/ nonpoint source pollution/ best management practices
Abstract: Annual literature review covers multiple aspects of nonpoint source pollution and includes references to articles on pollution trading.
This citation is from AGRICOLA.

1019. **North American agroforestry: An intergrated science and practice.**
Garrett, H. E.; Rietveld, W. J.; and Fisher, Richard F.
Madison, Wis. American Society of Agronomy, Inc.; 402 p. (2000)
NAL Call #: S494.5.A45-.N68-2000;
ISBN: 0891181423
Descriptors: Agroforestry---United States/ Forest management---United States
This citation is from AGRICOLA.

1020. **The North-South divide! Organic wastes, or resources for nutrient management.**
Giller, K. E.; Cadisch, G.; and Palm, C.
Agronomie 22 (7/8): 703-709. (Nov. 2002-Dec. 2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627 [AGRNDZ].

Notes: Paper presented at the 11th Nitrogen Workshop held September 9-12, 2001, Reims, France. Includes references.
Descriptors: cattle manure/ crop residues/ nitrogen/ mineralization/ tropics/ green manures/ literature reviews/ waste utilization/ nutrient availability/ soil fertility/ soil flora/ soil biology/ biological activity in soil/ crop management/ nitrogen fixation/ legumes
This citation is from AGRICOLA.

1021. **Northeast cover crop handbook.**
Sarrantonio, Marianne
Emmaus, PA: Rodale Institute; xiii, 118 p.: ill.; Series: Soil health series. (1994)
Notes: Includes bibliographical references (p. [105]-107) and index.
NAL Call #: SB284.3.U6S27--1994;
ISBN: 0913107174 (pbk.)
Descriptors: Cover crops---Northeastern States---Handbooks, manuals, etc
This citation is from AGRICOLA.

1022. **Northern forested wetlands: Ecology and management.**
Trettin, Carl C.
Boca Raton, Fla.: CRC Lewis; 486 p.: ill., maps. (1997)
NAL Call #: SD410.9.N67--1997;
ISBN: 1566701775
Descriptors: Wetland forestry/ Forested wetlands---Management/ Wetlands---Management/ Wetland ecology/ Forest ecology
This citation is from AGRICOLA.

1023. **Notes on sediment management in reservoirs: National and international perspectives.**
Fan, Shou shan.; Morris, Gregory.; and United States. Federal Energy Regulatory Commission.
Washington, D.C.: Printed by Federal Energy Regulatory Commission; iii, 248 p.: ill., maps. (1994)
Notes: Cover title. Distributed to depository libraries in microfiche. Shipping list no.: 96-0337-M. "December 31, 1993." Includes bibliographical references. SUDOCS: E 2.2:SE 2/3.
NAL Call #: Fiche--S-133-E-2.2: SE-2/3-
Descriptors: Sediments---Geology/ Reservoir sedimentation/ Desilting basins
This citation is from AGRICOLA.

1024. **Nuisance concerns and odor control.**
Miner JR
Journal of Dairy Science 80 (10): 2667-2672; 11 ref. (1997)
NAL Call #: 44.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

1025. **Nursery soil management: Organic amendments.**
Davey, C B
In: U.S. Forest Service General Technical Report: PNW (Series: U.S. Forest Service General Technical Report: PNW 389), 1997. pp. 6-18
Notes:
ISSN: 0363-6224
Descriptors: trees (Spermatophyta)/ plants/ spermatophytes/ vascular plants/ bulk density/ composts/ forestry/ manures/ nursery soil management/ root penetration/ soil amendments/ soil compaction/ soil organic matter/ soil science/ water holding capacity/ wood wastes
Abstract: In von Carlowitz' book of 1713 on economic silviculture, he devotes a full chapter to nurseries. He discusses the best soil for a nursery, how the soil is treated and prepared for sowing, and the favorability of using lots of organic matter. Thus, our present topic is hardly new. However, there is considerable new information that will help us to a better understanding of the dynamics of organic matter in soil. Recently it has been shown that some of the most active and important organic matter is soluble. It breaks down very rapidly, however, so it must be continuously replaced. Organic matter maintenance is a bother but it is essential to the production of high quality grade one seedlings. It even makes economic sense. The roles of organic matter in the physical, chemical, and biological aspects of nursery soil management are discussed in this review. The impact of soil organic matter on air and water movement into and out of the soil, the water-holding capacity, soil compaction and bulk density, and ease of root penetration are all physical aspects. The dynamics of nutrients in the soil, both immobilization and mineralization, the components of acidity (both the pH value and exchangeable aluminum), and the cation exchange capacity are the important chemical aspects. The enhancement of mycorrhiza formation and function and the suppression of soil-borne pests, including disease organisms, nematodes, insects, and some weeds are parts of the biological factors. These are all discussed in terms of improved seedling quality.
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1026. **Nutrient concentrations and yields in undeveloped stream basins of the United States.**
Clark, G. M.; Mueller, D. K.; and Mast, M. A.
Journal of the American Water Resources Association 36 (4): 849-860. (2000)
NAL Call #: GB651.W315;
ISSN: 1093-474X [JWRAF5]
Abstract: Data from 85 sites across the United States were used to estimate concentrations and yields of selected nutrients in streams draining relatively undeveloped basins. Flow-weighted concentrations during 1990-1995 were generally low with median basin concentrations of 0.020, 0.087, 0.26, 0.010, and 0.022 milligrams per liter (mg/L) for ammonia as N, nitrate as N, total nitrogen, orthophosphate as P, and total phosphorus, respectively. The flow-weighted concentration of nitrate exceeded 0.6 mg/L in only three basins. Total nitrogen exceeded 1 mg/L in only four basins, and total phosphorus exceeded 0.1 mg/L in only four basins. The median annual basin yield of ammonia as N, nitrate as N, total nitrogen, orthophosphate as P, and total phosphorus was 8.1, 26, 86, 2.8, and 8.5 kilograms per square kilometer, respectively. Concentrations and yields of nitrate tended to be highest in northeastern and mid-Atlantic coastal states and correlated well with areas of high atmospheric nitrogen deposition. Concentrations and yields of total nitrogen were highest in the southeastern part of the nation and in parts of the upper Midwest. In the northeast, nitrate was generally the predominant form of nitrogen, and in the southeast and parts of the upper Midwest, organic nitrogen was the dominant form. Concentrations of total phosphorus were generally highest in the Rocky Mountain and Central Plain states.
This citation is from AGRICOLA.

1027. **Nutrient cycling and fertility management in temperate short rotation forest systems.**
Heilman, Paul and Norby, Richard J
Biomass and Bioenergy 14 (4): 361-370. (1998);
ISSN: 0961-9534
Descriptors: nitrate: leaching/ nitrogen: nutrient/ cropping strategies/ denitrification/ fertility management/ fertilizer requirements/ nutrient cycling/ nutrient losses/ short rotation forest systems/ soil pH/ waste disposal
Abstract: Under most conditions, fertilizers will be required to maintain production of short rotation forestry (SRF) plantations. Information from fertilizer trials together with knowledge of general soil fertility in an area permits approximation of fertilizer requirements. Refining those approximations for specific plantations is important for the following three reasons: the need to assure high production; the need to minimize production costs; and the desire to limit off-site effects of fertilizer application. To meet those goals, requires understanding the behavior of fertilizer in soils including leaching, immobilization and, in the case of nitrogen, denitrification. Knowledge of nutrient cycling in SRF including nutrient removal at harvest, other nutrient losses, and natural inputs of nutrients, helps in achieving good fertilizer practices. Cropping strategies that minimize fertilizer use can lower costs and reduce off-site effects of fertilizing. This review summarizes current knowledge of nutrient cycling, cropping strategies and fertility management in temperate SRF plantations.
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1028. **Nutrient cycling in integrated plant-animal systems: Implications for animal management strategies in smallholder farming systems.**
Ndlovu LR and Mugabe PH
In: Natural resources management in African agriculture: Understanding and improving current practices/ Barrett, Christopher B.; Place, Frank; and Aboud, Abdillahi A.
Wallingford, UK: CABI Publ., 2002; pp. 251-260.
Notes: "Published in association with the International Centre for Research in Agroforestry."
This citation is provided courtesy of CAB International/CABI Publishing.

1029. **Nutrient cycling on organic farms.**
Goulding K; Stockdale E; Fortune S; and Watson C
Journal of the Royal Agricultural Society of England 161: 65-75. (2000)
NAL Call #: 10 R81
This citation is provided courtesy of CAB International/CABI Publishing.

1030. **Nutrient Enrichment and Decomposition in Wetland Ecosystems: Models, Analyses and Effects.**
Rybczyk, J. M.; Garson, G.; and Day, J. W.
Current Topics in Wetland Biogeochemistry 2: 52-72. (1996);
ISSN: 1076-4674
Descriptors: litter/ wetlands/ ecosystems/ mineralization/ decomposition/ nutrients/ cycling nutrients/ model studies/ enrichment/ literature review/ nutrient cycles/ nutrients (mineral)/ degradation / biodegradation/ literature reviews/ decomposers/ leaves/ biogeochemistry/ nutrient enrichment/ Chemical processes/ Habitat community studies/ Protective measures and control/ Freshwater pollution
Abstract: Decomposition refers to the breakdown of organic matter to carbon dioxide, water and inorganic mineral components (mineralization) (Dickinson and Pugh 1974). Inorganic components can also be re-incorporated into the litter matrix during decomposition (immobilization). Generally, nutrient availability limits the rate of biological decomposition of plant organic matter because of the disparity between the high demand for nitrogen and phosphorus by decomposer organisms that use plant litter carbon as an energy source and the relatively low concentrations of nutrients found in the leaf litter (Swift et al. 1979, Neely and Davis 1985, Enriquez et al. 1993). Nutrient amendments to wetland ecosystems can potentially increase the rates of decomposition by either improving initial litter nutrient quality, via fertilization of the growing plant (Coulson and Butterfield 1978, Valiela et al. 1985, Lukumbuzya et al. 1994), or by increasing externally, the nutrients available to decomposer communities (Howarth and Fisher 1976, Haines and Hanson 1979, Fairchild et al. 1984). Nutrient amendments can also affect the mineralization and immobilization of nutrients within the decomposing litter matrix by altering the distribution and amounts of nutrients associated with the labile and refractory litter components, and by increasing the external pool of nutrients that can be re-incorporated into the decomposing litter matrix (Kaushik and Hynes 1971, Howarth and Fisher 1976, Andersen 1978, Coulson and Butterfield 1978, Elwood et al. 1981, Marinucci et al. 1983, DeBusk and Dierberg 1984, Fairchild et al. 1984, Neely and Davis 1985, Valiela et al. 1985, Hohmann and Neely 1993). We reviewed 24 studies that examined the effects of nutrient amendments, most commonly nitrogen and phosphorus, on the rates of wetland plant litter decomposition in either, wetland ecosystems, laboratory wetland mesocosms, streams or vegetated littoral zones of lakes.
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1031. **Nutrient losses in surface irrigation runoff.**
Bjorneberg, D. L.; Westermann, D. T.; and Aase, J. K.
Journal of Soil and Water Conservation 57 (6): 524-529. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina.
Includes references.
Descriptors: nutrients/ nitrogen/ phosphorus/ losses from soil/ surface irrigation/ return flow/ water reuse/ water erosion/ sediment yield/ polyacrylamide / furrows/ grass strips/ erosion control/ ponds/ sediment/ pollution control/ sediment trapping ponds
This citation is from AGRICOLA.

1032. **Nutrient management: Crop production and water quality.**
Klausner, Stu.
Ithaca, N.Y.: Northeast Regional Agricultural Engineering Service. vi, 40 p.: ill. (some col.); Series: NRAES 101. (1997)
Notes: Cover title. Includes bibliographical references p. 38-39.
NAL Call #: S675-.N72-no.-101
This citation is from AGRICOLA.

1033. **Nutrient management, cultivar development and selection strategies to optimize water use efficiency.**
Davis, J. G. and Quick, J. S.
Journal of Crop Production 1 (2): 221-240. (1998)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Nutrient Use in Crop Production / edited by Z. Rengel. Includes references.
Descriptors: crops/ cultivars/ artificial selection/ selection program/ genetic improvement/ fertilizers/ water use efficiency/ nutrient sources/ photosynthesis/ crop yield/ rooting/ soil water content/ economic analysis/ evapotranspiration/ literature reviews
This citation is from AGRICOLA.

1034. **Nutrient Management for Water Quality Protection: Integrating Research Into Environmental Policy.**
Sims, J. T.; Goggin, N.; and Mcdermott, J.
Water Science and Technology 39 (12): 291-298. (1999)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: IAWQ 3. International Conference on Diffuse Pollution, Edinburgh (UK), 21 Aug-4 Sep 1998; Source: Diffuse Pollution '98; Editors: Novotny, V. //D'Arcy, B.; DOI: 10.1016/S0273-1223(99)00346-7; *ISBN:* 0080434096
Descriptors: United States, Delaware/ Cycling Nutrients/ Environmental Policy/ Reviews/ Water Quality Management/ Agricultural Practices/ Degradation/ Nutrients (mineral)/ Water pollution / Policies/ Water quality control/ Agricultural pollution/ Nutrients/ Environment management/ Legislation/ Agriculture/ Government policies/ Nutrient cycles/ Pollution monitoring/ Ecosystem management/ United States, Delaware/ Water quality control/ Environmental action/ Prevention and control/ Freshwater pollution
Abstract: Agriculture's impacts on water quality have been the focus of basic and applied research in Delaware for more than 25 years. Research has examined nutrient cycling in soils, nutrient transport from soils to water, and the environmental consequences of ground water contamination and surface water eutrophication by nutrients. Much of the research has specifically been oriented towards the development of agricultural management practices to prevent the degradation of water quality by nutrients. Other research has focused on increasing our understanding of the chemical, physical, and biological processes that control nutrient cycling and transport and improving the monitoring techniques needed to document how changing management practices affects water quality. Agencies responsible for water quality protection have sought to integrate this research into environmental policy, but have often been frustrated by the fragmented and sometimes contradictory nature of the information provided to them. This paper reviews key advances in research on nutrient management and water quality in Delaware and discusses the obstacles faced in translating research into widely accepted management practices and environmental policies.
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1035. **Nutrient management of food animals to enhance and protect the environment.**
Kornegay, E. T.
Boca Raton, Fla.: CRC/Lewis Publishers; xix, 344 p.: ill. (1996)
Notes: " ... based on the proceedings of the John Lee Pratt International Symposium on Nutrient Management of Food Animals to Enhance and Protect the Environment held on June 4-7 at Virginia Polytechnic Institute and State University"--Pref. Includes bibliographical references and index.
NAL Call #: SF94.6.N87--1996;
ISBN: 1566701996 (alk. paper)
Descriptors: Animal nutrition---Congresses/ Food animals---Nutrition---Congresses/ Feeds---Congresses
This citation is from AGRICOLA.

1036. **Nutrient management strategies on Dutch dairy farms: An empirical analysis.**
Ondersteijn, C. J. M.
Wageningen: s.n.; 200 p.: ill., maps. (2002)
Notes: "Stellingen" inserted. Thesis (doctoral)--Wageningen Universiteit, 2002. Includes bibliographical references (p. 162-175).
NAL Call #: DISS-F2002088;
ISBN: 9058087166
This citation is from AGRICOLA.

1037. **Nutrient recycling: The European experience: Review.**
Hall JE
Asian Australasian Journal of Animal Sciences 12 (4): 667-674; 7 ref. (1999)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

1038. **Nutrient recycling: The North American experience: Review.**
Fontenot, J. P.
Asian Australasian Journal of Animal Sciences 12 (4): 642-650. (1999)
NAL Call #: SF55.A78A7;
ISSN: 1011-2367
This citation is provided courtesy of CAB International/CABI Publishing.

1039. **Nutrient retention in riparian ecotones.**
Vought, L. B. M.; Dahl, J.; Pedersen, C. L.; and Lacoursiere, J. O.
Ambio 23 (6): 342-348. (1994)
NAL Call #: QH540.A52;
ISSN: 0044-7447
This citation is provided courtesy of CAB International/CABI Publishing.

1040. **Nutrients in ground water and surface water of the United States: An analysis of data through 1992.**
Mueller, D. K. and Geological Survey (U.S.). Denver, Colo.: U.S. Dept. of the Interior, U.S. Geological Survey, 1995. 74 p.
Notes: "National Water-Quality Assessment Program"--Cover.
NAL Call #: GB701.W375-no.95-4031
http://pubs.er.usgs.gov/pubs/wri/wri954031
Descriptors: Water---Nitrogen content---United States/ Water---United States---Phosphorus content
This citation is from AGRICOLA.

1041. **Nutrients in groundwaters of the conterminous United States, 1992-1995.**
Nolan, B. T. and Stoner, J. D.
Environmental Science and Technology 34 (7): 1156-1165. (2000)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG]
Descriptors: groundwater/ water quality/ contaminants/ groundwater pollution/ federal programs/ United States/ US geological survey's national water quality assessment program nawqa
This citation is from AGRICOLA.

1042. **Nutrients in shallow ground waters beneath relatively undeveloped areas in the conterminous United States.**
Nolan, B. T.; Hitt, K. J.; and National Water Quality Assessment Program (U.S.). Denver, Colorado: U.S. Dept. of the Interior, U.S. Geological Survey, 2003. 17 p.
Notes: "National Water-Quality Assessment Program."
NAL Call #: GB701-.W375-no.-2002-4289
http://water.usgs.gov/nawqa/nutrients/pubs/wri02-4289/wri02-4289.pdf
Descriptors: Nutrient pollution of water---United States/ Groundwater---Pollution---United States
This citation is from AGRICOLA.

1043. **Nutrients in the nation's waters: Too much of a good thing?**
Mueller, David K.; Helsel, Dennis R.; and Kidd, Mary A.
Washington, D.C. U.S. G.P.O., 1996. 24 p.
Notes: Includes bibliographical references (p. 22).
NAL Call #: TD427.N87M84--1996
http://water.usgs.gov/nawqa/circ-1136/circ-1136main.html
Descriptors: Nutrient pollution of water---United States
This citation is from AGRICOLA.

1044. **Nutritional management for environment friendly animal production.**
Paik IK
Asian Australasian Journal of Animal Sciences 13: 302-314. (2000)
NAL Call #: SF55.A78A7.
Notes: Special Issue; Number of References: 37; From: Proceedings of 2000 International Symposium Recent Advances in Animal Nutrition, Seoul, Korea, 20-22 April 2000; Special issue editors: Aumaitre A, Lee BD, Ha JK
This citation is provided courtesy of CAB International/CABI Publishing.

1045. **Oak regeneration using the shelterwood-burn technique: Management options and implications for songbird conservation in the southeastern United States.**
Lanham, J. D.; Keyser, P. D.; Brose, P. H.; and Van Lear, D. H.
Forest Ecology and Management 155 (1/3): 143-152. (Jan. 2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW].
Notes: Special issue: Forest ecology in the next millennium: Putting the long view into practice / edited by A.C. Dibble. Paper presented at a workshop held June 27-30, 1999, Orono, Maine. Includes references.
Descriptors: quercus/ liriodendron tulipifera/ wild birds/ shelterwood/ natural regeneration/ prescribed burning/ forest management/ nature conservation/ plant competition/ stand structure/ botanical composition/ woodlands/ plant succession/ habitats/ literature reviews/ southeastern states of USA
This citation is from AGRICOLA.

1046. **Occurrence and fate of hormone steroids in the environment.**
Ying GuangGuo; Kookana, R. S.; and Ru YingJun
Environment International 28 (6): 545-551. (2002)
NAL Call #: TD169.E54;
ISSN: 0160-4120
This citation is provided courtesy of CAB International/CABI Publishing.

1047. **Occurrence, degradation and fate of pesticides during composting: Part I: Composting, pesticides, and pesticide degradation.**
Buyuksonmez, Fatih; Rynk, Robert; Hess, Thomas F; and Bechinski, Edward
Compost Science and Utilization 7 (4): 66-82. (1999)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: fungicide: compost chemistry, degradation, pesticide/ herbicide: compost chemistry, degradation, pesticide/ insecticide: compost chemistry, degradation, pesticide
Abstract: This paper reviews the findings of research reported in the currently available literature regarding the occurrence and transformations of pesticides through the composting process and the use of compost. Part I summarizes the composting process, pesticides and mechanisms of pesticide degradation. Part II reviews research studies concerning the occurrence and fate of pesticides during composting. Investigations of pesticide residues in composting feedstocks and finished compost detected few of the target pesticides. The compounds that were found occurred at low concentrations. The majority of the compounds detected were insecticides in the organochlorine category, including chemicals that have been banned from use in the U.S. for many years. Generally, organophosphate and carbamate insecticides and most herbicides were rarely detected. Comparisons of pesticide concentrations before and after composting also showed organochlorine compounds to be most resistant to biodegradation during composting. With some exceptions, pesticides in other categories decomposed moderately well to very well. Studies that followed the mechanisms of degradation indicate that mineralization accounts for only a small portion of pesticide disappearance. Other prominent fates include partial degradation to secondary compounds, adsorption, humification, and volatilization. In general the research results suggest that the pattern of pesticide degradation during composting is similar to the degradatiion observed in soils. With a few important distinctions, composting can be considered a biologically active soil environment in which degradation is accelerated. However, as some studies noted, composting does not always speed the degradation of all pesticides. The nature of the pesticide, specific composting conditions and procedures, the microbial communities present, and the duration of composting affect the extent and the mechanisms of degradation.
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1048. **Occurrence, degradation and fate of pesticides during composting: Part II, Occurrence and fate of pesticides in compost and composting systems.**
Buyuksonmez, Fatih; Rynk, Robert; Hess, Thomas F; and Bechinski, Edward
Compost Science and Utilization 8 (1): 61-81. (2000)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: pesticides: degradation, fate/ microbes (Microorganisms)/ Microorganisms/ compost
Abstract: This paper reviews the findings of research reported in the currently available literature regarding the occurrence and transformations of pesticides through the composting process and the use of compost. Part I summarizes the composting process, pesticides and mechanisms

of pesticide degradation. Part II reviews research studies concerning the occurrence and fate of pesticides during composting. Investigations of pesticide residues in composting feedstocks and finished compost detected few of the target pesticides. The compounds that were found occurred at low concentrations. The majority of the compounds detected were insecticides in the organochlorine category, including chemicals that have been banned from use in the U.S. for many years. Generally, organophosphate and carbamate insecticides and most herbicides were rarely detected. Comparisons of pesticide concentrations before and after composting also showed organochlorine compounds to be most resistant to biodegradation during composting. With some exceptions, pesticides in other categories decomposed moderately well to very well. Studies that followed the mechanisms of degradation indicate that mineralization accounts for only a small portion of pesticide disappearance. Other prominent fates include partial degradation to secondary compounds, adsorption, humification, and volatilization. In general the research results suggest that the pattern of pesticide degradation during composting is similar to the degradation observed in soils. With a few important distinctions, composting can be considered a biologically active soil environment in which degradation is accelerated. However, as some studies noted, composting does not always speed the degradation of all pesticides. The nature of the pesticide, specific composting conditions and procedures, the microbial communities present, and the duration of composting affect the extent and the mechanisms of degradation.

1049. **Occurrence of Nitrate in Groundwater: A Review.**
Spalding, R. F. and Exner, M. E.
Journal of Environmental Quality 22 (3): 392-402. (1993)
NAL Call #: QH540.J6 [JEVQAA]
Descriptors: Groundwater pollution/ Irrigation effects/ Nitrates/ Nonpoint pollution sources/ United States/ Water pollution sources/ Agricultural runoff/ Aquifers/ Cropland/ Drainage effects/ Soil types/ Tile drainage/ Sources and fate of pollution
Abstract: The results of federal, state, and local surveys, which included more than 200,000 NO3-N data points, are summarized in this review of NO3 in groundwater in the USA. The levels of NO3-N are associated with source availability and regional environmental factors. In regions where well-drained soils are dominated by irrigated cropland, there is a strong propensity toward the development of large areas with groundwater that exceeds the maximum contaminant level of 10 mg/L NO3-N. Most of these areas are west of the Missouri River where irrigation is a necessity. Aquifers in highly agricultural areas in the southeastern USA reportedly are not contaminated. Vegetative uptake and denitrification in this warm, wet, C-rich environment are responsible for the natural remediation of NO3 in shallow aquifers. In the Middle Atlantic states and the Delmarva Peninsula, localized contamination occurs beneath cropped, well-drained soils that receive excessive applications of manure and commercial fertilizer. Extensive tile drainage has for the most part prevented a NO3 problem in the groundwater of the Corn Belt states. Throughout the USA there are recurring themes. They include a decrease in NO3-N levels with depth; lower NO3-N levels in shallow wells (<8 m); and a significant increase in NO3-N in older wells and in wells with poor construction. The factors affecting the distribution of NO3 in aquifers are complex and poorly understood. Interdisciplinary studies using discrete depth sampling, geohydrological indicators, isotopic tracers, and microbiological techniques are necessary to unravel the complex dynamics. (Author's abstract) 35 012605040

1050. **Occurrence of pesticides in shallow groundwater of the United States: Initial results from the National Water-Quality Assessment Program.**
Kolpin, D. W.; Barbash, J. E.; and Gilliom, R. J.
Environmental Science and Technology 32 (5): 558-566. (1998)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG]
This citation is from AGRICOLA.

1051. **Occurrence of pesticides in the atmosphere in France.**
Bedos, Carole; Cellier, Pierre; Calvet, Raoul; and Barriuso, Enrique
Agronomie 22 (1): 35-49. (2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627
Descriptors: pesticides: physico chemical characteristics, pollutant/ aerosol particles/ atmosphere/ fog/ gaseous phase/ rainwater/ seasonality/ spatial variability
Abstract: The transfer of pesticides to the atmosphere leads to a contamination of all atmospheric phases: gaseous, aerosol particles, fog droplets or rainwater. This paper makes a review of observations of pesticides in the atmosphere in France, which started at the end of the 80s. Measured concentrations in rainwater were very high, with maximum values reaching 60 mugcntdotl-1. Concentrations in fog were much higher than in rainwater. Regarding the gaseous and particulate phases, the measured concentrations range from not detected to 185 ngcntdotm-3. Very high values (2.6 mugcntdotm-3) have been measured locally. This contamination is observed throughout the year, sometimes displaying a seasonal pattern and spatial variability. Compounds which have been banned are still present in the atmosphere. It is also striking that pesticides which could be expected to be not very volatile based on their physico-chemical characteristics are found in the atmosphere.

1052. **Odor control for livestock systems.**
Powers, W J
Journal of Animal Science 77 (2 [supplement]): 169-176. (1999)
NAL Call #: 49 J82;
ISSN: 0021-8812
Descriptors: livestock (Mammalia)/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ anaerobic digesters/ biofilters/ dietary restriction/ lagoons/ management practices/ manure storage systems/ odor control strategies
Abstract: Odors are generated primarily as the result of manure storage but also result from animal housing and manure application. Effective odor control is dependent upon implementation of strategies that are complementary to management

practices. Some systems use a deep pit or a holding tank for manure storage. In such systems, little or no biological processing occurs, and they are therefore considered high-load systems. In systems where biological processing occurs to a great extent, such as in anaerobic digesters or lagoons, the system would be termed a low-load system. Odor control strategies for manure storage areas, such as solids separation and additives, are best suited for low-load systems, whereas covers and biofilters provide the best results for high-load systems. Strategies that reduce nutrient production, such as dietary restriction of nutrients, are well-suited for all types of manure storage systems. To comply with current or pending odor control regulations, it is imperative that producers be provided with sound recommendations of odor control strategies.
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1053. **Odor mitigation for concentrated animal feeding operations: White paper and recommendations.**
Sweeten, J. M.; Jacobson, L. D.; Heber, A. J.; Schmidt, D. R.; Lorimor, J. C.; Westerman, P. W.; Miner, J. R.; Zhang, R. H.; Williams, C. M.; and Auvermann, B. W.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1054. **Odor sensor for manure management.**
Kizil, U.; Panigrahi, S.; and Lindley, J. A.
In: 2000 ASAE Annual International Meeting. (Held 9 Jul 2000-12 Jul 2000 at Milwaukee, Wisconsin.)
St. Joseph, Mich.: American Society of Agricultural Engineers; pp. 1-14; 2000.
Notes: ASAE Paper No. 004046
This citation is provided courtesy of CAB International/CABI Publishing.

1055. **Off-stream water sources for grazing cattle as a stream bank stabilization and water quality BMP.**
Sheffield, Ronald Erle
Blacksburg, Va.: Virginia Polytechnic Institute and State University, 1996.
Notes: Thesis (M.S.); Bibliography: leaves 147-153.
NAL Call #: ViBlbV LD5655.V855-1996.S544
This citation is from AGRICOLA.

1056. **On-line sample handling strategies for the trace-level determination of pesticides and their degradation products in environmental waters.**
Barcelo, Damia and Hennion, Marie Claire
Analytica Chimica Acta 318 (1): 1-41. (1995)
NAL Call #: 381 An1;
ISSN: 0003-2670
Descriptors: analytical method/ gas chromatography/ liquid chromatography/ mass spectrometry/ N Methylcarbonate/ pollution
Abstract: An overview of the use of on-line techniques is presented. First, it includes the on-line coupling of solid-phase extraction and liquid chromatography, which is certainly the most commonly used automated technique really well adapted to the multiresidue analysis of pesticides in aqueous samples. The different parameters which govern the method (dimension of the pre-columns, type of sorbents, pre-columns in series, quantitative analysis) are discussed and applications to various waters are presented. Emphasis is given to the limits of detection obtained using UV diode array, fluorescence or electrochemical detection modes. The on-line post-column reaction detection coupled to liquid chromatography are also reviewed with emphasis on the determination of N-methylcarbamates. The performances of the on-line mass spectrometric detection coupled to solid-phase extraction and liquid chromatography are presented using thermospray, particle beam or electrospray. The main characteristics of the on-line coupling of solid-phase extraction and gas chromatography are also given, with various applications and corresponding detection limits. The recent results obtained with the on-line coupling of gas chromatography with solid-phase micro-extraction are outlined. Supercritical fluid extraction is also mentioned as a new sample handling technique which can be easily on-line coupled to the chromatographic separation.
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1057. **On the Choice of Structural Parameters and Endpoints to Indicate Responses of Freshwater Ecosystems to Pesticide Stress.**
Brock, T. C. M. and Budde, B. J.
In: Freshwater Field Tests for Hazard Assessment of Chemicals/ Hill, I. R.; Heimbach, F.; Leeuwangh, P.; and Mattiessen, P.
Boca Raton, FL: Lewis Publishers, 1994; pp. 19-56.
Notes: Conference: European Workshop on Freshwater Field Tests, Potsdam (Germany), 25-26 Jun 1992;
ISBN: 0-87371-940-9
Descriptors: pesticides/ ecosystem disturbance/ pollution effects/ freshwater ecology/ population dynamics/ literature review/ water pollution/ ecosystems/ Effects on organisms/ Effects of pollution/ Freshwater pollution
Abstract: A review is presented of the recent literature (published after 1980) on the choice of structural parameters in studying the biological effects of pesticides in freshwater ecosystems. A short overview is given of the types of pesticide applied. Three types of test system are distinguished, viz., macrophyte-dominated lentic systems, open water lentic systems, and lotic systems. The biological populations frequently studied in these systems, and the set of parameters used, are outlined. Gaps in the knowledge of community structure responses in pesticide-stressed freshwaters are discussed. Furthermore, the predictability and causality of structural community responses is commented on, with reference to primary and secondary effects of pesticides and the recovery of affected populations.
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1058. **One phytopathologist's growth through IPM to holistic plant health: The key to approaching genetic yield potential.**
Browning, J. A.
Annual Review of Phytopathology 36: 1-24. (1998)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]

Descriptors: plant pathology/ integrated pest management/ plants/ crop yield/ maximum yield/ biographies/ history/ plant diseases/ plant disease control/ crop management/ genetic diversity/ literature reviews
This citation is from AGRICOLA.

1059. **Opportunities and constraints to improving irrigation water management: Foci for research.**
Burton, M A; Kivumbi, D; and El Askari, K
Agricultural Water Management 40 (1): 37-44. (1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: water management: research foci/ water use efficiency
Abstract: Potential areas for research to improve irrigation water management and irrigation water utilization are identified, and their likelihood of adoption discussed within the context of existing constraints.
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1060. **Opportunities for increased nitrogen-use efficiency from improved resource management in irrigated rice systems.**
Cassman, K. G.; Peng, S.; Olk, D. C.; Ladha, J. K.; Reichardt, W.; Dobermann, A.; and Singh, U.
Field Crops Research 56 (1/2): 7-39. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: oryza sativa/ nitrogen/ use efficiency/ crop management/ irrigation/ crop yield/ nitrogen fertilizers/ application rates/ application date/ soil fertility/ nutrient uptake/ nutritional state/ losses/ soil organic matter/ decomposition/ nitrogen cycle/ soil biology/ soil depth/ intensive cropping/ heat sums/ nitrogen content/ literature reviews
This citation is from AGRICOLA.

1061. **Optimization procedure for cost effective BMP placement at a watershed scale.**
Veith, T. L.; Wolfe, M. L.; and Heatwole, C. D.
Journal of the American Water Resources Association 39 (6): 1331-1343. (2003)
NAL Call #: GB651.W315;
ISSN: 1093-474X.
Notes: Number of References: 26
Descriptors: Environment/ Ecology/ watershed management/ genetic algorithm/ spatial optimization/ modeling/ geographic information systems/ nonpoint source pollution/ sediment delivery
Abstract: A combinatorial optimization procedure for best management practice (BMP) placement at the watershed level facilitates selection of cost effective BMP scenarios to control nonpoint source (NPS) pollution. A genetic algorithm (GA) was selected from among several optimization heuristics. The GA combines an optimization component written in the C++ language with spatially variable NPS pollution prediction and economic analysis components written within the ArcView geographic information system. The procedure is modular in design, allowing for component modifications while maintaining the basic conceptual framework. An objective function was developed to lexicographically optimize pollution reduction followed by cost increase. Scenario cost effectiveness is then calculated for scenario comparisons. The NPS pollutant fitness score allows for evaluation of multiple pollutants, based on prioritization of each pollutant. The economic component considers farm level public and private costs, cost distribution, and land area requirements. Development of a sediment transport function, used with the Universal Soil Loss Equation, allows the optimization procedure to run within a reasonable timeframe. The procedure identifies multiple near optimal solutions, providing an indication of which fields have a more critical impact on overall cost effectiveness and flexibility in the final solution selected for implementation. The procedure was demonstrated for a 1,014-ha watershed in the Ridge and Valley physiographic region of Virginia.
© Thomson ISI

1062. **Options for managing odor: A report from the Swine Odor Task Force.**
Swine Odor Task Force.
North Carolina Agricultural Research Service, North Carolina State University, 1995.
Notes: 78 pp.: ill. (text/html)
http://www.ces.ncsu.edu/whpaper/SwineOdor.html
Descriptors: swine/ pig manure/ swine housing/ odor emissions/ odor control/ odor control technology/ North Carolina

1063. **Options for using low-quality water for vegetable crops.**
Shannon, M. C. and Grieve, C. M.
HortScience 35 (6): 1058-1062. (Oct. 2000)
NAL Call #: SB1.H6;
ISSN: 0018-5345 [HJHSAR].
Notes: Special section: Water management and water relations of horticultural crops. Paper presented at a conference held July 24, 1997, Salt Lake City, Utah. Includes references.
Descriptors: vegetables/ horticultural crops/ irrigation water/ water quality/ salinity/ drainage water/ saline water/ water reuse/ salt tolerance/ susceptibility/ yield losses/ economic analysis/ germplasm/ crop management/ rotations/ lycopersicon esculentum/ cucumis melo/ soil salinity/ literature reviews
This citation is from AGRICOLA.

1064. **Organic amendments and phosphorus sorption by soils.**
Iyamuremye, F. and Dick, R. P.
Advances in Agronomy 56: 139-185. (1996)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
Descriptors: phosphorus/ animal manure/ organic soil amendment/ plant residues/ soil aeration/ soil phosphorus sorption/ soil science
© Thomson

1065. **Organic farming and water pollution.**
Brown, S.
Journal of the Institution of Water and Environment Management 7 (6): 586-591. (Dec. 1993)
NAL Call #: TD420.W374;
ISSN: 0951-7359
Descriptors: organic farming/ water pollution/ groundwater pollution/ nitrate/ leaching/ pesticides/ runoff/ fertilizers/ low input agriculture/ animal manures/ soil conservation
Abstract: Farming activities are often a source of water pollution in rural areas. Nitrate leaching, eutrophication, pesticide accumulation and other forms of contamination are causing increasing concern. This paper briefly reviews the problems and discusses the possible solutions

offered by organic farming systems, along with any new problems that may be created.
This citation is from AGRICOLA.

1066. **Organic nitrogen deposition on land and coastal environments: A review of methods and data.**
Cornell, S. E.; Jickells, T. D.; Cape, J. N.; Rowland, A. P.; and Duce, R. A.
Atmospheric Environment 37 (16): 2173-2191. (2003)
NAL Call #: TD881.A822;
ISSN: 1352-2310
This citation is provided courtesy of CAB International/CABI Publishing.

1067. **Organic pollutant migration in soils as affected by soil organic matter. Molecular and mechanistic aspects.**
Senesi, N.
NATO ASI Series: Series G, Ecological Sciences 32: 47-74. (1993)
NAL Call #: QH540.N3;
ISSN: 0258-1256.
Notes: In the series analytic: Migration and fate of pollutants in soils and subsoils / edited by D. Petruzzelli and F.G. Helfferich. Proceedings of the NATO Advanced Study Institute, May 24-June 5, 1992, Maratea, Italy. Literature review. Includes references.
Descriptors: soil pollution/ pollutants/ pesticides/ organic compounds/ transport processes/ soil organic matter/ humic acids/ fulvic acids/ literature reviews
This citation is from AGRICOLA.

1068. **Organizing paradigms for the study of inland aquatic ecosystems.**
Brezonik, Patrick L.
Washington, D.C.: National Academy Press, 1996; pp. 203-217
http://www.nap.edu/books/0309054435/html/
Descriptors: flowing waters/ freshwater ecology/ inland aquatic ecosystems study/ lakes/ methodology/ organizing paradigms/ river continuum concept/ terrestrial aquatic interactions/ wetlands
© Thomson

1069. **Organochlorine pesticides and PCBs in stream sediment and aquatic biota: Initial results from the National Water-Quality Assessment Program, 1992-1995.**
Wong, C. S.; Capel, P. D.; Nowell, L. H.; and National Water Quality Assessment Program (U.S.).
Sacramento, Calif. U.S. Dept. of the Interior, 2000. 88 p.
Notes: Shipping list no.: 2000-0353-P.
NAL Call #: GB701 .W375 no. 00-4053
Descriptors: National Water Quality Assessment Program---United States/ Organochlorine compounds---Environmental aspects---United States/ Water quality biological assessment---United States/ River sediments---United States---Analysis
This citation is from AGRICOLA.

1070. **Our changing perspectives on benefits and risks of pesticides: A historical overview.**
Ecobichon, Donald J
Neurotoxicology 21 (1-2): 211-218. (2000);
ISSN: 0161-813X
Descriptors: DDT: pesticide/ pesticide: environmental contamination, misuse, pesticide, use/ global use
Abstract: The introduction of chemical pesticides following WW II ushered in the era of the "quick fix" for any agricultural, forestry and human health problems. Scenarios of use, misuse, abuse and environmental contamination can be presented for any class of pesticide, culminating in dependence on these chemicals for increased production of food and fibre and improved health. With time, sophisticated agents having unique, target-specific mechanisms of action evolved but at increased cost(s) to crop production. Equatorical countries, rapidly becoming "breadbaskets" of the world, are particularly dependent on pesticides as they strive to increase production of nontraditional export products (NTEPS), valuable cash crops in demand in countries having more temperate climates. Developing nations have neither the legislation and regulations necessary to control pesticides nor trained personnel to inspect and monitor use, to analyze residues in produce or to initiate training programs. Their transition from agrarian to industrialized societies has meant that smaller, less well educated populations must shoulder the responsibility of increased traditional food production for consumption by urban populations as well as that of NTEPS. Unfortunately, to attain these goals, many older, more toxic, environmentally persistent and cheap pesticides, long banned in developed countries, are used extensively, creating serious local and global contamination and health problems.
© Thomson

1071. **Outdoor Air Quality.**
Auverman, B.; Bicudo, J.; Lorimor, J.; Jacobson, L.; and Schmidt, D.
Ames, Iowa: Midwest Plan Service, Iowa State University MWPS-18; 96 p. (2002); *ISBN:* 0-89373-096-3
Descriptors: livestock/ animal manure management/ odor control/ odor emissions/ air quality/ dust emissions/ land application
Abstract: With the trend towards larger and more concentrated production sites, odors, gases, and dust are rapidly becoming issues that are even more important for animal producers and others involved with the agricultural community. The public's increasing intolerance for odors coupled with the economic importance of animal agriculture has resulted in an urgent need for all stakeholders to find adequate solutions. Outdoor Air Quality, MWPS-18 Section 3, uses a science-based approach to measuring air quality and emphasizes the basic principles involved in controlling dust and odor. This book covers five major topics: basics of outdoor air quality, managing odors from buildings, managing dust and odor from open lots, managing odors from manure storages, and managing odors during manure application.
© Midwest Plan Service (MWPS)

1072. **Overland flow transport of pathogens from agricultural land receiving faecal wastes.**
Tyrrel, S. F. and Quinton, J. N.
Journal of Applied Microbiology 94, Suppl. S: 87S-93S. (2003)
NAL Call #: QR1.J687;
ISSN: 1364-5072.
Notes: Number of References: 43
Descriptors: Biology/ Microbiology/ coastal waters/ thermophilic campylobacters/ bacteriological quality/ indicator organisms/ runoff water/ pollution/ salmonella/ prevalence/ delivery/ cattle
Abstract: Considerable investment has been made in recent years in improvements to the microbiological quality of urban wastewater discharges to surface waters, particularly in coastal towns, with the aim of reducing the exposure of bathers and surfers to gastrointestinal pathogens. As this source of pollution

has come under greater control, attention has started to focus on diffuse catchment sources of faecal contamination which have been shown to be dominant during high river flows associated with storm events. This association with storm events suggests that rapidly responding hydrological pathways such as overland flow are likely to be important. The aim of this paper is to establish the current state of knowledge of pathogen transport processes in overland flow. In addition, the paper will attempt to convey the way that soil erosion science may aid our understanding of this environmental problem. The scale and nature of faecal waste applications to land in the UK is briefly reviewed, with data presented on both livestock slurry and manure, and human sewage sludge. Particular emphasis is placed on factors influencing the likelihood of pathogens making their way from infected livestock and humans to the soil surface, and therefore the chances of them being available for transport by overland flow. The literature relating to pathogen transport in overland flow is reviewed. Existing pathogen transport models treat pathogens as particles and link pathogen transport models to pathogen die-off kinetics. Such models do not attempt to describe the interactions that may occur between pathogens and soil and waste particles. Although conceptual models describing the possible states in which pathogen transport may occur have been proposed, an understanding of the factors controlling the partitioning of the microorganisms between the different states is only just beginning to emerge. The apparent poor performance of overland flow mitigation measures such as grass buffer strips in controlling the movement of faecal indicators highlights the need for a better understanding the dynamics of microbial transport so that better management approaches may be developed. Examples of on-going research into overland flow transport processes are briefly described and gaps in knowledge identified.

1073. **Overview and Future Direction of Biological Control Technology.**
Cofrancesco, A. F.
Journal of Aquatic Plant Management 36: 49-53. (1998)
NAL Call #: SB614.H9;
ISSN: 0146-6623.
Notes: Special section: Proceedings of the U.S. Army Corps of Engineers Aquatic Plant Control Research Program Review, July 15, 1997
Descriptors: Exotic Species/ Biotechnology/ Pathogens/ Aquatic Plants/ Submerged Plants/ Research Priorities/ Evaluation/ Aquatic Weed Control / Interagency Cooperation/ Insects/ Biological control/ Herbivores/ Introduced species/ Environmental impact/ Ecosystem management/ Environment management/ Reviews/ Freshwater environments/ Research programs/ Hydrilla verticillata/ Melaleuca quinquenervia/ Alternanthera philoxeroides/ Myriophyllum spicatum/ Pistia stratiotes/ Eichhornia crassipes/ United States/ Bottle brush tree/ Cajeput tree/ Control of water on the surface/ Species interactions: pests and control/ Control
Abstract: The Corps of Engineers (CE) biological control technology area had its beginnings in 1959 when the CE and the U.S. Department of Agriculture began a cooperative research effort. Since then, numerous insects and pathogens have been studied as potential agents for the management of target plant populations. Researchers have traveled to the countries of origin of six target plants (Eichhornia crassipes Mart. (Solms), Alternanthera philoxeroides (Mart.) Griseb., Myriophyllum spicatum L., Pistia stratiotes L., Hydrilla verticillata (L. F.) Royle, and Melaleuca quinquenervia (Cav.) S. T. Blake) to search for host specific agents. As a result, 13 insect biocontrol agents have been released as management tools lot five of these targets. On average these projects have developed one agent every 2.9 years. The CE also has conducted pathogen biological control research using endemic pathogens. More recently the CE has begun classical biocontrol studies using exotic pathogens as potential agents of aquatic plants. Research in the near future will be directed at the management of submersed aquatic vegetation. The past successes will be used to assist in directing the program, however, new emphasis will be placed on the development of more effective evaluation procedures to document impact of the biological control agents.

1074. **Overview of Areawide Management of Insects.**
Chandler, L. D. and Faust, R. M.
Journal of Agricultural Entomology 15 (4): 319-325. (1998)
NAL Call #: SB599.J69;
ISSN: 0735-939X
Descriptors: Integrated control/ United States/ Insecta/ Agricultural & general applied entomology
Abstract: In 1995 the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) implemented a new areawide pest management initiative. This program, targeted at key pests across the United States, has resulted in renewed discussion of the pros and cons of this integrated-pest-management-related control tactic. This introduction to an areawide pest management symposium presented at the 1997 Entomological Society of America Annual Meeting provides information on the development of areawide pest management as we know it today. Additionally, a comparison of areawide management to conventional pest control strategies, as well as examples of historic and current programs are presented.

1075. **Overview of areawide programs and the program for suppression of codling moth in the western USA directed by the United States Department of Agriculture, Agricultural Research Service.**
Calkins, C. O. and Faust, R. J.
Pest Management Science 59 (6-7): 601-604. (2003)
NAL Call #: SB951 .P47;
ISSN: 1526-498X.
Notes: Number of References: 7; Publisher: John Wiley & Sons Ltd
Descriptors: Entomology/ Pest Control/ Cydia pomonella/ mating disruption/ integrated pest management/ pheromone
Abstract: An areawide suppression program for codling moth (Cydia pomonella L) populations was initiated in 1995 in Washington, Oregon and California under the direction of the US Department of Agriculture,

Agricultural Research Service in cooperation with Washington State University, Oregon State University and University of California, Berkeley. Mating disruption was used to reduce the pest population while reducing and eliminating the use of organophosphate insecticides. During the 5-year program, the original 1064 hectares were expanded to 8400 hectares and from 66 grower participants to more than 400 participants. The acreage under mating disruption in the three states increased from 6000 hectares in 1994 to 54 000 hectares in the year 2000. © Thomson ISI

1076. **Overview of Canadian Watershed Monitoring Programs for Improved Water Quality.**
Perrone, J.; Madramootoo, C. A.; Enright, P.; and Papineau, F.
Canadian Water Resources Journal 23 (2): 121-134. (1998);
ISSN: 0701-1784.
Notes: Alternative title: Revue Canadienne Des Ressources Hydriques
Descriptors: Canada/ Watersheds/ Water Pollution Control/ Monitoring/ Water Quality Control/ Water Resources Management/ Agriculture/ Hydroelectric Plants/ Agricultural runoff/ Pollution monitoring/ Pollution control/ Water quality/ Government policy/ Sociological aspects/ Economics/ Resource management/ Government programs/ Environmental monitoring/ Ontario/ North America/ Great Lakes/ Network design/ Behavior and fate characteristics/ Environmental action
Abstract: Pollution from intensive agricultural production is a major contributor to water quality degradation in Canada. Activities such as forestry and hydroelectric development in rural areas also endanger water quality. The need to develop good management practices to reduce such contamination has led to the initiation of numerous watershed water quality and modeling studies. Great Lakes basin water quality studies in the 1970s formed a technical and methodological basis for future watershed studies in Canada. More recently, implementation of various governmental programs such as the Canada Green Plan has promoted an integrated ecosystems approach that achieves water quality improvement by focusing on socio-economic aspects of basin water resources management. Some of the significant watershed studies initiated in recent years in Canada are discussed in the present paper. © Cambridge Scientific Abstracts (CSA)

1077. **Overview of conservation tillage on cotton production in the mid- south.**
Bradley, J. F.
In: 1995 Proceedings Beltwide Cotton Conferences. (Held 4 Jan 1995-7 Jan 1995 at San Antonio, Texas.); Vol. 1. Memphis, Tenn.: National Cotton Council; pp. 200-203; 1995.
This citation is provided courtesy of CAB International/CABI Publishing.

1078. **An Overview of Constructed Wetlands as Alternatives to Conventional Waste Treatment Systems.**
Hamilton, H.; Nix, P. G.; and Sobolewski, A.
Water Pollution Research Journal of Canada 28 (3): 529-548. (1993)
NAL Call #: TD420.A1W34;
ISSN: 0197-9140.
Notes: Conference: BIOQUAL '92 Meet., Vancouver, BC (Canada), 9-11 Jun 1992; Editors: Hall, E. R.
Descriptors: wetlands / construction/ wastewater treatment/ hydrocarbons/ organic compounds/ biodegradation/ bacteria/ biofilms/ Non patents/ Microbial degradation/ Environmental Applications/ Impact/ Sewage & wastewater treatment/ Wastewater treatment processes
Abstract: Constructed wetlands are an attractive alternative to conventional wastewater treatment under certain conditions. This review presents background information on wetland treatment and wetland design, and outlines the potential for wetlands to treat water contaminated with organic compounds including hydrocarbons. The major mechanisms that reduce contaminant concentrations in wetlands are sedimentation, filtration, chemical precipitation, microbial interaction and plant uptake. The presence of bacteria in "Biofilms" on the enormous plant and detrital surface area in wetlands is fundamental to their ability to degrade complex organic contaminants. There are few examples in the literature of wetlands being used to control organic chemical pollution. However, the very high level of biochemical activity in the water column and upper sediment layer in wetlands, combined with a high degree of ecological resilience, suggests that wetlands can be an attractive low cost, low energy, low maintenance alternative to conventional treatment methods. © Cambridge Scientific Abstracts (CSA)

1079. **Overview of cover crops and green manures.**
Sullivan, Preston G.; Diver, Steve.; and Appropriate Technology Transfer for Rural Areas (Organization).
Fayetteville, AR: ATTRA; 17 p.: ill.; Series: Fundamentals of sustainable agriculture (Appropriate Technology Transfer for Rural Areas (Organization)). (2001)
Notes: Caption title. "ATTRA, Appropriate Technology Transfer for Rural Areas." "January 2001." "ATTRA is the national sustainable agriculture information center funded by the USDA's Rural Business--Cooperative Service." Includes bibliographical references (p. 12-13).
NAL Call #: SB284.3.U6-S85-2001
http://www.attra.org/attra-pub/covercrop.html
Descriptors: Cover crops---United States/ Green manure crops---United States
This citation is from AGRICOLA.

1080. **An overview of EPA's watershed model BASINS and related federal spatial data products.**
Whittemore, Raymond C. and National Council of the Paper Industry for Air and Stream Improvement (U.S.).
Research Triangle Park, NC: National Council of the Paper Industry for Air and Stream Improvement; 15, 11 p.: ill. (some col.), col. maps; Series: Technical bulletin (National Council of the Paper Industry for Air and Stream Improvement (U.S.): 1981) no. 744. (1997)
Notes: "September 1997." Includes bibliographical references (p. 15).
NAL Call #: TD899.P3N34--no.744
Descriptors: United States Environmental Protection Agency---Computer programs/ BASINS---Computer program/ Watersheds---Research---United States---Computer programs/ Water quality management---United States---Computer programs/ Watershed management---United States---Computer programs/ Water---Pollution---United States/ Point source

identification---Computer programs/ Nonpoint source pollution---United States---Computer programs
This citation is from AGRICOLA.

1081. **An overview of forest canopy ecosystem functions with reference to urban and riparian systems.**
Shaw, D. C. and Bible, K.
Northwest Science 70 (special issue): 1-6. (1996)
NAL Call #: 470-N81;
ISSN: 0029-344X [NOSCAX]
Descriptors: forests/ canopy/ ecosystems/ riparian forests/ urban areas/ forest ecology/ literature reviews
This citation is from AGRICOLA.

1082. **Overview of green manures/cover crops.**
Power, J. F.
In: Proceedings Northeastern and Intermountain Forest and Conservation Nursery Associations. (Held 2 Aug 1993-5 Aug 1993 at St. Louis, Missouri.)
Fort Collins, Colo.: United States Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 47-50; 1994.
Notes: Series: General technical report RM 243
NAL Call #: aSD11.A42-no.243
Descriptors: green manures/ cover crops/ erosion/ ground cover/ soil organic matter/ nitrogen/ soil fertility/ glycine max/ adaptability/ vicia villosa/ growth period/ seasonal variation/ fabaceae/ soil temperature/ dry matter/ Nebraska/ North Dakota
This citation is from AGRICOLA.

1083. **Overview of pesticide fate in the environment: Principles, processes, and offsite transport.**
Neary, D. G.
Proceedings - Forest Vegetation Management Conference (22nd): 19-24. (2001)
NAL Call #: QH541.5.F6F67;
ISSN: 1057-2147.
Notes: Meeting held January 16-18, 2001, Redding, California. Includes references.
Descriptors: herbicides/ transport processes/ environmental impact/ soil water movement/ forest ecology/ herbicide residues/ application methods/ degradation
This citation is from AGRICOLA.

1084. **An overview of phosphorus behavior in wetlands with implications for agriculture.**
Gale, P. M. and Reddy, K. R.
In: Animal waste and the land-water interface.
Boca Raton, Fla.: Lewis Publishers, 1995; pp. 205-213.
ISBN: 1566701899
NAL Call #: TD930.A55-1995
Descriptors: wetland soils/ soil chemistry/ phosphorus/ pollutants/ retention/ water pollution/ agricultural wastes
This citation is from AGRICOLA.

1085. **An overview of present knowledge on methane emission from biomass burning.**
Delmas, R.
Fertilizer Research 37 (3): 181-190. (1994)
NAL Call #: S631.F422;
ISSN: 0167-1731 [FRESDF].
Notes: Special section: Methane and nitrous oxide: the other greenhouse gases / edited by A.R. van Amstel and A.R. Mosier. Papers presented at a workshop February 3-5, Amersfoort, Netherlands. Includes references.
Descriptors: methane/ emission/ biomass/ burning/ agricultural wastes/ bioenergy/ prescribed burning/ world/ global methane emission
This citation is from AGRICOLA.

1086. **Overview of recycling nutrients from animal waste through forages.**
Evers, G. W.
Proceedings of the Southern Pasture and Forage Crop Improvement Conference 52: 59-64. (1996)
NAL Call #: 60.19-So83;
ISSN: 0193-6425.
Notes: Meeting held March 30-April 2, 1996, Oklahoma City, Oklahoma. Includes references.
This citation is from AGRICOLA.

1087. **Overview of soil erosion from irrigation.**
Koluvek, P. K.; Tanji, K. K.; and Trout, T. J.
Journal of Irrigation and Drainage Engineering 119 (6): 929-946. (1993)
NAL Call #: 290.9 AM3Ps (IR);
ISSN: 0733-9437
This citation is provided courtesy of CAB International/CABI Publishing.

1088. **An overview of some tillage impacts on earthworm population abundance and diversity: Implications for functioning in soils.**
Chan, K. Y.
Soil and Tillage Research 57 (4): 179-191. (2001)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1089. **Overview of studies on riparian vegetation: Past, present and future perspectives.**
Sakio, H.; Nakamura, F.; and Oshima, Y.
Japanese Journal of Ecology 45 (3): 291-294. (1995);
ISSN: 0021-5007
This citation is provided courtesy of CAB International/CABI Publishing.

1090. **An Overview of Substances Present in Canadian Aquatic Environments Associated With Endocrine Disruption.**
Hewitt, M. and Servos, M.
Water Quality Research Journal of Canada 36 (3): 191-213. (2001);
ISSN: 1201-3080.
Notes: Theme Issue: Endocrine Disrupting Substances in the Canadian Environment
Descriptors: Reviews/ Aquatic environment/ Endocrine system/ Canada / endocrine disruptors/ Contaminants/ Chemical pollution/ Biota/ Water pollution/ Pollution effects/ Water quality (Natural waters)/ Pollutants/ Endocrine glands/ Metals/ Pesticides/ Industrial wastes/ Chemicals/ Water Pollution Effects/ Pesticides/ Toxicity/ Canada/ endocrine disruptors/ Environmental action/ Effects of Pollution/ Effects of pollution
Abstract: Numerous environmental contaminants have been associated with the ability to affect the endocrine status of animals and with the potential to elicit effects on individuals or populations in Canadian aquatic environments. Potential endocrine disrupting substances (EDS) consist of almost every class of environmental contaminants reported to date, including industrial chemicals, historical and current use pesticides, metals, and different classes of natural products. It has been difficult to establish cause-and-effect relationships with potential EDS for several reasons: i) the diversity of

ways that chemicals can influence endocrine systems challenges efforts to characterize chemicals that can cause endocrine responses, ii) many responses in aquatic biota have been associated with complex mixtures where the causative agents remain unidentified, and iii) most literature information deals with mammalian studies using pure compounds so there is considerable uncertainty regarding extrapolation to aquatic species and efficacy of environmental concentrations. An overview of the literature on EDS, specific to exposure within Canadian aquatic environments, is presented to emphasize the diversity and complexity of chemicals capable of altering endocrine function.
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1091. **An overview of the latest development of microencapsulation for agricultural products.**
Gimeno, M.
Journal of Environmental Science and Health: Part B, Pesticides, Food Contaminants and Agricultural Wastes B31 (3): 407-420. (1996)
NAL Call #: TD172.J61;
ISSN: 0360-1234 [JPFCD2].
Notes: Special issue: Pesticide chemistry for sustainable agriculture / edited by A. Ambros. Paper presented at the Fifth European Conference on Chemistry and the Environment, May 1995, Budapest, Hungary. Includes references.
Descriptors: agricultural chemicals/ pesticides/ formulations/ controlled release/ microencapsulation/ product development/ toxicity
This citation is from AGRICOLA.

1092. **Overview of the rivers in the West.**
Rosgen, D. L.
In: General Technical Report RM; Vol. 226.
Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1993; pp. 8-15.
Notes: In the series analytic: Riparian management: common threads and shared interests. Paper presented at a conference on Feb. 4-6, 1993, Albuquerque, New Mexico;
ISSN: 0277-5786
NAL Call #: aSD11.A42
Descriptors: rivers/ stream flow/ erosion/ sediment/ riverbank protection/ channels/ Western states of USA
This citation is from AGRICOLA.

1093. **An Overview on Organic Contaminants, Focusing on Monitoring of a Few Chlorinated Organic Pollutants, Through Immission Studies.**
Reutergaardh, L.
Resources, Conservation and Recycling 16 (1-4): 361-382. (1996)
NAL Call #: TP156.R38R47;
ISSN: 0921-3449.
Notes: Conference: Int. Symp. on Environmental Management and Pollution Control, Bangkok (Thailand), 7-14 Nov 1994; Source: Pollution Control and Management and Environmental Toxicology., 1996; Editors: Wise, D. L. //Polprasert, C. //Reutergardh, L. //Visvanathan, C. //Suselo, T. B.
Descriptors: fuel/ organic compounds/ fertilizers/ herbicides/ bioaccumulation/ trophic level/ contamination/ chlorinated hydrocarbons/ food chains/ path of pollutants/ monitoring/ pollution monitoring/ Sources and fate of pollution/ Toxicology and health
Abstract: The problem of environmental pollution is usually considered to be a consequence of the industrialization and urbanization processes in the late 19th and early 20th centuries. Fertilizers and herbicides were introduced into agriculture, the chemical industry developed new products and the large-scale use of fossil fuels increased rapidly. Population growth in the cities gave rise to the problems of garbage disposal and domestic effluents into surrounding waters and the contribution of industrial discharges directly into the environment grew rapidly. During the last decades, however, both scientists and society have become aware of the growing contamination and pollution problems. Some of the man-made chemicals were shown to be extremely persistent in the environment and to accumulate in fatty tissues of animals. At the same time, insects, plants, and fungi developed new forms that were resistant to the chemicals used to combat them. Industries grew up where population densities were high and transportation facilities were good. These places were in many cases along river banks, bays, and coast lines. Thus pollution of the aquatic environment became an issue, but it was soon realized that weathering processes transported contaminants even to remote areas. The presentation will briefly consider the influence of some classes of chlorinated organic pollutants on different trophic levels. The emphasis will be on substances which are persistent and which show bioaccumulation properties in food chains. Within this group of substances the majority are chlorinated organic compounds. (DBO)
© Cambridge Scientific Abstracts (CSA)

1094. **Pacific salmon, nutrients, and the dynamics of freshwater and riparian ecosystems.**
Naiman, Robert J; Bilby, Robert E; Schindler, Daniel E; and Helfield, James M
Ecosystems 5 (4): 399-417. (2002)
NAL Call #: QH540.E3645;
ISSN: 1432-9840
Descriptors: nutrients: marine derived/ Oncorhynchus spp. [Pacific salmon] (Osteichthyes): anadromous/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ aquatic productivity/ climate cycles/ ecosystem dynamics: freshwater, riparian/ management implications/ marine environments/ predation/ resource management/ vegetation
Abstract: Pacific salmon (Oncorhynchus spp.) accumulate substantial nutrients in their bodies as they grow to adulthood at sea. These nutrients are carried to predominantly oligotrophic lakes and streams, where they are released during and after spawning. Research over more than 3 decades has shown that the annual deposition of salmon-borne marine-derived nutrients (MD-nutrients) is important for the productivity of freshwater communities throughout the Pacific coastal region. However, the pathways and mechanisms for MD-nutrient transfer and accumulation in freshwater and riparian ecosystems remain virtually unexplored, consequently, there are many uncertainties in this area. This article addresses three related topics. First, we summarize recent advances in our understanding of the linkages among MD-nutrients, freshwater (including riparian) ecosystems, and community dynamics by addressing

the importance of MD-nutrients to lakes and streams and by then reviewing large-scale and long-term processes in the atmosphere and ocean that govern variability in salmon populations. Second, we evaluate the validity of the discoveries and their implications for active ecosystem management, noting areas where extrapolation from these results still requires great caution. Finally, we outline five key research issues where additional discoveries could greatly augment our understanding of the processes shaping the structure and dynamics of salmon populations and the characteristics of their freshwater habitat and associated riparian zones. Collectively, the data suggest that the freshwater portion of the salmon production system is intimately linked to the ocean. Moreover, for the system to be sustainable, a holistic approach to management will be required. This holistic approach will need to treat climate cycles, salmon, riparian vegetation, predators, and MD-nutrient flowpaths and feedbacks as an integrated system.
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1095. **Paradigms of metal accumulation in rooted aquatic vascular plants.**
Jackson, L J
Science of the Total Environment 219 (2-3): 223-231. (1998)
NAL Call #: RA565.S365;
ISSN: 0048-9697
Descriptors: metals: accumulation, bioavailability/ plant (Plantae): rooted aquatic vascular/ Plants/ sediment
Abstract: This paper reviews paradigms of metal accumulation in rooted aquatic vascular plants. Radio-tracer studies have demonstrated that root uptake from sediments with subsequent translocation to above-ground tissues is the principal pathway for metal movement. The metal concentration of rooted macrophytes is generally proportional to metal concentrations in the underlying sediments, excluding crystal lattice-bound metals. Deviations from 1:1 predictions between sediment and macrophyte metal concentrations have been shown to be correlated to variation in sediment geochemistry. Sediment pH, redox potential and organic content are three particularly important sediment variables that affect phase partitioning of metals, and their bioavailability. Metals contained within macrophyte tissues can participate in cycling within the littoral zone, or at senescence, lost to the surrounding water in a dissolved form or exported out of the lake bound to shoot fragments. Relatively little is known about the trophic transfer of macrophyte-bound metals to herbivores or algae. A better understanding of the role of rooted aquatic macrophytes in ecosystem processes is likely to be advanced by considering the fate of plant metals leaked during the summer, and those dissolved forms lost to the water column during senescence. Modeling metal accumulation in aquatic vascular plants has been restricted to empirical models that provide descriptions of general patterns.
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1096. **Parameterisation of hydrological models: A review and lessons learned from studies of an agricultural catchment (Naizin, France).**
Durand, P.; Gascuel Odoux, C.; and Cordier, M. O.
Agronomie 22 (2): 217-228. (Mar. 2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627 [AGRNDZ].
Notes: Special issue: Parameter estimation for crop models / edited by D. Wallach. Proceedings of a seminar held June 2000, Toulouse, France. Includes references.
Descriptors: agricultural land/ watersheds/ catchment hydrology/ simulation models/ mathematical models/ Bayesian theory/ Monte Carlo method/ estimation/ hydraulic conductivity/ water flow/ soil water/ Brittany/ generalized likelihood uncertainty estimation/ maximum storage in root zone/ channel flow velocity
This citation is from AGRICOLA.

1097. **Parasitic protozoa and the waterborne route for the transmission of disease.**
Smith, H. V.; Ahmad, R. A.; and Watkins, J.
Tropical Biomedicine 14 (1/2): 35-49. (1997);
ISSN: 0127-5720
This citation is provided courtesy of CAB International/CABI Publishing.

1098. **Parasitism and Ecology of Wetlands: A Review.**
Thomas, F.; Cezilly, F.; De Meeues, T.; Crivelli, A.; and Renaud, F.
Estuaries 20 (3): 646-654. (1997)
NAL Call #: GC96.E79;
ISSN: 0160-8347
Descriptors: Ecosystems/ Wetlands/ Ecology/ Coastal Waters/ Parasites/ Reviews/ Predation/ Conservation/ Literature reviews/ Estuaries/ Nature conservation/ Species interactions: parasites and diseases/ Ecology/ Community Studies/ Wetlands
Abstract: Recent advances in ecology have suggested that parasites, through the spectrum of their effects, could act as key species in ecosystems. Wetlands are productive ecosystems within which parasitism is diversified. There already exists evidence for direct and indirect effects of parasites on their host species. The influence of parasites on the population ecology of hosts includes survival, castration, sexual selection, predation, and spatial distribution. Parasites can also affect the evolution of host biological diversity (i.e., genetic structure and interspecific competition) and trophic interactions between prey and predators. The key role parasites might play in the ecology of coastal waters and wetlands should be considered in conservation programs applied to such ecosystems.
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1099. **Particulate matter emissions from confined animal feeding operations: Management and control measures.**
Auvermann, B. W.; Bottcher, R. W.; Parnell, C. B.; Shaw, B.; and Worley, J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1100. **Past and future impacts of wetland regulations on playa ecology in the Southern Great Plains.**
Haukos, D. A. and Smith, L. M.
Wetlands 23 (3): 577-589. (2003)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212.
Notes: Number of References: 52; Soc Wetland Scientists
Descriptors: Environment/ Ecology/ playa wetlands/ regulations/ Southern High Plains/ Texas/ lakes/ vegetation/ basins
Abstract: Playa wetlands provide functions critical to the existence of life on the High Plains portion of the Great Plains, including surface drainage, aquifer recharge, and wildlife habitat. These small, circular, isolated depressional wetlands with closed watersheds have a dynamic, unpredictable hydroperiod, which is essential to the maintenance of biodiversity. Most numerous in the Southern High Plains of northwestern Texas and eastern New Mexico, playas have been impacted by sedimentation, pit excavation, road construction, industrial and municipal wastewater, feedlot runoff, urban development, overgrazing, and deliberate filling. Despite being declared, as a wetland class, jurisdictional "waters of the United States" since 1977, regulations and laws for conservation of wetland functions have seldom been applied to playas. The January 2001 Supreme Court decision, Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army of Corps of Engineers, likely eliminated federal regulation of impacts covered by the Clean Water Act in all but a few playas. Although still subject to the Federal "Swampbuster" provision enacted by the 1985 Food Security Act, extended natural dry periods allows for frequent cultivation and other activities in playas without incurring violation, contributing to the continued degradation of playa functions. None of the states with significant numbers of playas have regulations for the conservation of playa functions. Suggestions for the successful future conservation of playas and their associated functions include (1) increased promotion and implementation of existing federal and state conservation programs specifically for playas; (2) proposed state regulations for playa conservation; (3) recognition of agricultural impacts on wetland determinations; (4) creation of Welland Management Districts to preserve intact, functioning playas; and (5) increased public education on the value of playas.
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1101. **Patch Characteristics and Landscape Context as Predictors of Species Presence and Abundance: A Review.**
Mazerolle, MJ and Villard, MA
Ecoscience 6 (1): 117-124. (1999);
ISSN: 1195-6860
Descriptors: Ecosystems/ Ecotypes/ Variability/ Correlation analysis/ Species diversity/ Abundance/ Literature reviews/ Aquatic organisms/ Reptilia/ Amphibia/ Pisces/ Gastropoda/ Invertebrata/ Vertebrata
Abstract: Studies were reviewed which simultaneously considered landscape-scale and patch-scale effects in order to answer the following question: does the inclusion of landscape characteristics as explanatory variables increase the ability to predict species presence and abundance when local (i.e., habitat patch) conditions are known? The 61 studies selected cover a wide array of taxa, landscape types, and explanatory variables, but many (36%) focused on avain communities in forests fragmented by agriculture. Patch-scale variables had a significant effect on invertebrates, amphibians, reptiles, birds, and mammals in all landscape types. Landscape-scale characteristics also were significant predictors of species presence and abundance for vertebrates (fish, reptiles, amphibians, birds etc.,) but not for the majority of invertebrates (Gastropodaetc.,) in the studies reviewed. Results indicate that both patch and landscape characteristics should be included in models investigating the distribution and abundance of animals, at least for vertebrates. Results from this review suggest that the inclusion of landscape characteristics will enhance conservation strategies if the landscape scale is properly defined with respect to the taxon or taxa under investigation.
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1102. **Pathogen reduction in sewage sludge by composting and other biological treatments: A review.**
Dumontet, S.; Dinel, H.; and Baloda, S. B.
Biological Agriculture & Horticulture 16 (4): 409-430. (1999);
ISSN: 0144-8765
This citation is provided courtesy of CAB International/CABI Publishing.

1103. **Pathogen survival in swine manure environments and transmission of human enteric illness: A review.**
Guan TatYee and Holley, R. A.
Journal of Environmental Quality 32 (2): 383-392. (2003)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

1104. **Pathogens and manure management systems: A review.**
Bicudo, J. R. and Goyal, S. M.
Environmental Technology 24 (1): 115-130. (2003)
NAL Call #: TD1.E59;
ISSN: 0959-3330
This citation is provided courtesy of CAB International/CABI Publishing.

1105. **Pathogens excreted by livestock and transmitted to humans through water.**
Atwill, Edward R. and University of California, Davis. Animal Agricultural Research Center. University of California Davis.
Agricultural Issues Center.
Davis, Calif.: UCD Animal Agriculture Research Center: UC Agricultural Issues Center; vi, 19 p. (1997)
Notes: "August 1997." Includes bibliographical references (p. 13-18).
NAL Call #: RA642.W3-A89-1997
Descriptors: Waterborne infection/ Animal waste---Environmental aspects/ Water quality management
This citation is from AGRICOLA.

1106. **Pathogens in animal wastes and the impacts of waste management practices on their survival, transport and fate.**
Sobsey, M. D.; Khatib, L. A.; Hill, V. R.; Alocilja, E.; and Pillai, S.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture;

Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1107. **PCR and the detection of microbial pathogens in water and wastewater.**
Toze, Simon
Water Research 33 (17): 3545-3556. (1999)
NAL Call #: TD420.W3;
ISSN: 0043-1354
Descriptors: bacteria (Bacteria): pathogen/ helminths (Aschelminthes)/ protozoans (Protozoa): pathogen/ viruses (Viruses): pathogen/ Animals/ Aschelminths/ Bacteria/ Eubacteria/ Helminths/ Invertebrates/ Microorganisms/ Protozoans/ Viruses/ ecotoxicology/ environmental contamination/ false positives/ fecal contamination/ health risks/ microbial pathogen detection/ quantification difficulty/ wastewater
© Thomson

1108. **Performance of bedding materials in reducing ammonia emissions from pig manure.**
Andersson, Mats.
Lund, Sweden: Sveriges lantbruksuniversitet, Institutionen for jordbrukets biosystem och teknologi (JBT); 50 p.: ill.; Series: Rapport (Sveriges lantbruksuniversitet. Institutionen for jordbrukets biosystem och teknologi) 101. (1995)
Notes: "ISRN-SLU-JBT-R--101--SE." Includes bibliographical references (p. 44-46).
NAL Call #: TH4911.A1S9--no.101
This citation is from AGRICOLA.

1109. **The performance of the human nose in odour measurement.**
Walker, J C
Water Science and Technology 44 (9): 1-7. (2001)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223
Descriptors: human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ environmental health/ indoor air quality/ water quality
Abstract: Over the last 20 years or so, there has been steadily increasing activity in the area of applied human odour measurement. This has been especially true outside of the United States. Yet, for about 40 years, there has also been decreasing interest and activity, on the part of academic smell researchers, in rigorous quantitative measurement of the functional properties of the human olfactory system. There are some optimistic signs, however, that this situation may be improving. Applied meetings such as this one are reaching out to learn more about basic research in human olfaction and some research groups are venturing out to indoor air quality, environmental health, water quality and other applied areas. In this paper I hope to support and accelerate the increasingly fruitful interactions that are beginning. The paper aims to make four main points. First, some of the most important ways in which the laboratory differs from everyday life will be noted. Keeping these differences in mind lessens the risk that laboratory data will be used uncritically to make predictions of real-world responses to chemical stimuli. Next, the specific benefits that would accrue from more fruitful interactions between basic and applied researchers will be highlighted; this is perhaps best seen by noting problem areas resulting from too little cross-fertilisation. Third, the CEN standard for the measurement of odour thresholds will be discussed in light of what is known concerning both the functional aspects of the human olfactory system and the current state of knowledge concerning best methods for investigating this system. Finally, some recent work we have done that was designed to help characterise human odour responses and demonstrate improved methodology, will be briefly mentioned. The paper concludes with suggestions as to how the scientific basis of applied odour measurement may best be enhanced.
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1110. **Periphyton function in lake ecosystems.**
Vadeboncoeur, Yvonne and Steinman, Alan D
The Scientific World 2: 1449-1468. (2002)
NAL Call #: 472 SCI25;
ISSN: 1537-744X
Descriptors: nutrients/ periphyton (Organisms): abundance, growth, productivity/ phytoplankton (Algae)/ Algae/ Microorganisms/ Nonvascular Plants/ Plants/ dissolved organic matter loading/ food web interactions/ habitat availability/ habitat type/ lake ecosystems/ lake morphometry/ landscape properties/ light availability/ nutrient cycling/ primary productivity/ resource competition/ sediments/ shallow depths/ trophic conditions/ water column transparency/ watershed related properties
Abstract: Periphyton communities have received relatively little attention in lake ecosystems. However, evidence is increasing that they play a key role in primary productivity, nutrient cycling, and food web interactions. This review summarizes those findings and places them in a conceptual framework to evaluate the functional importance of periphyton in lakes. The role of periphyton is conceptualized based on a spatial hierarchy. At the coarsest scale, landscape properties such as lake morphometry, influence the amount of available habitat for periphyton growth. Watershed-related properties, such as loading of dissolved organic matter, nutrients, and sediments influence light availability and hence periphyton productivity. At the finer scale of within the lake, both habitat availability and habitat type affect periphyton growth and abundance. In addition, periphyton and phytoplankton compete for available resources at the within-lake scale. Our review indicates that periphyton plays an important functional role in lake nutrient cycles and food webs, especially under such conditions as relatively shallow depths, nutrient-poor conditions, or high water-column transparency. We recommend more studies assessing periphyton function across a spectrum of lake morphometry and trophic conditions. Periphyton communities have received relatively little attention in lake ecosystems. However, evidence is increasing that they play a key role in primary productivity, nutrient cycling, and food web interactions.
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1111. **Pest and pesticide management on southern forests.**
United States. Forest Service. Southern Region.
Atlanta, GA: USDA Forest Service, Southern Region; vi, 46 p.: ill., col. map; Series: Management bulletin R8 MB 60. (1994)
Notes: "September 1994." Includes bibliographical references (p. 43) and index.
NAL Call #: aSB763.A13P47--1994

Descriptors: Trees---Diseases and pests---Southern States/ Trees---Diseases and pests---Control---Southern States
This citation is from AGRICOLA.

1112. **Pest management implications of glyphosate-resistant wheat (Triticum aestivum) in the Western United States.**
Lyon, D. J.; Bussan, A. J.; Evans, J. O.; Mallory Smith, C. A.; and Peeper, T. F.
Weed Technology 16 (3): 680-690. (July 2002-Sept. 2002)
NAL Call #: SB610.W39;
ISSN: 0890-037X [WETEE9]
Descriptors: triticum aestivum/ glyphosate/ herbicide resistance/ weed control/ pest management/ cultivars/ crop plants as weeds/ application date/ risk assessment/ weed associations/ rotations/ herbicide resistant weeds/ crop management/ information needs/ literature reviews/ United States
This citation is from AGRICOLA.

1113. **Pesticide acute toxicity reference values for birds.**
Mineau, P.; Baril, A.; Collins, B. T.; Duffe, J.; Joerman, G.; and Luttik, R.
Reviews of Environmental Contamination and Toxicology 170: 13-74. (2001)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: wild birds/ toxicity/ pesticides/ risk assessment/ literature reviews
This citation is from AGRICOLA.

1114. **Pesticide chemical oxidation processes: An analytical approach.**
Chiron, Serge; Fernandez, Alba Amadeo R; and Rodriguez, Antonio
Trends in Analytical Chemistry 16 (9): 518-527. (1997)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: organophosphorus compounds/ phenoxyacids/ triazines/ water/ by product identification/ degree of mineralization/ pesticide chemical oxidation processes
Abstract: This article gives an overview of the different analytical approaches for carrying out pesticide degradation studies in waters by means of advanced oxidation processes (AOPs). The degree of mineralization achieved under AOPs and the identity of by-products of a large number of compounds belonging to the major pesticide families, triazines, phenoxyacids, and organophosphorus compounds, are presented. Critical comments are aimed at emphasizing the lack of suitable analytical methods in order to both follow the kinetics of formation and disappearance of by-products and identify their chemical structures. More particularly the crucial role of gas chromatography and liquid chromatography in combination with mass spectrometry is stated.
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1115. **Pesticide Chemical Oxidation: State-of-the-Art.**
Chiron, S.; Fernandez-Alba, A.; Rodriguez, A.; and Garcia-Calvo, E.
Water Research 34 (2): 366-377. (2000)
NAL Call #: TD420.W3;
ISSN: 0043-1354.
Notes: DOI: 10.1016/S0043-1354(99)00173-6
Descriptors: Pesticides/ Oxidation/ Degradation/ Optimization/ Mass Spectrometry/ Byproducts/ Wastewater Treatment/ Technology/ Reviews/ Kinetics/ Ozonation/ Photolysis/ Chemical degradation/ titanium dioxide/ Pesticides/ Decomposition/ Spectrometry (Mass)/ Wastewater treatment processes/ Sewage & wastewater treatment/ Industrial Effluents
Abstract: The various currently used chemical oxidation processes (AOPs), for pesticide elimination from wastewater are reported. Heterogeneous TiO sub(2) photocatalysis, ozonation and photo-Fenton's reagent are the most intensively investigated technologies. Theoretical and practical advantages and limitations of each method are discussed. Degradation mechanism and experimental conditions employed for the optimization of each technology are reviewed. Performances such as the achieved degree of mineralization and obtained degradation rates are detailed. The various analytical approaches for studying pesticide degradation by AOPs are also discussed. Formation of by-products is unavoidable during cost effective treatments. Their detection and identification are required in order to determine which kind of chemical structures are left at the end of the process. For this purpose, the crucial role of gas and liquid mass spectrometry is emphasized. The review reveals a general lack of data on kinetics of formation and disappearance of the major by-products. The efficiency of AOPs has scarcely been investigated at industrial scales, i.e. in presence of a mixture of active ingredients together with their formulating agents and at concentration levels above 10 mg/l. The more polar by-products are largely unknown and their toxicity is usually not addressed.
© Cambridge Scientific Abstracts (CSA)

1116. **Pesticide Contamination of Surface Waters: An Approach to the Use of Buffers.**
Harris, G. and Forster, A.
In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 2 Aug 1930-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 20-21; 1996.
Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: path of pollutants/ pesticides/ contamination/ surface water/ literature review/ catchment areas/ leaching/ degradation/ retention/ permeability coefficient/ subsurface drainage/ particulate matter/ adsorption/ water pollution control/ catchments/ drainage/ buffer zones/ Sources and fate of pollution / Freshwater pollution
Abstract: As contamination of surface waters by pesticides has become more widespread, the need for measures that can reduce the risk of pesticides reaching watercourses has increased. These include influencing the movement of water and possible chemical contaminants at the hillslope, to reduce pesticide export, as well as measures to minimise the input to the water body itself. One such measure gaining considerable acceptance is the use of a streamside buffer, which is a feature established to separate the pollution source - the adjacent agricultural area - from the watercourse. Buffers have become attractive because they are seen as offering a non-chemical treatment for pesticides and provide an additional measure within a catchment management approach to reduce the risk of contamination. In addition, buffers are seen as important as they provide an opportunity for conservation opportunities for flora and fauna. This paper reviews the transport mechanisms of pesticides

within catchments and assesses the key parameters that influence pesticide loss from studies undertaken in Central and Northern Europe and the United States. The importance of sub-surface drainage in influencing the division between surface and subsurface movement of pesticides is discussed together with an assessment of the potential for the occurrence of erosion and the transport of pesticides attached to particulates. The significance of selected pesticides in the water and sediment phase to the aquatic environment is also reviewed. At the hillslope, the adsorption of the pesticide together with the degradation rate, are shown to be the main parameters determining the potential for leaching of pesticides. However, soil type can also be important, and in particular the presence of macropores in clay soils, are shown as critical to the speed with which pesticides can reach the watercourse.

1117. **Pesticide Contamination of Surface Waters: The Potential Role of Buffer Zones.**
Harris, G. L. and Forster, A.
In: Buffer Zones: Their Processes and Potential in Water Protection. Haycock, N. E.; Burt, T. P.; Goulding, K. W. T.; and Pinay, G. (eds.)
Hertfordshire, UK: Quest Environmental; pp. 62-69; 1997.
Notes: Conference: International Conference on Buffer Zones, [np], Sep 1996; Source: Buffer Zones: Their Processes and Potential in Water Protection., Quest Environmental, PO Box 45, Harpenden, Hertfordshire, AL5 5LJ (UK); *ISBN:* 0-9530051-0-0
Descriptors: Europe/ pesticides/ surface water/ literature review/ path of pollutants/ zones/ riparian land/ water quality control/ environmental protection/ remediation/ water pollution/ groundwater pollution/ agricultural runoff/ literature reviews/ Europe/ buffer zones/ Sources and fate of pollution/ Water quality control/ Freshwater pollution/ Characteristics, behavior and fate
Abstract: The movement of pesticides to surface waters has become an area of concern across Europe and other countries where pesticide usage is a key part of crop management. Pesticide losses to surface waters can be rapid; as a consequence, remedial measures may have a more or less immediate effect in reducing contamination, and resulting environmental impact. One such measure attracting increasingly widespread interest is the use of buffers generally considered to be best located close to, or adjacent to, surface water courses. However, the mechanisms by which buffer zones can control pesticide loss are not well understood, neither is the optimum design and function of buffers always clear. This review paper considers the mechanisms and importance of pesticide transport to surface waters and assesses the evidence that indicates whether buffers can be effective in protecting both water quality and the environment. In particular, the paper examines research which addresses the appropriate design of buffers and assesses the potential long-term role for these landscape features.

1118. **Pesticide effects of bacterial diversity in agricultural soils: A review.**
Johnsen, K.; Jacobsen, C. S.; Torsvik, V.; and Sorenson, AJ.
Biology and Fertility of Soils 33 (6): 443-453. (June 2001)
NAL Call #: QH84.8.B46;
ISSN: 0178-2762
Descriptors: agricultural soils/ soil bacteria/ species diversity/ biodiversity/ polymerase chain reaction/ ribosomal DNA/ identification/ adverse effects/ pesticides/ metabolism/ soil fertility/ measurement/ sampling/ temporal variation/ spatial variation/ mineralization/ literature reviews/ pesticide residues
Abstract: According to guidelines for the approval of pesticides, side-effects on soil microorganisms should be determined by studying functional parameters such as carbon or nitrogen mineralisation. However, the microbial diversity may have been markedly changed following pesticide use despite unaltered metabolism, and such changes may affect soil fertility. This review evaluates new methods for measuring pesticide effects on bacterial diversity, and discusses how sampling should take temporal and spatial heterogeneity into account. Future research on pesticide approval protocols should establish the relationships between mineralisation assays and new and rapid bacterial diversity profiling methods, and should include the possible ecological implications of altered bacterial diversity for soil fertility.
This citation is from AGRICOLA.

1119. **Pesticide Fate and Behaviour in Australian Soils in Relation to Contamination and Management of Soil and Water: A Review.**
Kookana, R. S.; Baskaran, S.; and Naidu, R.
Australian Journal of Soil Research 36 (5): 715-764. (1998)
NAL Call #: 56.8 Au7;
ISSN: 0004-9573
Descriptors: Australia/ Fate of Pollutants/ Pesticides/ Soil Contamination/ Water Pollution Sources/ Public Health/ Pesticide Residues/ Groundwater pollution/ Water pollution/ Air pollution/ Sources and fate of pollution/ Environmental action/ Pesticides
Abstract: Pesticides, if used as recommended, are generally expected to cause little adverse impact on the environment. However, it is evident that trace levels of pesticide residues present in soil, water, air, and sometimes food, may result in harmful effects on human and environmental health. Pesticides can pose health risks through several exposure pathways including direct occupational related exposure, through food, or through the residues present in the environment. This paper reviews available information on the nature and extent of pesticide contamination of Australian soils, surface water, and groundwaters. Published studies on the fate and behaviour of pesticides in Australian soils have also been reviewed, covering the key processes controlling the fate and behaviour of pesticides in soils, namely sorption-desorption, degradation (biological and abiotic), and volatilisation in soil and their off-site transport into surface and groundwaters. Some management options for minimising the diffuse source pollution of soils and waters by pesticides and remediation of contaminated soils and water have also been discussed. The review concludes that contamination of soils and water with pesticides has occurred in Australia and there is a need to understand the behaviour of pesticides in the soil environment in

order to develop management practices to minimise any adverse impact on our environment in future.

1120. **Pesticide fate in farming systems: Research and monitoring.**
Kookana, R. S. and Simpson, B. W.
Communications in Soil Science and Plant Analysis 31 (11/14): 1641-1659. (2000)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Paper presented at the 1999 International Symposium on Soil and Plant Analysis held March 22-29, 1999, Brisbane, Queensland, Australia. Includes references.
Descriptors: pesticide residues/ losses from soil/ soil pollution/ water pollution/ runoff/ cropping systems/ crop production/ leaching/ volatilization/ sorption/ degradation/ literature reviews/ Australia
Abstract: Pesticides, being toxic by design, cause considerable public concern about their possible non-target impact on the ecosystem and human health. Pesticide use has increased substantially in Australia and globally over the last two decades, partly due to changes in tillage practices. Some 400 chemically active ingredients, of varying properties, are currently available in Australia alone. Pesticide residues have been found, mostly at acceptable levels, in food commodities and in surface and ground water bodies in Australia. Such contamination needs to be minimized. However, the variety of pesticides, their use under a range of soil and climatic conditions and the complexity of processes governing their fate make this task particularly daunting. Furthermore, as little local data is available for Australian conditions, there is danger in extrapolating overseas Temperate Zone data, especially for risk assessment in tropical regions. The effect of farming practices, e.g. conservation tillage, on run-off and leaching losses, needs better understanding and quantification. Such studies aimed at providing knowledge on the fate and persistence of pesticides must be supported by sound information on pesticide usage (inputs), particularly at catchment-scale. Correct sampling and analytical protocols are crucial for any research or monitoring study. Analysts are faced with a continuous demand for newer, cost effective and improved analytical methods for pesticides and their metabolites, for better sensitivity and quality control.
This citation is from AGRICOLA.

1121. **Pesticide-induced immunotoxicity: Are Great Lakes residents at risk?**
Thomas, P. T.
Environmental Health Perspectives 103 (9 [supplement]): 55-61. (1995);
ISSN: 0091-6765.
Notes: Special issue: Human health and environmental pollution in the great lakes; Document number: NIH 95-218
Descriptors: pesticides/ immunotoxicity/ man/ North America, Great Lakes/ reviews/ organophosphates/ organochlorines/ organochlorine compounds/ immunity/ toxicity/ public health/ literature reviews/ risks/ literature review/ organophosphorus compounds/ immunotoxicity/ Reviews/ Toxicology and health/ Chemicals (corrosion)/ Public health/ medicines/ dangerous organisms/ Effects of pollution
Abstract: Several organophosphate and organochlorine compounds, including pesticides commonly found in the Great Lakes basin, have the potential to induce immunotoxicity. Because of biomagnification and accumulation in the food chain, Great Lakes residents may inadvertently be exposed to these compounds and thus face increased risk of immune dysfunction. In spite of the laboratory animal data and evidence from occupational exposures that suggest immunotoxicity, there is no definitive evidence as yet that environmental exposure to these xenobiotics poses a significant threat to the human immune system that is sufficient to predispose residents of the Great Lakes basin to increased disease. However, uncertainties with regard to exposure levels, predictability of tests, suitability of the animal models, and immune reserve cannot be ruled out when making risk assessment decisions such as this.

1122. **Pesticide inputs and risks in coastal wetlands.**
Clark, J. R.; Lewis, M. A.; and Pait, A. D.
Environmental Toxicology and Chemistry 12 (12): 2225-2233. (Dec. 1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268 [ETOCDK].
Notes: Annual Review Issue: Wetland Ecotoxicology and Chemistry. Includes references.
Descriptors: pesticides/ wetlands/ coastal areas/ toxicology/ environmental impact/ exposure/ sublethal effects/ literature reviews/ ecotoxicology
This citation is from AGRICOLA.

1123. **Pesticide levels in groundwater: Value and limitations of monitoring.**
Funari, Enzo; Donati, Loredana; Sandroni, Donatello; and Vighi, Marco
In: Pesticide risk in groundwater/ Vighi, M. and Funari, E.
Boca Raton, FL: CRC Press, 1995; pp. 3-44.
ISBN: 0873714393
Descriptors: Conservation / Ecology (Environmental Sciences)/ Pest Assessment Control and Management/ Pollution Assessment Control and Management/ Toxicology/ Hominidae (Hominidae)/ animals/ chordates/ humans/ mammals/ primates/ vertebrates/ environmental toxicology/ herbicides/ human impact/ pollutants

1124. **Pesticide Loss to Water: A Review of Possible Agricultural Management Opportunities to Minimise Pesticide Movement.**
Harris, G. L.
In: Pesticide Movement to Water/ Walker, A.; Allen, R.; Bailey, S. W.; Blair, A. M.; Brown, C. D.; Gunther, P.; Leake, C. R.; and Nicholls, P. H.; Series: BCPC Monograms 62.
Alton, Hampshire, UK: British Crop Protection Council, 1995; pp. 371-380.
Notes: Conference: British Crop Protection Council Symposium, Coventry (UK), 3-5 Apr 1995;
ISBN: 0-948404-85-X;
ISSN: 0306-3941
Descriptors: pesticides/ water pollution/ agriculture/ environmental protection/ water quality/ groundwater pollution/ catchment areas/ physicochemical properties/ path of pollutants/ surface water/ catchments/

pollution dispersion/ agricultural runoff/ groundwater contamination/ Water quality control/ Freshwater pollution
Abstract: The movement of pesticides to surface and groundwater has been an area of increasing concern as EC Directives on water quality have been introduced. Losses of pesticides to groundwater form part of a long-term cycle as the water can take decades to reach depths where water abstraction takes place. As a result, concentrations tend to be lower for most chemicals than those found in water leaving the top metre of the soil, and measures adopted now to reduce pesticide levels in groundwater will take many years to show effect. In contrast, pesticide losses to surface waters are more immediate and concentrations can be transient at the small catchment scale. Various agricultural measures are being evaluated in the U.K., and elsewhere, to minimise loss of pesticides to surface waters. These measures, if effective, will have a counterpart role in the effort to reduce pesticide losses to depth. This paper reviews the mechanisms of pesticide transport and some of the opportunities being assessed in the U.K. to reduce the movement of pesticides.

1125. **Pesticide metabolism in plants and microorganisms.**
Eerd, L. L. van; Hoagland, R. E.; Zablotowicz, R. M.; and Hall, J. C.
Weed Science 51 (4): 472-495. (2003)
NAL Call #: 79.8-W41;
ISSN: 0043-1745
This citation is provided courtesy of CAB International/CABI Publishing.

1126. **Pesticide soil sorption parameters: Theory, measurement, uses, limitations and reliability.**
Don, Wauchope R; Yeh, Simon; Linders, Jan B H J; Kloskowski, Regina; Tanaka, Keiji; Rubin, Baruch; Katayama, Arata; Koerdel, Werner; Gerstl, Zev; Lane, Michael; and Unsworth, John B
Pest Management Science 58 (5): 419-445. (2002)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: pesticide: leaching, soil sorption parameters/ hydrologic system/ soil properties/ soil variability
Abstract: The soil sorption coefficient Kd and the soil organic carbon sorption coefficient KOC of pesticides are basic parameters used by environmental scientists and regulatory agencies worldwide in describing the environmental fate and behavior of pesticides. They are a measure of the strength of sorption of pesticides to soils and other geosorbent surfaces at the water/solid interface, and are thus directly related to both environmental mobility and persistence. KOC is regarded as a 'universal' parameter related to the hydrophobicity of the pesticide molecule, which applies to a given pesticide in all soils. This assumption is known to be inexact, but it is used in this way in modeling and estimating risk for pesticide leaching and runoff. In this report we examine the theory, uses, measurement or estimation, limitations and reliability of these parameters and provide some 'rules of thumb' for the use of these parameters in describing the behavior and fate of pesticides in the environment, especially in analysis by modeling.

1127. **Pesticide studies: Replicability of micro/mesocosms.**
Sanderson, Hans
Environmental Science and Pollution Research International 9 (6): 429-435. (2002); *ISSN:* 0944-1344
Descriptors: pesticide: pesticide/ mesocosm replicability/ microcosm replicability/ pesticide registration/ Type II error
Abstract: The objective of this state-of-the-art review was to quantify the replicability of pesticide studies using micro/mesocosms. Low interpretability of micro/mesocosm studies, and inconclusive and highly variable data, resulted in a discontinuation of the use of these studies for the registration of pesticides. Coefficients of variation, CV%, were calculated on the basis of data tables as a measure of statistical 'effectiveness' taken from the literature. The average CV in the investigated studies was 45%; larger out-door mesocosms averaged 51%, and smaller indoor micro/mesocosms averaged 32%. CVs on variables involving animals were higher than CVs on plant end-points, which in turn were higher than abiotic variables for all experiments. However, to enhance the interpretability and implementation of micro/mesocosm studies for pesticide registration, a number of context-dependent steps could be incorporated; 1) determine the appropriate experimental design and number of replicates by using power analysis, 2) Utilise advanced statistical analysis, such as probabilistic effect distribution and principal response curves, 4) report, preferably in quantitative terms using power analysis, the risk of Type II error. The author's primary conclusion is that the level of CVs is context dependent and, therefore, it is not possible to suggest a generally acceptable level of CVs for all experiments. This has been suggested both directly and indirectly in the literature. Moreover, the number of insignificant ($p>0.05$) results is high, 88% of all test biotic variables had no statistical significance. The average number of replicates were 3-4, which theoretically should yield significant effects at least at the highest test-concentration, then resulting in 75-66% insignificant results.

1128. **Pesticide Toxicity Endpoints in Aquatic Ecosystems.**
Simon, D.; Helliwell, S.; and Robards, K.
Journal of Aquatic Ecosystem Stress and Recovery 6 (2): 159-177. (1998)
NAL Call #: QH541.5.W3 J68;
ISSN: 1386-1980.
Notes: DOI: 10.1023/A:1009920227241
Descriptors: Pesticides/ Pollution effects/ Nutrients (mineral)/ Plankton/ Toxicity tests/ Bioassays/ Toxicity/ Ecosystems/ Reviews/ Nutrients/ Numerical Analysis/ Fuzzy Logic/ Model Studies/ Aquatic environment/ Toxicity testing/ multispecies testing/ Methods and instruments/ Instruments/ Methods/ Effects of pollution/ Toxicology and health
Abstract: To adequately protect aquatic ecosystems from impact by anthropogenic perturbations it is necessary to distinguish what is safe from what is not. This review examines approaches to this problem in relation to primary and secondary effects of pesticides. Understanding nutrient - plankton and plankton - plankton interrelationships on both spatial and temporal scales is important if secondary or indirect effects are to be assessed. Before defining or measuring a toxicity

endpoint, consideration must be given to whether to use single species or multispecies tests. Each has its strengths and weaknesses and is reviewed. In single species testing, toxicity endpoints can be more clearly defined but extrapolation of effects to an ecosystem is more difficult than with multispecies testing and can often lead to incorrect conclusions. Interpretation of multispecies testing results are challenging and numerical analysis techniques including methods whose objectives are inference, classification and ordination are required. Conceptual and fuzzy logic modelling techniques promise a solution to the interpretation of multispecies tests.

1129. **Pesticide transport to subsurface tile drains in humid regions of North America.**
Kladivko, Eileen J; Brown, Larry C; and Baker, James L
Critical Reviews in Environmental Science and Technology 31 (1): 1-62. (2001)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: pesticides: pesticide, pollutant, toxin, transport/ crop production/ environmental protection/ humidity/ rainfall/ soil surface runoff / water quality/ weather patterns

1130. **Pesticide use in the U.S. and policy implications: A focus on herbicides.**
Short, Polly and Colborn, Theo
Toxicology and Industrial Health 15 (1-2): 240-275. (1999);
ISSN: 0748-2337
Descriptors: herbicide: endocrine disruptor, enzyme inhibitor, toxicity, usage, resistance/ pesticide: toxicity, usage/ plant (Plantae): crop, weed/ Plants/ agriculture
Abstract: This article examines herbicide use in the United States, providing estimates of poundage, land surface covered, distribution, and recent trends based on federal and state figures. Herbicides are by far the most widely used class of pesticide in the US, where 556 million lbs of herbicide active ingredients (AIs) were applied in 1995. Agriculture accounts for the majority of herbicide use, totaling 461 million lbs of AIs in 1995. Over 60% of the poundage of all agricultural herbicides consist of those that are capable of disrupting the endocrine and/or reproductive systems of animals. In addition, at least 17 types of 'inert ingredients,' which can equal 90% or more of a pesticide product, have been identified as having potential endocrine-disrupting effects. Atrazine is the predominant herbicide used according to poundage, with 68-73 million lbs of AIs applied in 1995. However, 2,4-D is the most widespread herbicide, covering 78 million acres for agricultural uses alone. Both of these herbicides are reported endocrine disruptors. Acetolactate synthase (ALS) inhibitors, namely the sulfonylureas and imidazolinones, are one of the fastest growing classes of herbicides. Many of these herbicides are 100 times more toxic to select plant species than their predecessors, so they can be applied at rates approximately 100 times lower. Consequently, they can affect plant species at concentration levels so low that no standard chemical protocol can detect them. Due in part to these more potent herbicides, the poundage of herbicides used in the US has decreased since the mid-1980s; however, the available data suggest that the number of treated acres has not significantly declined. A thorough assessment of potential exposure to herbicides by wildlife and humans is limited due to the inaccessibility of production and usage data.

1131. **Pesticides and herbicides.**
Ro, K. S. and Chung, K. H.
Water Environment Research 66 (4): 432-433. (June 1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: pesticides/ herbicides/ transport processes/ environmental impact/ pollution/ movement in soil/ biodegradation/ dynamics/ residues/ literature reviews
This citation is from AGRICOLA.

1132. **Pesticides and herbicides.**
Ro, K. S. and Libra, J. A.
Water Environment Research 67 (4): 548-552. (June 1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: pesticides/ herbicides/ pesticide residues/ herbicide residues/ soil pollution/ water pollution/ toxicity/ literature reviews
This citation is from AGRICOLA.

1133. **Pesticides and Herbicides.**
Libra, J. A.; Ro, Kyoung S.; Chung, K. Y. U.; and Chung, Y. U. N.
Water Environment Research 68 (4): 564-568. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ pesticides/ herbicides/ pollutant identification/ spatial distribution/ water pollution effects/ water pollution/ fate of pollutants/ Sources and fate of pollution/ Secondary publication and distribution
Abstract: The distribution of endosulfan residues in the drainage waterways of the Lower Fraser Valley of British Columbia was studied by Wan et al. (1995). Both the water and sediment of the farm ditches were sampled. The potential impact of these residues on non-target aquatic organisms is discussed. Similarly, Mogensen and Spliid (1995) investigated pesticide occurrence in Danish watercourses. Samples from soil water, drainage water, stream water and pond water from a sandy and a clayey catchment survey area were analyzed. Pesticide concentration in the clayey, more intensively cultivated area, was found to be higher compared to the sandy, less intensively cultivated area. Donald and Syrgiannis (1995) determined the concentrations of pesticides in Saskatchewan prairie lakes following severe drought and compared the results with values set for the protection of aquatic life. When the lakes were grouped by salinity, detection frequencies of pesticides were significantly higher in brackish lakes, which tended to be semi-permanent, than in saline lakes, which tended to be permanent. However, with one exception, the concentrations in the lakes were below those levels that might be deleterious to aquatic life.

1134. **Pesticides and herbicides.**
Ro, K. S.; Chung, K. H.; Chung, Y. C.; and Tsai, F. J.
Water Environment Research 69 (4): 664-667. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

1135. **Pesticides and Herbicides.**
Chung, Kyuhyuck; Starrett, S.; Chung, Yunchul; and Ro, Kyoung S.
Water Environment Research 70 (4): 693-698. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Pesticides/ Herbicides/ Leaching/ Groundwater Pollution/ Monitoring/ Contamination/ Water Pollution Sources/ Literature Review/ Wells/ Atrazine/ Insecticides/ Freshwater pollution/ Aquifers/ Water wells/ alachlor/ fenitrothion/ Anguilla anguilla/ Nebraska/ Recharge Lake/ Sources and fate of pollution/ Freshwater pollution/ United States
Abstract: Wood and Anthony (1997) investigated herbicide leaching using a series of natural springs draining small surficial aquifers. The herbicides were detected at the level of nanograms per liter. Monitoring herbicides in Recharge Lake in York, Nebraska, was performed. Herbicide concentrations rose rapidly in the spring and diminished gradually over a few months. Atrazine half-life was determined to be approximately 223 days. Sancho et al. (1997) reported that the insecticide fenitrothion showed a strong tendency to bioconcentrate into the brain of the European eel (Anguilla anguilla). Herbicide contamination of shallow groundwater beneath claypan soils was studied. Spatial variability was determined to be larger than the effects of atrazine and alachlor application rates. Atrazine and alachlor were detected in 7.2 and 0.4%, respectively, of the samples taken from approximately 75 monitoring wells.
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1136. **Pesticides and herbicides.**
Starrett, S.; Bhandari, A.; and Xia, K.
Water Environment Research 71 (5): 853-860. (Aug. 1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: pesticides/ herbicides/ pesticide residues/ herbicide residues/ groundwater pollution/ water pollution/ runoff/ agricultural land/ leaching/ literature reviews
This citation is from AGRICOLA.

1137. **Pesticides and the future: Minimizing chronic exposure of humans and the environment.**
Kuhr, Ronald J. and Motoyama, Naoki.
Amsterdam; Washington, D.C.: IOS Press; viii, 332 p.: ill. (1998)
Notes: Papers from a joint United States-Japan seminar held on May 26-30, 1997 in Kisarazu, Japan. Also issued as v. 2, nos. 1-4 of the journal Reviews in Toxicology. Includes bibliographical references and index.
NAL Call #: RA1270.P4-P47-1998;
ISBN: 9051993889
Descriptors: Pesticides---Toxicology/ Pesticides---Environmental aspects
This citation is from AGRICOLA.

1138. **Pesticides in domestic wells.**
Chittaranjan, R.
St. Joseph, MI: American Society of Agricultural Engineers. (2003)
Notes: Available through fee-based ASAE Technical Library;
ISBN: 1892769298
Descriptors: Water---Pesticide content---United States/ Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States

1139. **Pesticides in ground water: Current understanding of distribution and major influences.**
Geological Survey (U.S.).
Sacramento, CA: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-95-244. (1996)
Notes: Title from caption. Includes bibliographical references.
NAL Call #: TD427.P35P474-1996
http://ca.water.usgs.gov/pnsp/gw/
Descriptors: Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States
This citation is from AGRICOLA.

1140. **Pesticides in ground water: Distribution, trends, and governing factors.**
Barbash, J. E. and Resek, E. A.
Chelsea, Michigan: Ann Arbor Press; 588 p. (1996)
NAL Call #: TD427.P35B37--1996;
ISBN: 1575040050
Descriptors: Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States
This citation is from AGRICOLA.

1141. **Pesticides in ground water of the United States, 1992-1996.**
Kolpin, D. W.; Barbash, J. E.; and Gilliom, R. J.
Ground Water 38 (6): 858-863. (2000)
NAL Call #: TD403.G7;
ISSN: 0017-467X [GRWAAP]
Descriptors: groundwater pollution/ pesticide residues/ surveys/ agricultural land/ urban areas/ rural areas/ high water tables/ United States/ shallow groundwater
This citation is from AGRICOLA.

1142. **Pesticides in stream sediment and aquatic biota: Current understanding of distribution and major influences.**
U.S. Dept. of the Interior, U. S. Geological Survey.
U.S. Geological Survey, 2000
NAL Call #: TD427.P35 P476 2000
http://ca.water.usgs.gov/shelbayreports/sediment/pesticides%5Fin%5Fstream%5Fsediments.pdf
Descriptors: Pesticides---Environmental aspects---United States/ Organochlorine compounds---Environmental aspects---United States/ Water---Pollution---United States/ Contaminated sediments---United States
This citation is from AGRICOLA.

1143. **Pesticides in stream sediment and aquatic biota: Distribution, trends, and governing factors.**
Nowell, L. H.; Capel, P. D.; and Dileanis, P. D.
Boca Raton, Florida: Lewis Publishers; 1001 p. (1999)
Notes: Includes bibliographical references (p. 867-946) and index.
NAL Call #: TD427.P35-N68-1999;
ISBN: 1566704693
Descriptors: Pesticides---Environmental aspects---United States/ Organochlorine compounds---Environmental aspects---United States/ Water---Pollution---United States/ Contaminated sediments---United States/ Aquatic organisms Effect of water pollution on---United States
This citation is from AGRICOLA.

1144. **Pesticides in streams of the United States: Initial results from the National Water-Quality Assessment Program.**
Larson, S. J.; Gilliom, R. J.; Capel, P. D.; and Geological Survey (U.S.).
Sacramento, Calif.: U.S. Dept. of the Interior, U.S. Geological Survey, 1999. 92 p.
Notes: "National Water-Quality Assessment Program"--Cover.
NAL Call #: GB701.W375-no.98-4222
http://ca.water.usgs.gov/pnsp/rep/wrir984222/
Descriptors: Water---Pollution---United States/ Pesticides---Environmental aspects---United States
This citation is from AGRICOLA.

1145. **Pesticides in surface and ground water.**
Wauchope, R. D.
Ames, Iowa: Council for Agricultural Science and Technology;
Issue paper 2, 1994.
Notes: Caption title.
http://www.cast-science.org/cast-science.lh/pwq_ip.htm
Descriptors: pesticides/ groundwater/ surface water
This citation is from AGRICOLA.

1146. **Pesticides in surface water of the Mid-Atlantic region.**
Ferrari, Matthew J.; Geological Survey (U.S.); United States. Environmental Protection Agency; and Mid Atlantic Integrated Assessment Region.
Baltimore, Md.: U.S. Geological Survey; 12 p.: col. ill., col. maps; Series: Water-resources investigations report 97-4280. (1997)
Notes: Caption title. "Mid-Atlantic Integrated Assessment (MAIA) Region" "WRIR 97-4280"--P. [12]. Includes bibliographical references (p. [12]). DW14937692-01-0.
NAL Call #: GB701.W375--no.97-4280
Descriptors: Pesticides---Environmental aspects---Middle Atlantic States/ Water---Pollution---Middle Atlantic States/ Pesticides---Environmental aspects---South Atlantic States/ Pesticides---Environmental aspects---West Virginia
This citation is from AGRICOLA.

1147. **Pesticides in Surface Waters: Distribution, Trends, and Governing Factors.**
Larson, S. J.; Capel, P. D.; and Majewski, M. S.
Chelsea, MI: Ann Arbor Press, Inc.; Series: Pesticides in the Hydrologic System 3; 373 p. (1997)
NAL Call #: TD427.P35L34--1997; *ISBN:* 1-57504-006-9
Descriptors: surface water/ contamination/ pesticides/ distribution / statistical analysis/ water pollution/ literature review/ agricultural runoff/ pollution dispersion/ pollution surveys/ public health/ United States/ Sources and fate of pollution/ Freshwater pollution
Abstract: The use of pesticides in the United States has increased dramatically during the last several decades. Hundreds of different chemicals have been developed for use in agricultural and non-agricultural settings. Concerns about the potential adverse effects of pesticides on the environmental and human health have spurred an enormous amount of research into their environmental behavior and fate. Much of this concern has focused on the potential for contamination of the hydrologic system, including surface waters. Pesticides in Surface Waters is a summary of research on the occurrence, distribution, and significance of pesticides in surface waters of the United States. The primary goal of this book is to assess the current understanding of the occurrence and behavior of pesticides in surface waters. To accomplish this, the authors have compiled and evaluated most of the published studies in which pesticide concentrations in surface waters of the United States have been measured. The primary focus of the literature search was on studies published in the peer-reviewed scientific literature and in reports of government agencies. The literature search covered studies published up to 1993, but many articles and reports published after 1993 were included as they became available. A number of studies--including laboratory studies and studies using microcosms and artificial streams and ponds--also were included in which factors affecting the behavior and fate of pesticides in the environment were investigated. Pertinent studies listed in a series of tables provide concise summaries of study sites, targeted pesticides, and results. Information obtained from these studies is used to develop an overview of the existing knowledge of pesticide contamination of surface waters. Pesticides in Surface Waters is intended to serve as a resource, text, and reference to a wide spectrum of scientists, students, and water managers, ranging from those primarily interested in the extensive compilations of references, to those looking for interpretive analyses and conclusions. For those unfamiliar with the studies of pesticides in surface waters, it can serve as a comprehensive introduction.
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1148. **Pesticides in the atmosphere: Current understanding of distribution and major influences.**
Geological Survey (U.S.).
Sacramento, CA: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-95-152. (1995)
Notes: USGS--pesticide in the atmosphere; Title from caption. Includes bibliographical references.
NAL Call #: TD887.P45P47-1995
http://ca.water.usgs.gov/pnsp/atmos/
Descriptors: Pesticides---Environmental aspects---United States/ Air---Pollution---United States/ Atmospheric deposition---United States/ Water---Pollution---United States
This citation is from AGRICOLA.

1149. **Pesticides in the atmosphere: Distribution, trends, and governing factors.**
Majewski, M. S.; Capel, P. D.; and National Water Quality Assessment Program (U.S.).
Sacramento, Calif. U.S. Geological Survey. (1995)
Notes: "National Water-Quality Assessment Program"
NAL Call #: TD196.P38M35--1995
Descriptors: Pesticides---Environmental aspects---United States/ Air---Pollution---United States/ Atmospheric diffusion---United States
This citation is from AGRICOLA.

1150. **Pesticides in the Hydrologic System: What Do We Know and What's Next?**
Gilliom, R. J.
Hydrological Processes 15 (16): 3197-3201. (2001)
NAL Call #: GB651.H93; *ISSN:* 0885-6087.

Notes: Special Issue: Canadian Geophysical Union - Hydrology Section; DOI: 10.1002/hyp.501
Descriptors: Water Pollution/ Pesticides/ Path of Pollutants/ Water Pollution Effects/ Hydrologic Systems/ Literature Review/ Research Priorities/ Pesticide environmental pollution/ Pesticides in surface waters/ Pollution effects / Water quality/ Drinking water/ Hydrology/ Aquatic organisms/ Food chains/ Hydrosphere/ Literature reviews/ Sources and fate of pollution/ Surface Water Hydrology/ Freshwater pollution
Abstract: Even though the occurrence and behaviour of pesticides in the environment have been studied for decades, water-quality managers and the public still demand more complete and consistent information, and there are many unanswered questions for environmental scientists. In many respects, the greatest potential for unintended adverse effects of pesticides is through contamination of the hydrologic system, which supports aquatic life and related food chains and is used for recreation, drinking water, and many other purposes. The movement of water is one of the primary mechanisms by which pesticides are transported from targeted application areas to other parts of the environment; thus, there is potential for movement into and through all components of the hydrologic system. Extensive reviews of existing information on pesticides in the hydrologic system, including the atmosphere, ground water, surface water, and fluvial sediments and aquatic biota, uncovered volumes of useful information, but also noted critical information gaps. For example: (a) relatively few pesticides have been thoroughly studied, particularly transformation products; (b) most data have been collected for small-scale site and field studies in agricultural areas; (c) urban areas have received little attention for monitoring or research; (d) the geographic and temporal distributions of data collection have been highly uneven; and (e) comparing and synthesizing results from most studies is difficult because of inconsistent approaches to data collection and chemical analysis.

1151. **Pesticides: Managing risks and optimizing benefits.**
Ragsdale, Nancy N. and Seiber, James N.
Washington, DC: American Chemical Society; Series: ACS symposium series 734; ix, 286 p.: ill., map. (1999)
Notes: Distributed by Oxford University Press
NAL Call #: QD1-.A45-no.-734;
ISBN: 084123616X
Descriptors: Pesticides---United States---Congresses/ Pesticides---Environmental aspects---United States---Congresses
This citation is from AGRICOLA.

1152. **Pharmaceutical antibiotic compounds in soils: A review.**
Thiele-Bruhn, S.
Journal of Plant Nutrition and Soil Science / Zeitschrift fur Pflanzenernahrung und Bodenkunde 166 (2): 145-167. (Feb. 2003)
NAL Call #: 384 Z343A;
ISSN: 1436-8730.
Notes: Number of References: 200
Descriptors: Agriculture/ Agronomy/ performance liquid chromatography/ tandem mass spectrometry/ solid phase extraction/ fungus gloeophyllum striatum/ waste water bacteria/ antibacterial agents/ marine sediments/ fluoroquinolone enrofloxacin/ tetracycline antibiotics/ antimicrobial resistance
Abstract: Antibiotics are highly effective, bioactive substances. As a result of their consumption, excretion, and persistence, they are disseminated mostly via excrements and enter the soils and other environmental compartments. Resulting residual concentrations in soils range from a few mug up to g kg(-1) and correspond to those found for pesticides. Numerous antibiotic molecules comprise of a non-polar core combined with polar functional moieties. Many antibiotics are amphiphilic or amphoteric and ionize. However, physicochemical properties vary widely among compounds from the various structural classes. Existing analytical methods for environmental samples often combine an extraction with acidic buffered solvents and the use of LC-MS for determination. In soils, adsorption of antibiotics to the organic and mineral exchange sites is mostly due to charge transfer and ion interactions and not to hydrophobic partitioning. Sorption is strongly influenced by the pH of the medium and governs the mobility and transport of the antibiotics. In particular for the strongly adsorbed antibiotics, fast leaching through soils by macropore or preferential transport facilitated by dissolved soil colloids seems to be the major transport process. Antibiotics of numerous classes are photodegraded. However, on soil surfaces this process if of minor influence. Compared to this, biotransformation yields a more effective degradation and inactivation of antibiotics. However, some metabolites still comprise of an antibiotic potency. Degradation of antibiotics is hampered by fixation to the soil matrix; persisting antibiotics were already determined in soils. Effects on soil organisms are very diverse, although all antibiotics are highly bioactive. The absence of effects might in parts be due to a lack of suitable test methods. However, dose and persistence time related effects especially on soil microorganisms are often observed that might cause shifts of the microbial community. Significant effects on soil fauna were only determined for anthelmintics. Due to the antibiotic effect, resistance in soil microorganisms can be provoked by antibiotics. Additionally, the administration of antibiotics mostly causes the formation of resistant microorganisms within the treated body. Hence, resistant microorganisms reach directly the soils with contaminated excrements. When pathogens are resistant or acquire resistance from commensal microorganisms via gene transfer, humans and animals are endangered to suffer from infections that cannot be treated with pharmacotherapy. The uptake into plants even of mobile antibiotics is small. However, effects on plant growth were determined for some species and antibiotics.

1153. **Phosphate rocks and partially-acidulated phosphate rocks as controlled release P fertilizers.**
Hagin, J and Harrison, R
Fertilizer Research 35 (1-2): 25-3. (1993)
NAL Call #: S631.F422;
ISSN: 0167-1731
Descriptors: phosphate/ phosphorus/ plant (Plantae Unspecified)/ Angiospermae (Angiospermae)/ angiosperms/ plants/ spermatophytes/

vascular plants/ agriculture/ minerals/ phosphorus/ soil
Abstract: Properties of phosphate rocks (PRs) and partially acidulated phosphate rocks (PAPRs) which affect the pattern of P dissolution and thus the potential for manipulating the rate of P release are reviewed. The effects of soil and plant properties are also considered.

1154. **Phosphogypsum in agriculture: A review.**
Alcordo, I. S. and Rechcigl, J. E.
Advances in Agronomy
49: 55-118. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: phosphogypsum/ physicochemical properties/ production/ utilization/ reclamation/ soil amendments/ sulfur/ calcium/ agricultural wastes/ environmental impact/ literature reviews / pollution
This citation is from AGRICOLA.

1155. **The phosphorus index: Background and status.**
Daneil, T. C.; Jokela, W. E.; Moore, P. A. Jr.; Sharpley, A. N.; and Gburek, W. J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1156. **Phosphorus indexing for cropland: Overview and basic concepts of the Iowa phosphorus index.**
Mallarino, A. P.; Stewart, B. M.; Baker, J. L.; Downing, J. D.; and Sawyer, J. E.
Journal of Soil and Water Conservation 57 (6): 440-447. (Nov. 2002-Dec. 2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: phosphorus/ losses from soil/ indexes/ soil fertility/ agricultural soils/ agricultural land/ risk assessment/ phosphorus fertilizers/ transport processes/ sheet erosion/ rill erosion/ water erosion/ water pollution/ drainage/ animal manures/ runoff/ broadcasting/ incorporation/ Iowa
This citation is from AGRICOLA.

1157. **Phosphorus loss from land to water: Integrating agricultural and environmental management.**
Sharpley, A. N.; McDowell, R. W.; and Kleinman, P. J. A.
Plant and Soil 237 (2): 287-307. (Dec. 2001)
NAL Call #: 450-P696;
ISSN: 0032-079X [PLSOA2].
Notes: Special issue: International symposium on phosphorus cycling in the soil-plant continuum / edited by Z. Rengel. Paper presented at a symposium held September 17-23, 2000, Beijing, China.
Includes references.
Descriptors: phosphorus/ eutrophication/ surface water/ water pollution/ soil fertility/ fertilizers/ manures/ runoff/ water quality/ phosphorus fertilizers/ feeds/ erosion/ literature reviews
This citation is from AGRICOLA.

1158. **Phosphorus loss in agricultural drainage: Historical perspective and current research.**
Sims, J T; Simard, R R; and Joern, B C
Journal of Environmental Quality 27 (2): 277-293. (1998)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: phosphorus: export, leaching, loss/ agricultural drainage/ conservation practices/ environmental impact/ eutrophication/ historical perspective/ nonpoint source pollution/ overfertilization/ resource management/ soil organic matter/ source reduction/ subsurface runoff
Abstract: The importance of P originating from agricultural sources to the nonpoint source pollution of surface waters has been an environmental issue for decades because of the well-known role of P in eutrophication. Most previous research and nonpoint source control efforts have emphasized P losses by surface erosion and runoff because of the relative immobility of P in soils. Consequently, P leaching and losses of P via subsurface runoff have rarely been considered important pathways for the movement of agricultural P to surface waters. However, there are situations where environmentally significant export of P in agricultural drainage has occurred (e.g., deep sandy soils, high organic matter soils, or soils with high soil P concentrations from long-term overfertilization and/or excessive use of organic wastes). In this paper we review research on P leaching and export in subsurface runoff and present overviews of ongoing research in the Atlantic Coastal Plain of the USA (Delaware), the Midwestern USA (Indiana), and eastern Canada (Quebec). Our objectives are to illustrate the importance of agricultural drainage to nonpoint source pollution of surface waters and to emphasize the need for soil and water conservation practices that can minimize P losses in subsurface runoff.

1159. **Phosphorus Removal From Everglades Agricultural Area Runoff by Submerged Aquatic Vegetation/Limerock Treatment Technology: An Overview of Research.**
Gu, B.; Debusk, T. A.; Dierberg, F. E.; Chimney, M. J.; Pietro, K. C.; and Aziz, T.
Water Science and Technology 44 (11-12): 101-108. (2001)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: 7. International Conference on Wetland Systems for Water Pollution Control 2000, Lake Buena Vista, FL [USA], 11-16 Nov 2000; Source: Wetland Systems for Water Pollution Control 2000;
ISBN: 1843394073
Descriptors: United States, Florida, Everglades/ Water Pollution Control/ Nonpoint Pollution Sources/ Agricultural Runoff/ Advanced Wastewater Treatment/ Wetlands/ Phosphorus Removal/ Submerged Plants/ Accumulation/ Feasibility Studies/ Experimental Data/ Performance Evaluation/ Pollution (Nonpoint sources)/ Runoff (Agricultural)/ Advanced treatment/ Aquatic macrophytes/ Aquatic plants/ Vegetation/ Lime/ Macrophytes/ artificial wetlands/ United States, Florida, Everglades/ Water quality control/ Water Treatment/ Freshwater

pollution/ Water Pollution: Monitoring, Control & Remediation
Abstract: The 1994 Everglades Forever Act mandates the South Florida Water Management District and the Florida Department of Environmental Protection to evaluate a series of advanced treatment technologies to reduce total phosphorus (TP) in Everglades Agricultural Area runoff to a threshold target level. A submerged aquatic vegetation/limerock (SAV/LR) treatment system is one of the technologies selected for evaluation. The research program consists of two phases. Phase I examined the efficiency of SAV/LR treatment system for TP removal at the mesocosm scale. Preliminary results demonstrate that this technology is capable of reducing effluent TP to as low as 10 mu g/L under constant flows. The SAV component removes the majority of the influent soluble reactive P, while the limerock component removes a portion of the particulate P. Phase II is a multi-scale project (i.e., microcosms, mesocosms, test cells and full-size wetlands). Experiments and field investigations using various environmental scenarios are designed to (1) identify key P removal processes; (2) provide management and operational criteria for basin-scale implementation; and (3) provide scientific data for a standardized comparison of performance among advanced treatment technologies.

1160. **Phosphorus research strategies to meet agricultural and environmental challenges of the 21st century.**
Sharpley, A. and Tunney, H.
Journal of Environmental Quality 29 (1): 176-181. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the Organization for Economic Cooperation and Development (OECD) sponsored conference on "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," held June 16-19, 1998, Antrim, Northern Ireland.
Descriptors: phosphorus/ losses from soil/ pollution control/ research
Abstract: The accumulation, management, and transfer of P in intensive farming systems has increased P export from agricultural watersheds and accelerated eutrophication of surface waters. Even though much research on P has been done in the last 20 years, there are still too few answers to the many questions now being asked regarding agricultural production and environmental quality. To address these concerns, four areas of research are suggested: (i) Soil P testing for environmental risk assessment--What losses are acceptable and can these losses be determined by plot-scale or watershed-scale studies? Threshold P levels in soil and water should be established in combination with an assessment of site vulnerability to P loss. (ii) Pathways of P transport--An analysis of the relative importance of different flow pathways is needed at a watershed scale. (iii) Best Management Practice (BMP) development and implementation--Overall, BMPs must attempt to bring P inputs and outputs into closer balance and should be targeted first to critical source areas within a watershed. Alternative management recommendations, uses, and market demand for manures must be developed. (iv) Strategic initiatives to manage P--To initiate lasting changes, research should focus on consumer-supported programs that encourage farmer performance and steward-ship to achieve agreed-upon environmental goals.
This citation is from AGRICOLA.

1161. **Phosphorus restrictions for land application of biosolids: Current status and future trends.**
Shober, A. L. and Sims, J. T.
Journal of Environmental Quality 32 (6): 1955-1964. (2003)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: Environment/ Ecology/ sewage sludge/ amended soils/ United States/ water quality/ sandy soils/ site index/ runoff/ manure/ losses/ availability
Abstract: The application of biosolids (sewage sludge) to agricultural soils provides P in excess of crop needs when applied to meet the N needs of most agronomic crops. These overapplications can result in the buildup of P in soils to values well above those needed for optimum crop yields and also may increase risk of P losses to surface and ground waters. Because of concerns regarding the influence of P on water quality in the USA, many state and federal agencies now recommend or require P-based nutrient management plans for animal manures. Similar actions are now under consideration for the land application of biosolids. We reviewed the literature on this subject and conducted a national survey to determine if states had restrictions on P levels in biosolids-amended soils. The literature review indicates that while the current N-based approach to biosolids management does result in increases of soil P, some properties of biosolids may mitigate the environmental risk to water quality associated with land application of P in biosolids. Results of the survey showed that 24 states have regulations or guidelines that can be imposed to restrict land application of biosolids based on P. Many of these states use numerical thresholds for P in biosolids-amended soils that are based on soil test phosphorus (STP) values that are much greater than the values considered to be agronomically beneficial. We suggest there is the need for a comprehensive environmental risk assessment of biosolids P. If risk assessment suggests the need for regulation of biosolids application, we suggest regulations be based on the P Site Index (PSI), which is the method being used by most states for animal manure management.

1162. **Phosphorus Retention in Streams and Wetlands: A Review.**
Reddy, K. R.; Kadlec, R. H.; Flaig, E.; and Gale, P. M.
Critical Reviews in Environmental Science and Technology 29 (1): 83-146. (1999)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: Phosphorus/ Nutrients/ Retention/ Streams/ Wetlands/ Reviews/ Kinetics/ Biogeochemical cycle/ Rivers/ Nutrient cycles/ Residence time/ Biogeochemistry/ Sources and fate of pollution/ Ecosystems and energetics/ Composition of water/ Behavior and fate characteristics/ Freshwater pollution/ Chemical processes
Abstract: Wetlands and streams buffer the interactions among uplands and adjacent aquatic systems. Phosphorus (P) is often the key

nutrient found to be limiting in both estuarine and freshwater ecosystems. As such, the ability of wetlands and streams to retain P is key to determining downstream water quality. This article reviews the processes and factors regulating P retention in streams and wetlands and evaluates selected methodologies used to estimate P retention in these systems. Phosphorus retention mechanisms reviewed include uptake and release by vegetation, periphyton and microorganisms; sorption and exchange reactions with soils and sediments; chemical precipitation in the water column; and sedimentation and entrainment. These mechanisms exemplify the combined biological, physical, and chemical nature of P retention in wetlands and streams. Methodologies used to estimate P retention include empirical input-output analysis and mass balances, and process kinetics applied at various scales, including micro- and mesocosms to full-scale systems. Although complex numerical models are available to estimate P retention and transport, a simple understanding of P retention at the process level is important, but the overall picture provided by mass balance and kinetic evaluations are often more useful in estimating long-term P retention.
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1163. **Phosphorus utilization and excretion in pig production.**
Poulsen HD
Journal of Environmental Quality 29 (1): 24-27; 20 ref. (2000)
NAL Call #: QH540.J6
This citation is provided courtesy of CAB International/CABI Publishing.

1164. **Physical impact assessment of USDA water quality projects.**
Meals, D. W.; Sutton, J. D.; and Griggs, R. H.
In: Clean water, clean environment: 21st century team agriculture: Working to protect water resources conference proceedings. (Held 5 Mar 1995-8 Mar 1995 at Kansas City, Missouri.)
St. Joseph, Mich.: ASAE; pp. 195-198; 1995.
NAL Call #: TD365.C54-1995;
ISBN: 0929355601
Descriptors: water pollution/ groundwater pollution/ pollution control/ USDA/ pilot projects/ water quality/ agricultural chemicals/ losses from soil/ monitoring/ United States/ hydrologic unit area projects/ pollution prevention/ non point source water pollution/ demonstration projects
This citation is from AGRICOLA.

1165. **The physical properties of compost.**
Agnew, J. M. and Leonard, J. J.
Compost Science and Utilization 11 (3): 238-264. (2003)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
This citation is provided courtesy of CAB International/CABI Publishing.

1166. **Physiological effects of incomplete root-zone wetting on plant growth and their implications for irrigation management.**
Glenn, D. M.
HortScience 35 (6): 1041-1043. (Oct. 2000)
NAL Call #: SB1.H6;
ISSN: 0018-5345 [HJHSAR].
Notes: Special section: Water management and water relations of horticultural crops. Paper presented at a conference held July 24, 1997, Salt Lake City, Utah. Includes references.
Descriptors: plants/ root systems/ water availability/ plant physiology/ growth/ microirrigation/ water use efficiency/ trickle irrigation/ crop yield/ maximum yield/ root hydraulic conductivity/ water uptake/ water potential/ water transfer/ dry matter distribution/ mortality/ nutrient transport/ literature reviews
This citation is from AGRICOLA.

1167. **Phytoremediation: An ecological solution to organic chemical contamination.**
Susarla, S.; Medina, V. F.; and McCutcheon, S. C.
Ecological Engineering 18 (5): 647-658. (2002);
ISSN: 0925-8574.
Notes: Special Issue: Ecology engineering applied to river and wetland restoration
Descriptors: Bioremediation/ Reviews/ Metals/ Hydrocarbons/ Pesticides/ Organochlorine compounds/ Plants/ Economics/ Environmental restoration/ Environment management/ Phytoremediation/ Pollutant removal/ Solvents/ Chemical pollution/ Detoxification/ Phytoremediation/ Pollution control/ Land pollution/ General Environmental Engineering
Abstract: Phytoremediation is a promising new technology that uses plants to degrade, assimilate, metabolize, or detoxify metals, hydrocarbons, pesticides, and chlorinated solvents. In this review, in situ, in vivo and in vitro methods of application are described for remediation of these compounds. Phytoaccumulation, phytoextraction, phytostabilization, phytotransformation, phytovolatilization and rhizodegradation are discussed and the role of enzymes in transforming organic chemicals in plants is presented. The advantages and constraints of phytoremediation are provided. Our conclusions is that phytoremediation prescriptions must be site-specific; however, these applications have the potential for providing the most cost-effective and resource-conservative approach for remediating sites contaminated with a variety of hazardous chemicals.
© Cambridge Scientific Abstracts (CSA)

1168. **Phytoremediation: An overview of metallic ion decontamination from soil.**
Singh, O. V.; Labana, S.; Pandey, G.; Budhiraja, R.; and Jain, R. K.
Applied Microbiology and Biotechnology 61 (5/6): 405-412. (2003);
ISSN: 0175-7598
This citation is provided courtesy of CAB International/CABI Publishing.

1169. **Phytoremediation in wetland ecosystems: Progress, problems, and potential.**
Williams, J. B.
Critical Reviews in Plant Sciences 21 (6): 607-635. (2002)
NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3].
Notes: Special issue: Phytoremediation II / edited by B.V. Conger. Includes references.
Descriptors: wetlands / bioremediation/ seasonal variation/ plant succession/ site factors/ heavy metals/ litter plant/ waste disposal/ rhizosphere/ indicator species/ temporal variation/ toxicity/ organic compounds/ herbicides/ pesticides/ explosives/ soil pollution/ evapotranspiration/ petroleum/ petroleum hydrocarbons / plant communities/ monitoring/ literature reviews
This citation is from AGRICOLA.

1170. **Pitfalls of passive mine water treatment.**
Johnson, D Barrie and Hallberg, Kevin B
Reviews in Environmental Science and Biotechnology 1 (4): 335-343. (2002);
ISSN: 1569-1705
Descriptors: heavy metals: pollutant/ iron: oxidation/ acid mine drainage/ remediation/ wetland
© Thomson

1171. **Planning a project: Selection and acquisition of woody and herbaceous plant species and materials for riparian corridor, shoreline, and wetland restoration and enhancement.**
Hoag, J. Chris.; Plant Materials Center; and Interagency Riparian-Wetland Plant Development Project
Aberdeen, ID: Interagency Riparian-Wetland Plant Development Project, USDA-Natural Resources Conservation Service, Plant Materials Center; Series: Riparian/Wetland Project information series no. 2. (1997)
Notes: Title from web page. "December, 1997." Description based on content viewed April 16, 2002. Includes bibliographical references.
NAL Call #: aQK938.M3-H64-1997
http://plant-materials.nrcs.usda.gov/pubs/idpmcarwproj2.pdf
Descriptors: Wetland plants/ Woody plants/ Perennials/ Wetland restoration/ Riparian areas
This citation is from AGRICOLA.

1172. **Plant biodiversity and environmental stress.**
Markert, B. A.; Breure, A. M.; and Zechmeister, H. G.
In: Bioindicators and biomonitors: Principles, concepts and applications/ Markert, B. A.; Breure, A. M.; and Zechmeister, H. G., 2003; pp. 501-525.
ISBN: 0-08-044177-7
This citation is provided courtesy of CAB International/CABI Publishing.

1173. **Plant disease incidence as influenced by conservation tillage systems.**
Watkins, J. E. and Boosalis, M. G.
In: Managing agricultural residues/ Unger, P. W.
Boca Raton, Fla.: Lewis Publishers, 1994; pp. 261-283.
ISBN: 0-87371-730-9
This citation is provided courtesy of CAB International/CABI Publishing.

1174. **Plant nutrient management for enchanced productivity in intensive grain production systems of the United States and Asia.**
Dobermann, A. and Cassman, K. G.
Plant and Soil 247 (1): 153-175. (Nov. 2002)
NAL Call #: 450-P696;
ISSN: 0032-079X [PLSOA2].
Notes: Special issue: Progress in plant nutrition: Plenary lectures of the XIV International Plant Nutrition Colloquium / edited by W.J. Horst, A. Burkert, N. Claassen, H. Flessa, W.B. Frommer, H. Goldbach, W. Merbach, H.W. Olfs, V. Romheld, B. Sattelmacher, U. Schmidhalter, M.K. Schenk, and N. Wiren. Includes references.
Descriptors: grain crops/ zea mays/ oryza sativa/ nutrient availability/ fertilizers/ application rates/ intensive production/ crop management/ crop yield/ irrigation/ cropping systems/ maximum yield/ genetic improvement/ soil fertility/ profitability/ environmental protection/ literature reviews/ United States/ Asia
This citation is from AGRICOLA.

1175. **Plant resistance to insects: A resource available for sustainable agriculture.**
Stoner, K. A.
Biological Agriculture and Horticulture 13 (1): 7-38. (1996)
NAL Call #: S605.5.B5;
ISSN: 0144-8765 [BIAHDP]
Descriptors: crops/ insect pests/ insect control/ genetic resistance/ plant breeding/ genetic engineering/ gene transfer/ transgenic plants/ history/ efficacy/ integrated pest management/ farming systems/ sustainability/ literature reviews
This citation is from AGRICOLA.

1176. **Plant succession and greentree reservoir management: Implications for management and restoration of bottomland hardwood wetlands.**
King, Sammy L and Allen, James A
Wetlands 16 (4): 503-511. (1996)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: plants (Plantae Unspecified)/ Plantae (Plantae Unspecified)/ plants/ bottomland hardwood wetlands/ conservation/ greentree reservoir management/ plant succession/ vegetation establishment/ wetlands management/ wetlands restoration
Abstract: Bottomland hardwood forests are distributed along rivers and streams throughout the central and eastern United States, with the greatest concentration in the Southeast. Past and projected losses of bottomland hardwoods and degradation of remaining stands suggest that habitat management and/or restoration strategies that target multiple species and multiple uses will be necessary to maintain, enhance, and restore flora and fauna within bottomland hardwood wetlands. A greentree reservoir is a current management strategy that entails manipulating water regimes to provide habitat for wintering waterfowl. We conducted a literature review and synthesis to determine the potential impacts of greentree reservoir management on plant succession within bottomland hardwood wetlands. Greentree reservoirs can impact vegetation establishment through several processes. Despite shortcomings of greentree reservoirs, designs similar to them could be very beneficial in restoring bottomland hardwood plant and animal communities from degraded forests provided water-level control and maintenance are substantially improved. Emulation of natural hydrologic regimes, including natural variability, could produce diverse bottomland hardwood plant communities and provide habitat for a variety of wildlife species.
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1177. **Plant toxic proteins with insecticidal properties. A review on their potentialities as bioinsecticides.**
Carlini, Celia R and Grossi de Sa Maria, Fatima
Toxicon 40 (11): 1515-1539. (2002);
ISSN: 0041-0101
Descriptors: Bacillus thuringiensis entomotoxic proteins/ arcelins: insecticide/ chitinases: insecticide/ environmentally aggressive chemicals/ enzyme inhibitors: insecticide/ lectins: insecticide/ modified storage proteins: insecticide/ plant toxic proteins: insecticide/ ribosome inactivating proteins: insecticide/ ureases: insecticide/ Bacillus thuringiensis (Endospore forming Gram Positives): pest/ plant (Plantae): crop/ Bacteria/ Eubacteria/ Microorganisms/ Plants/ defense mechanism/ world population expansion

Abstract: To meet the demands for food of the expanding world population, there is need of new ways for protecting plant crops against predators and pathogens while avoiding the use of environmentally aggressive chemicals. A milestone in this field was the introduction into crop plants of genes expressing Bacillus thuringiensis entomotoxic proteins. In spite of the success of this new technology, however, there are difficulties for acceptance of these 'anti-natural' products by the consumers and some concerns about its biosafety in mammals. An alternative could be exploring the plant's own defense mechanisms, by manipulating the expression of their endogenous defense proteins, or introducing an insect control gene derived from another plant. This review deals with the biochemical features and mechanisms of actions of plant proteins supposedly involved in defense mechanisms against insects, including lectins, ribosome-inactivating proteins, enzymes inhibitors, arcelins, chitinases, ureases, and modified storage proteins. The potentialities of genetic engineering of plants with increased resistance to insect predation relying on the repertoire of genes found in plants are also discussed. Several different genes encoding plant entomotoxic proteins have been introduced into crop genomes and many of these insect resistant plants are now being tested in field conditions or awaiting commercialization.

1178. **Plants in wetlands.**
Redington, Charles B.
Dubuque, Iowa: Kendall/Hunt Pub. Co.; xxi, 394 p.: ill.; Series: Redington field guides to biological interactions. (1994)
Notes: Includes bibliographical references (p. 331-332) and index.
NAL Call #: QK938.M3R44--1994;
ISBN: 0840389833
Descriptors: Wetland plants---United States---Identification/ Marsh plants---United States---Identification/ Swamp plants---United States---Identification/ Wetlands---United States
This citation is from AGRICOLA.

1179. **Polluted river systems: Monitoring and assessment of ecotoxicological risks.**
Velde, G. van der and
Leuven, R S E W
Acta Hydrochimica et Hydrobiologica 27 (5): 251-256. (1999);
ISSN: 0323-4320
Descriptors: biomonitoring/ chemical monitoring/ ecotoxicology/ mixture toxicity/ quantitative structure activity relationships/ risk assessment / risk management/ river pollution/ sediment quality/ water quality
Abstract: In the past chemical, ecological, and toxicological research was carried out in a separate way. Nowadays, more and more studies are undertaken considering these three approaches in an integrated way (triad studies). A sophisticated combination of chemical and biological monitoring and bioassays can improve water quality management of polluted rivers. Application of quantitative structure-activity relationships (QSARs), algorithms for mixture toxicity of known substances, chemical group parameters, and response-oriented sum parameters, may reduce uncertainties in ecotoxicological risk management.

1180. **Pollution filtration by plants in wetland-littoral zones.**
Mickle, A. M.
Proceedings of the Academy of Natural Sciences of Philadelphia 144: 282-290. (1993)
NAL Call #: 500-P53;
ISSN: 0097-3157 [PANPA5].
Notes: Literature review. Includes references.
Descriptors: aquatic plants/ bog plants/ filtration/ purification/ waste water/ waste water treatment/ wetlands/ coastal areas/ literature reviews
This citation is from AGRICOLA.

1181. **Polyacrylamide preparations for protection of water quality threatened by agricultural runoff contaminants.**
Entry, J. A.; Sojka, R. E.; Watwood, M.; and Ross, C.
Environmental Pollution 120 (2): 191-200. (2002)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491 [ENPOEK]
Descriptors: pollution control/ calcium oxide/ aluminum sulfate/ pollutants/ wastewater

1182. **Polyacrylamide quantification methods in soil conservation studies.**
Lu, J. and Wu, L.
Journal of Soil and Water Conservation 58 (5): 270-275. (2003)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: polyacrylamide/ soil conservation/ analytical methods/ water pollution/ irrigation water

1183. **Polyacrylamide review: Soil conditioning and environmental fate.**
Seybold, C. A.
Communications in Soil Science and Plant Analysis 25 (11/12): 2171-2185. (1994)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2]
Descriptors: soil stabilization/ polyacrylamide/ water erosion/ erosion control/ environmental impact/ toxicity/ soil/ interactions/ reviews
Abstract: The adoption of polyacrylamide (PAM) in reducing irrigation induced erosion in California's San Joaquin Valley has been stymied by the lack of information about its toxicity and environmental fate. A review of the literature was conducted to bring to the forefront knowledge of polyacrylamide, its effectiveness in controlling erosion and its environmental fate. Polyacrylamide is a water-soluble, high molecular weight synthetic organic polymer that primarily interacts with the clay fraction of soils. The degree of interaction depends on both the properties of the polymer and properties of the soil. It is effective in stabilizing soil aggregates, reducing soil erosion, and increasing water infiltration, and also has an indirect significant impact upon crop growth and yield. For the most part, polyacrylamide is resistant to microbial attack, and its degradation is mainly through physical breakdown. Polyacrylamide has been shown to be non-toxic to humans, animals, fish, and plants; the only concern has been the toxicity of its residual monomer (acrylamide) content, which is a known neurotoxin to humans. The residual monomer is bio-degradable and does not accumulate in soils. The

major source of acrylamide that is released into the environment if from the use of polyacrylamide products, so the FDA regulates the residual monomer content of PAM used in food contact products. If the acrylamide content is kept to a minimum, PAM itself does not pose any environmental threat, and thus, can be used effectively as a soil conditioner.
This citation is from AGRICOLA.

1184. **Pond Fertilization Regimen: State-of-the-Art.**
Das, S. K. and Jana, B. B.
Journal of Applied Aquaculture
13 (1-2): 35-66. (2003);
ISSN: 1045-4438
Descriptors: Pond culture/ Fish ponds/ Habitat improvement (fertilization)/ Fertilizers/ Manure/ Aquaculture
Abstract: Pond fertilization has assumed an important role to supplement nutrient deficiency and augment biological productivity through autotrophic and heterotrophic pathways. This is especially important in the extensive and semi-intensive culture systems by promoting the functioning of natural ecosystems in a benign environment. The composition of inorganic and organic fertilizers forms the basis for selection of dose and quality of fertilizer application. While inorganic fertilizers produce perceptible results within a short period, organic manure is extremely cheap and is of considerable significance in developing countries. Nitrogen demand in fish ponds can be compensated through nitrogen fixation, as well as from accumulated humus from bottom sediments, especially from old fish ponds. The frequency of fertilizer application should be economical, though it is accepted that the lower the frequency, the better the productivity. In aquaculture ponds, the optimum N:P ratio was suggested between 4:1 to 8:1, whereas the optimum C:N ratio for composting was between 20 and 40. The exchange properties and equilibrium phosphorus concentration between soil and water influence water quality, nutrient status, and primary productivity of the pond ecosystem. These act as buffers to stabilize environmental conditions in ponds. Pond soils may exert negative influence on aquaculture production if one or more of their properties are outside the optimum range for aquaculture. The present study reviews state-of-the art pond fertilization in relation to the role of pond soils; different inorganic fertilizers such as phosphorus (P), nitrogen (N), potassium (K); fertilizer dose and frequency; P:N ratio; organic manure; aquatic food web; optimal manuring; decomposition of organic manures; mineralization; production efficiency; and limitations of organic manures. More studies on pond fertilization in the context of nutrient dynamics and fertilizer-microbial interactions under different agroclimatic regions are necessary for an effective, appropriate, and economic fertilization program. The environmental consequences of overfertilization resulting in pollution and subsequent hazards to public health should be taken into consideration.

1185. **Pond water aeration systems.**
Boyd, C. E.
Aquacultural Engineering 18 (1): 9-40. (July 1998)
NAL Call #: SH1.A66;
ISSN: 0144-8609 [AQEND6]
Descriptors: ponds/ aeration/ evaluation/ biomass/ equipment/ performance testing/ water flow/ water quality/ feed conversion efficiency/ dissolved oxygen/ mortality/ stress/ literature reviews/ water erosion
Abstract: During the past decade, pond aeration systems have been developed which will sustain large quantities of fish and invertebrate biomass. These aeration systems are modifications of standard wastewater aeration equipment. Aeration-performance testing has been important in selecting design features to provide cost-effective yet efficient aquaculture pond aerators. Paddlewheel aerators and propeller-aspirator-pumps are probably most widely used. Amounts of aeration vary from as little as 1-2 kW ha(-1) in some types of fish culture to as much as 15 or 20 kW ha(-1) in intensive culture of marine shrimp. Calculations suggest that about 500 kg additional production of fish or crustaceans can be achieved per kW of aeration. Aerators usually are positioned in ponds to provide maximum water circulation. This practice can result in erosion of pond bottoms and inside slopes of embankments, and accumulation of sediment piles in central areas of ponds where water currents are weaker. Recent studies suggest that the use of heavy aeration to provide the greatest possible production is less profitable than moderate aeration to improve water quality and enhance feed conversion efficiency. Automatic devices to start and stop aerators in response to daily changes in dissolved oxygen (DO) concentrations are improving, but they are expensive and not completely reliable. Augmentation of natural supplies of DO in ponds often is necessary to prevent stress or mortality of fish and crustaceans when DO concentrations are low. Several procedures have been used in attempts to increase DO concentrations in ponds. These methods include exchanging part of the oxygen-depleted pond water with oxygenated. water from a well, pond, or other source, application of fertilizer to stimulate oxygen production by photosynthesis of aquatic plants, additions of compounds which release oxygen through chemical reactions, release of pure oxygen gas into pond waters, and aeration with mechanical devices which either splash water into the air or release bubbles of air into the water. Water circulation devices also enhance DO supplies in ponds by mixing DO supersaturated surface waters with deeper waters of lower DO concentration. This reduces the loss of oxygen from ponds by diffusion. Also, when surface waters are not saturated with DO, water circulation causes surface disturbance and enhances oxygen absorption by the water. Mechanical aeration is by far the most common and usually the most effective means of increasing DO concentrations in ponds. In semi-intensive aquaculture, aeration is applied on an emergency basis. Farmers check DO concentrations, and when low concentrations of DO are expected, aeration is applied. In intensive aquaculture, aeration is applied each night or even continuously. The purpose of this article is to summarize the 'state of the art' of mechanical aeration of aquaculture ponds.
This citation is from AGRICOLA.

1186. **Pore water testing and analysis: The good, the bad, and the ugly.**
Chapman, Peter M; Wang, Feiyue; Germano, Joseph D; and Batley, Graeme
Marine Pollution Bulletin 44 (5): 359-366. (2002)
NAL Call #: GC1000.M3;
ISSN: 0025-326X
Descriptors: pore water: contamination/ bioaccumulation/ sediment: quality
Abstract: The increasingly common practice of collecting and assessing sediment pore water as a primary measure of sediment quality is reviewed. Good features of this practice include: pore water is a key exposure route for some organisms associated with sediments; pore water testing eliminates particle size effects; pore water analyses and tests can provide useful information regarding contamination and pollution. Bad features include: pore water is not the only exposure route; pore water tests lack chemical or biological realism; their "sensitivity" relative to other tests may be meaningless due to manipulation and laboratory artifacts; many sediment and surface dwelling organisms are not directly influenced by pore water. Bad features can become ugly if: other exposure pathways are not considered (for toxicity or bioaccumulation); manipulation techniques are not appropriate; pore water tests are inappropriately linked to population-level effects. Pore water testing and analyses can be effective tools provided their limitations are well understood by researchers and managers.
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1187. **Porphyrins as biomarkers for hazard assessment of bird populations: Destructive and non-destructive use.**
Casini, S.; Fossi, M. C.; Leonzio, C.; and Renzoni, A.
Ecotoxicology 12 (1): 297-305. (2003)
NAL Call #: RA565.A1 E27;
ISSN: 0963-9292.
Notes: "Review: Porphyrins as biomarkers for hazard assessment of bird populations: Destructive and non-destructive use."
This citation is provided courtesy of CAB International/CABI Publishing.

1188. **Position on Soil Erosion Research Priorities.**
American Society of Agricultural Engineers
Resource 10 (9): 16-17. (2003).
Notes: ASAE Presents...
Descriptors: Soil erosion

1189. **Possibilities for future carbon sequestration in Canadian agriculture in relation to land use changes.**
Dumanski, J; Desjardins, R L; Tarnocai, C; Monreal, C; Gregorich, E G; Kirkwood, V; and Campbell, C A
Climatic Change 40 (1): 81-103. (1998)
NAL Call #: QC980 .C55;
ISSN: 0165-0009
Descriptors: carbon dioxide: greenhouse gas, pollutant/ carbon: sequestration/ agriculture/ conservation tillage/ cropping practices/ erosion control/ fertilization/ land use change/ nutrient balance/ soil conservation/ sustainable land management
Abstract: Increasing carbon sequestration in agricultural soils in Canada is examined as a possible strategy in slowing or stopping the current increase in atmospheric CO2 concentrations. Estimates are provided on the amount of carbon that could be sequestered in soils in various regions in Canada by reducing summerfallow area, increased use of forage crops, improved erosion control, shifts from conventional to minimal and no-till, and more intensive use of fertilizers. The reduction of summerfallow by more intensive agriculture would increase the continuous cropland base by 8.1% in western Canada and 6.8% in all of Canada. Although increased organic carbon (OC) sequestration could be achieved in all agricultural regions, the greatest potential gains are in areas of Chernozemic soils. The best management options include reduction of summerfallow, conversion of fallow areas to hay or continuous cereals, fertilization to ensure nutrient balance, and adoption of soil conservation measures. The adoption of these options could sequester about 50-75% of the total agricultural emissions of CO2 in Canada for the next 30 years. However, increased sequestration of atmospheric carbon in the soil is possible for only a limited time. Increased efforts must be made to reduce emissions if long-term mitigation is to be achieved.
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1190. **The possible minimum chicken nutrient requirements for protecting the environment and improving cost efficiency.**
Nahm KH and Carlson CW
Asian Australasian Journal of Animal Sciences 11 (6): 755-768; 84 ref. (1998)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

1191. **Potential environmental benefits of ionophores in ruminant diets.**
Tedeschi, L. O.; Fox, D. G.; and Tylutki, T. P.
Journal of Environmental Quality 32 (5): 1591-1602. (2003)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

1192. **Potential environmental effects of corn (Zea mays L.) stover removal with emphasis on soil organic matter and erosion.**
Mann, L.; Tolbert, V.; and Cushman, J.
Agriculture, Ecosystems and Environment 89 (3): 149-166. (2002)
NAL Call #: S601 .A34;
ISSN: 0167-8809
This citation is provided courtesy of CAB International/CABI Publishing.

1193. **The potential for manipulating crop-pest-natural enemy interactions for improved insect pest management.**
Verkerk, R. H. J.; Leather, S. R.; and Wright, D. J.
Bulletin of Entomological Research 88 (5): 493-501. (1998);
ISSN: 0007-4853
Descriptors: Crops/ Biological control/ Pest control/ Insecta/ Lepidoptera/ Insects/ Insecta/ Butterflies/ Moths/ Control/ Agricultural & general applied entomology
Abstract: This review identifies key ways in which manipulations of the crop environment based on detailed understanding of tritrophic interactions can contribute to improvements in the control of insect pests. Such approaches are likely to be of particular benefit against those pests, notably certain species of Lepidoptera

and aphid, which are difficult to control with insecticides because of insecticide resistance or suppression of natural enemies. Particular attention is given to the compatibility (or otherwise) of partial plant resistance and biological control, citing examples which support contrasting tritrophic theories. Other areas considered and supported with examples include the use or effects of allelochemicals, refugia, intercropping, crop backgrounds, fertilization regimes, parasitoid conditioning (by host plants) and transgenic crops. Examples of manipulations involving use of selective insecticides which show compatibility with biological methods are also included owing to their possible suitability in integrated crop management programmes.
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1194. **Potential for preferential pathways of phosphorus transport.**
Simard, R. R.; Beauchemin, S.; and Haygarth, P. M.
Journal of Environmental Quality 29 (1): 97-104. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

1195. **Potential health risks associated with the persistence of Escherichia coli O157 in agricultural environments.**
Jones, D. L.
Soil Use and Management 15 (2): 76-83. (June 1999)
NAL Call #: S590.S68;
ISSN: 0266-0032 [SUMAEU]
Descriptors: public health/ escherichia coli/ pathogens/ persistence/ survival/ soil/ cattle dung/ cattle manure/ cattle slurry/ application to land/ vegetation/ water/ transmission/ health hazards/ UK
Abstract: Escherichia coli serotype O157 is a virulent human pathogen the global incidence of which has increased. It has been demonstrated that cattle are the primary reservoir of this pathogen. This has serious implications for the land-based disposal of organic wastes such as cattle manure, cattle slurry and abattoir waste. Further, it also has serious ramifications for the protection of surface and groundwater drinking supplies and public access to pasture land. However, while soil and vegetation can be expected to directly influence the survival of this pathogen, there is a paucity of information concerning the behaviour and survival of E. coli O157 in agricultural environments. It appears that E. coli O157 presently contaminates between 1 to 15% of UK cattle herds, depending on region, and that faecal excretion of the bacterium shows a distinct seasonality which also reflects the incidence of human infections. E. coli O157 can remain viable in soil for greater than 4 months and appears to be a highly resilient pathogen possessing the capability to adapt easily to environmental stresses. While most human cases of E. coli O157 related food poisoning have been associated with the consumption of contaminated meat and dairy products, there is also evidence that human infection has occurred through the ingestion of contaminated soil, fruit and vegetables and drinking water. In this review the potential threat to human health posed by the application of contaminated organic wastes to soil and possible strategies for reducing the amount of pathogen entering the food chain are highlighted.
This citation is from AGRICOLA.

1196. **Potential impact model to assess agricultural pressure to landscape ecological functions.**
Freyer, B.; Reisner, Y.; and Zuberbühler, D.
Ecological Modelling 130 (1/3): 121-129. (2000)
NAL Call #: QH541.15.M3E25;
ISSN: 0304-3800
This citation is provided courtesy of CAB International/CABI Publishing.

1197. **The potential impact of imposing best management practices for nutrient management on the US broiler industry.**
McIntosh, C S; Park, T A; and Karnum, C
Journal of environmental management 60 (2): 145-154. (2000)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797
Descriptors: broiler chicken (Galliformes)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Vertebrates/ best management practices/ BMPs/ cost increasing events/ economic impact/ environmental impact/ nutrient management/ poultry litter/ production levels/ wholesale prices
Abstract: The imposition of nutrient management plans for disposal of poultry litter will increase broiler production costs. This research examines the potential impacts of these cost increasing events on the US broiler industry. The results show that for 8, 40 and 80% increases in costs, wholesale prices eventually return to previous levels, and production levels stabilize at slightly lower levels.
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1198. **The potential impact of veterinary and human therapeutic agents in manure and biosolids on plants grown on arable land: A review.**
Jjemba, P. K.
Agriculture, Ecosystems and Environment 93 (1/3): 267-278. (Dec. 2002)
NAL Call #: S601-.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agricultural land/ manures/ drugs/ drug residues/ veterinary products/ pollutants/ metabolites/ excretion/ feedlots/ bioavailability/ soil organic matter/ soil ph/ literature reviews
Abstract: The fate of human and veterinary therapeutic agents has aroused attention in recent years as a potential pollutant of the environment. Prescription drugs are a US$ 91 billion industry in the United States alone and a major part of the economy in other developed countries. Substantial quantities of these compounds and their metabolites are excreted, flushed down the drain, discarded as waste, or left over in animal feedlots. When they enter the sewer, several of these compounds are not adequately eliminated by the methods that are currently used in sewage treatment. Substantial quantities of biosolids and livestock manure end up on agricultural land. In laboratory studies, the growth and development of Phaseolus vulgaris L., Glycine max, Medicago sativa, Zea mays, and several other plants are affected by some commonly used therapeutic agents. However, most of the phytotoxicity studies have been conducted in vitro. The few studies conducted in soil suggest that phytotoxicity varies between species. The bioavailability of these compounds is greatly dependent on the sorption kinetics of the respective

compound, soil organic matter, and soil pH. Some research needs, such as establishing concentrations that prevail in soil, potential effects to microbial processes in soil, and effects on crops under field conditions, are highlighted.
This citation is from AGRICOLA.

1199. **Potential of biopesticides in agriculture.**
Rodgers, P. B.
Pesticide Science 39 (2): 117-129. (1993)
NAL Call #: SB951.P47;
ISSN: 0031-613X [PSSCBG].
Notes: Paper presented at the symposium, "Natural Products as a Source for New Agricultural Chemicals II," December, 1-2, 1992, London, UK. Includes references.
Descriptors: pesticides/ research/ biological control agents/ biological control/ plant protection/ technical progress/ trends/ literature reviews
Abstract: All living organisms are subject to predation, parasitism or competition from other organisms. The study of these interactions has led to the identification of many potential opportunities for the use of living organisms as biopesticides to protect agricultural crops against insect pests, fungal, bacterial and viral diseases, weeds, nematodes and mollusc pests. A range of biopesticide products (including as active agents bacteria, fungi, nematodes, protozoa, viruses and beneficial insects) are now available commercially for control of insect pests, fungal and bacterial diseases and weeds. However, world biopesticide sales in 1990 were estimated to be $120 million, representing less than 0.5% of the world agrochemical market. Over 90% of biopesticide sales are represented by a single product type, containing Bacillus thuringiensis Berl., for control of insect pests. Nevertheless, biopesticide sales are estimated to be increasing at 10-25% per annum whilst the world agrochemical market is static or even shrinking. There has been a significant renewal of commercial interest in biopesticides as evidenced by the substantial number of alliances forged between major agrochemical companies and biotechnology companies which allow these major companies access to marketing rights to novel biopesticides. This paper reviews the current commercial status of biopesticides and discusses the technical and commercial constraints which have impeded development of biopesticides in the past. Novel developments in R&D, which may enable some of these constraints to be overcome, are examined by reference to a number of specific examples (some of which arise from the author's own experience in a biotechnology company). The future prospects for biopesticides are discussed in the light of technical advances and commercial and regulatory requirements.
This citation is from AGRICOLA.

1200. **Potential of forages to diversify cropping systems in the Northern Great Plains.**
Entz, M. H.; Baron, V. S.; Carr, P. M.; Meyer, D. W.; Smith, S. R. Jr.; and McCaughey, W. P.
Agronomy Journal 94 (2): 240-250. (2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962
This citation is provided courtesy of CAB International/CABI Publishing.

1201. **The potential of rapid assessment techniques as early warning indicators of wetland degradation: A review.**
Van Dam, R. A.; Camilleri, C.; and Finlayson, C. M.
Environmental Toxicology and Water Quality 13 (4): 297-312. (1998)
NAL Call #: RA1221.T69;
ISSN: 1053-4725 [ETWQEZ].
Notes: In the special issue: 8th International Symposium on Toxicity Assessment / edited by Y. Tsvetnenko and L. Evans. Includes references.
Descriptors: wetlands/ pollutants/ environmental degradation/ environmental impact/ toxicity/ indicators/ biological indicators/ bacteria/ phytoplankton/ invertebrates/ vertebrates/ risk assessment/ monitoring/ rapid methods/ bioassays/ literature reviews/ Australia/ ecotoxicology/ physicochemical indicators/ macrophytes
Abstract: In recent years, the need to develop assessment techniques that could provide advanced warning of significant wetland stress or degradation has been recognized. The goal of this paper is to identify rapid, yet realistic and reliable methods for the early detection of pollutant impacts on wetland ecosystems, particularly those in the wet-dry tropics of northern Australia. In doing so, it describes the ideal attributes of early warning indicators and their subsequent selection for wetland research. It then evaluates the potential of existing methods of assessment as early warning indicators of wetland degradation due to pollutant impacts. Particular attention is paid to rapid assessment techniques, covering a range of trophic levels and levels of biological organization. Due to a number of favorable characteristics, phytoplankton were considered to be potentially the most promising indicators of wetland degradation, and thus the scope of application of toxicity assessment and monitoring methods warrants further investigation. Rapid toxicity bioassays using invertebrates and vertebrates were also considered to be an essential part of an early detection program for wetlands, while biomarkers represented a promising tool for achieving true "early warning" of potential pollutant impacts. Given further refinement and development, rapid methods of monitoring aquatic community assemblages were also considered potentially useful tools for the early detection of wetland degradation. Finally, to gain effective use from an early warning system for wetlands, its incorporation into an ecological risk assessment framework was recommended.
This citation is from AGRICOLA.

1202. **Potential use of Populus for phytoremediation of environmental pollution in riparian zones.**
Dix, M. E.; Klopfenstein, N. B.; Zhang, J. W.; Workman, S. W.; and Kim, M. S.
In: Micropropagation, genetic engineering, and molecular biology of Populus; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station (Series: General technical report RM 297), 1997. pp. 206-211
NAL Call #: aSD11.A42-no.297
Descriptors: populus/ riparian vegetation/ pollution/ biodegradation/ nitrates/ tolerance/ immobilization/ absorption/ heavy metals/ soil flora/ soil chemistry/ literature reviews/ bioremediation
This citation is from AGRICOLA.

1203. **Potential uses for geographic information system-based planning and decision support technology in intensive food animal production.**
Colby, M. M. and Johnson, Y. J.
Animal Health Research Reviews
3 (1): 31-42. (2002);
ISSN: 1466-2523
This citation is provided courtesy of CAB International/CABI Publishing.

1204. **Potentiality of poultry droppings in livestock feeding: A review.**
Paul BN; Gupta BS; Srivastava A; and Chaudhary LC
Indian Journal of Dairy Science
48 (2): 92-97; 49 ref. (1995)
This citation is provided courtesy of CAB International/CABI Publishing.

1205. **Potentially beneficial uses of inland saline waters in the Southwestern USA.**
Miyamoto, S.
Tasks for Vegetation Science
(28): 407-422. (1993)
NAL Call #: QK1.T37;
ISSN: 0167-9406.
Notes: In the series analytic: Towards the rational use of high salinity tolerant plants. 2. Agriculture and forestry under marginal soil water conditions / edited by H. Lieth and A.A. Al Masoom. Proceedings of the 1st ASWAS Conference held December 8-15, 1990, Al Ain, United Arab Emirates. Literature review. Includes references.
Descriptors: crop production/ gossypium hirsutum/ halophytes/ irrigation/ irrigation water/ saline water/ salinity/ salt tolerance/ aquaculture/ literature reviews/ Texas/ New Mexico/ Arizona/ California/ Utah
This citation is from AGRICOLA.

1206. **Poultry integrated pest management: Status and future.**
Axtell, R. C.
Integrated Pest Management Reviews
4 (1): 53-73. (1999)
NAL Call #: SB950.9.I572;
ISSN: 1353-5226 [IPMRF5]
Descriptors: arthropod pests/ ectoparasites/ rodents/ integrated pest management/ poultry/ intensive livestock farming/ literature reviews
Abstract: Modern commercial poultry production under large companies is expanding worldwide with similar methods and housing, and the accompanying arthropod and rodent pest problems. The pests increase the cost of production and are factors in the spread of avian diseases. The biology, behavior and control of ectoparasites and premise pests are described in relation to the different housing and production practices for broiler breeders, turkey breeders, growout (broilers and turkeys), caged-layers, and pullets. Ectoparasites include Ornithonyssus fowl mites, Dermanyssus chicken mites, lice, bedbugs, fleas, and argasid fowl ticks. Premise pests include Alphitobius darkling beetles, Dermestes hide beetles, the house fly and several related filth fly species, calliphorid blow flies, moths, cockroaches, and rodents. Populations of these pests are largely determined by the housing, waste, and flock management practices. An integrated pest management (IPM) approach, tailored to the different production systems, is required for satisfactory poultry pest control. Biosecurity, preventing the introduction of pests and diseases into a facility, is critical. Poultry IPM, based on pest identification, pest population monitoring, and methods of cultural, biological, and chemical control, is elucidated. The structure of the sophisticated, highly integrated poultry industry provides a situation conducive to refinement and wider implementation of IPM.
This citation is from AGRICOLA.

1207. **Poultry litter as fuel.**
Dagnall, S P
World's Poultry Science Journal
49 (2): 175-177. (1993)
NAL Call #: 47.8-W89;
ISSN: 0043-9339
Descriptors: bird (Aves Unspecified)/ chicken (Galliformes)/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ electricity/ energy/ waste management
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1208. **Poultry manure: Source of fertilizer, fuel and feed.**
Henuk, Y. L. and Dingle, J. G.
World's Poultry Science Journal
59 (3): 350-360. (2003)
NAL Call #: 47.8-W89;
ISSN: 0043-9339
This citation is provided courtesy of CAB International/CABI Publishing.

1209. **Poultry waste management: Agricultural and environmental issues.**
Sims, J. T. and Wolf, D. C.
Advances in Agronomy
52: 1-83. (1994)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: poultry manure/ poultry droppings/ nitrogen/ phosphorus/ chemical reactions/ waste treatment/ application to land/ nitrogen cycle/ cycling/ mineralization/ literature reviews
This citation is from AGRICOLA.

1210. **Poultry waste management handbook.**
Collins, Eldridge and Natural Resource, Agriculture and Engineering Service. Cooperative Extension.
Ithaca, N.Y. Natural Resource, Agriculture, and Engineering Service, Cooperative Extension; 64 p. (1999)
Notes: Includes bibliographical references (p. 62).
NAL Call #: S675-.N72-no.-132;
ISBN: 0935817425 (pbk.)
Descriptors: Poultry industry---Waste disposal---Handbooks, manuals, etc
Abstract: Waste management has been a concern in poultry operations for many years. Problems with proper storage, handling, management, and utilization of byproducts of production have come to the forefront in planning, establishing, and operating poultry farms. In addition, growers have become sensitive to the potential for nuisance litigation should their farms generate odors, insects and vermin, or runoff that offends neighbors. This publication covers all aspects of solid, semisolid, and liquid poultry waste management, including: manure production and characteristics, environmental regulations and hazards, poultry housing design and waste management, manure storage systems, waste treatment (including composting, anaerobic/facultative lagoons, anaerobic digestion, and incineration), nutrient management, application equipment, dead bird management, and alternative uses for manure (for example, in fertilizers, as ruminant feed, and in compost for growing mushrooms).
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1211. **Practical and innovative measures for the control of agricultural phosphorus losses to water: An overview.**
Sharpley, A.; Foy, B.; and Withers, P.
Journal of Environmental Quality 29 (1): 1-9. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the Organization for Economic Cooperation and Development (OECD) sponsored conference on "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," held June 16-19, 1998, Antrim, Northern Ireland.
Descriptors: phosphorus fertilizers/ runoff/ water pollution/ pollution control/ conferences
Abstract: Inputs of P are essential for profitable crop and livestock production. However, its export in watershed runoff can accelerate the eutrophication of receiving fresh waters. The specialization of crop and livestock farming has created regional imbalances in P inputs in feed and fertilizer and output in farm produce. In many areas, soil P exceeds crop needs and has enriched surface runoff with P. This paper provides a brief overview of P management strategies to maintain agricultural production and protect water quality that were discussed at the conference, "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," sponsored by the Organization for Economic Cooperation and Development and held in Antrim, Northern Ireland, June 1998. The purpose of the conference was to assess current strategies for reducing the loads and concentrations of P from agricultural land to surface waters. Topics discussed at the interdisciplinary conference and reviewed here included sustainable P management in productive agriculture; assessing land application of P; evaluating and modeling P transport and transformations in soil, runoff, streams, and lakes; and implementation of integrated best management practices (BMPs). From these discussions, measures to control agricultural P transfer from soil to water may be brought about by optimizing fertilizer P use-efficiency, refining animal feed rations, using feed additives to increase P absorption by the animal, moving manure from surplus to deficit areas, and targeting conservation practices, such as reduced tillage, buffer strips, and cover crops, to critical areas of P export from a watershed.
This citation is from AGRICOLA.

1212. **Practical application of 25 years' research into the management of shallow lakes.**
Phillips, Geoff; Bramwell, Alison; Pitt, Jo; Stansfield, Julia; and Perrow, Martin
Hydrobiologia 395-396 (0): 61-76. (1999)
NAL Call #: 410 H992;
ISSN: 0018-8158
Descriptors: phosphorus: pollutant/ biomanipulation/ eutrophication/ lake restoration/ sediment release/ sediment removal
Abstract: The Norfolk Broads are a series of shallow, man-made lakes dug in medieval times for peat extraction, in Eastern England. Their eutrophic state has been well-documented and, since the early 1980s, their restoration has been attempted using a variety of techniques. The restoration began with the removal of point sources of phosphorus from sewage treatment works, which then revealed the role of sediment release when lake phosphorus levels failed to decline following inflow phosphorus levels. Small-scale removal of sediment layers in isolated broads demonstrated the feasibility, both technical and economic, of this technique, but experience then showed that sediment removal alone could not provide long-term restoration. Biomanipulation following sediment removal now offers the most reliable route to restoration, but the mechanisms by which a stable submerged plant community can be maintained after biomanipulation are still not clear.
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1213. **Practical handbook for wetland identification and delineation.**
Lyon, John Grimson.
Boca Raton, FL: CRC Press; 157 p.: ill. (1993)
NAL Call #: QH104.L95-1993;
ISBN: 087371590X
Descriptors: Wetlands---United States Classification/ Land use---United States Planning/ Wetland conservation---United States/ Wetland ecology---United States/ Wetland flora---United States
This citation is from AGRICOLA.

1214. **The practical handbook of compost engineering.**
Haug, Roger Tim.
Boca Raton, Fla.: Lewis Publishers; 717 p.: ill. (1993)
NAL Call #: TD796.5.H39-1993;
ISBN: 0873713737 (acid-free paper)
Descriptors: Compost/ Refuse and refuse disposal---Biodegradation
This citation is from AGRICOLA.

1215. **Practical Realities of Conjunctive Management: The Middle Rio Grande as an Example.**
Dumars, C.
Las Cruces, NM: New Mexico Water Resources Research Institute, New Mexico State University. (1995)
Notes: Conference: 39. Annual New Mexico Water Conference, Albuquerque, NM (USA), 3-4 Nov 1994; Source: The Future of Albuquerque and Middle Rio Grande Basin. Proceedings of the 39th Annual New Mexico Water Conference., New Mexico Water Resources Research Institute, New Mexico State University, Box 30001, Dept. 3167, Las Cruces, NM 88003 (USA), 1995, Pp. 119-122, Tech. Rep. New Mex. Water Resour. Res. Inst., Vol. 290
Descriptors: United States, New Mexico, Rio Grande River/ water rights/ management planning/ water resources/ water supply/ water management/ legal aspects/ riparian rights/ legal review/ conjunctive use/ river basin management/ regional planning/ multiple use of resources/ Techniques of planning/ Environmental action/ Conservation, wildlife management and recreation
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1216. **Practical use of the mycorrhizal fungal technology in forestry, reclamation, arboriculture, agriculture, and horticulture.**
Marx, D. H.; Marrs, L. F.; and Cordell, C. E.
Dendrobiology 47: 27-40. (2002);
ISSN: 1641-1307
This citation is provided courtesy of CAB International/CABI Publishing.

1217. **Prairie conservation in North America.**
Samson, F. and Knopf, F.
Bioscience 44: 418-421 (1994)
NAL Call #: 500 Am322A
Descriptors: Supporting science
Abstract: Discussed the degradation of native prairies and possible management solutions.

1218. **Prairie wetland ecology: The contribution of the Marsh Ecology Research Program.**
Murkin, Henry R.; Valk, Arnoud van der; Clark, William R.; and Marsh Ecology Research Program.
Ames: Iowa State University Press; xiv, 413 p.: ill., maps. (2000)
Notes: 1st ed.; Includes bibliographical references (p. 395-401) and index.
NAL Call #: QH541.5.M3-P73-2000;
ISBN: 0813827523
Descriptors: Wetland ecology/ Prairies
This citation is from AGRICOLA.

1219. **Precipitation use efficiency as affected by cropping and tillage systems.**
Peterson, G. A.; Schlegel, A. J.; Tanaka, D. L.; and Jones, O. R.
Journal of Production Agriculture 9 (2): 180-186. (1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
This citation is provided courtesy of CAB International/CABI Publishing.

1220. **Precision agriculture and environmental quality: Challenges for research and education.**
Hatfield, Jerry L.; United States. National Resources Conservation Service; United States. Agricultural Research Service; and National Arbor Day Foundation.
United States: USDA National Resources Conservation Service: USDA Agricultural Research Service; 18 p. (2000)
Notes: Cover title. "Prepared for the National Arbor Day Foundation." "July 2000." Includes bibliographical references (p. 11-13).
NAL Call #: aS494.5.P73-H38-2000
Descriptors: Precision farming---Environmental aspects/ Precision farming---Research/ Agricultural pollution/ Environmental monitoring
This citation is from AGRICOLA.

1221. **Predation and Ring-Necked Pheasant Population Dynamics.**
Riley, TZ and Schulz, JH
Wildlife Society Bulletin 29 (1): 33-38. (2001)
NAL Call #: SK357.A1W5;
ISSN: 0091-7648
Descriptors: Wildlife management/ Predation/ Population dynamics/ Recruitment/ Phasianus colchicus/ Ring necked pheasant/ Management
Abstract: Because ring-necked pheasants (Phasianus colchicus) are an important wildlife resource in agricultural ecosystems, we reviewed the role of predators on pheasant population dynamics and suggest management options to ameliorate predation. Predator reduction programs have the potential to increase survival and recruitment, but these parameters decrease once predator control ceases. Extensive application of predator reductions may be ethically questionable, and habitat management directed at moderating the effects of predators at the landscape scale is expensive. An extensive distribution of cover during the nesting and brood-rearing periods can increase pheasant recruitment. Federal agricultural and conservation programs can be used to accomplish many of these landscape habitat improvements, but federal and state agencies must provide the technical assistance to deliver the program options to producers. New federal farm programs aimed at improving avian survival and recruitment must have an evaluation and monitoring component built in to determine their effectiveness.
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1222. **Predicting long-term wetland hydrology from hydric soil field indicators.**
Vepraskas, Michael J. and Water Resources Research Institute of the University of North Carolina.
Raleigh, N.C.: Water Resources Research Institute of the University of North Carolina; xv, 55 p.: ill., maps; Series: Report (Water Resources Research Institute of the University of North Carolina); no. 342. (2002)
Notes: "UNC-WRRI-2002-342." "August 2002." Includes bibliographical references (p. 53-55). Funded by through the Water Resources Research Institute of the University of North Carolina. WRRI project no. 70175.
NAL Call #: TD201-.N6-no.-342
Descriptors: Wetlands---Hydrology---North Carolina/ Soil absorption and adsorption---Research---North Carolina/ Sewage lagoons---North Carolina---Hydrodynamics
This citation is from AGRICOLA.

1223. **Predicting Salmonid Habitat-Flow Relationships for Streams from Western North America.**
Hatfield, T. and Bruce, J.
North American Journal of Fisheries Management 20 (4): 1005-1015. (2000)
NAL Call #: SH219.N66;
ISSN: 0275-5947
Descriptors: Water flow/ Streams/ Wildlife management/ North America/ Habitat/ Microhabitats/ Stream flow/ Stocking (organisms)/ Fish culture/ Rivers/ Fishery management/ Salmonidae/ Oncorhynchus mykiss/ West/ Salmonids/ habitat flow relationships/ Rainbow trout/ Management/ Habitat community studies/ Fish culture/ United States
Abstract: One of the most widely applied methodologies for developing instream flow recommendations is the instream flow incremental methodology (IFIM) and its component microhabitat model, physical habitat simulation (PHABSIM). In this paper we reviewed over 1,500 habitat-flow curves obtained from 127 PHABSIM studies from western North America to develop predictions for flow needs for salmonids in this region and to test whether habitat-flow relationships for salmonids were related to watershed characteristics and geographic location. We present regressions that predict PHABSIM optima for four life history stages of four salmonid species and for all salmonid species in the database as a group, and we quantify the uncertainty in these estimates. Mean annual discharge (MAD) was the best predictor of optimum flow. The general form of the regressions was log sub(e)(optimum flow) = A x log sub(e)(MAD), where A < 1. Minor improvement in predictive power was sometimes possible with addition of latitude and longitude coordinates to the regression. This relationship is asymptotic and differs considerably from the fixed flow percentages recommended by Tennant. Our results are presented as a planning tool to (1) allow managers and project proponents to conduct a preliminary assessment of proposed

water-use development projects, (2) optimize research efforts for instream flow studies and experiments, and (3) set experimental boundaries for adaptive management of stream flow.

1224. **Predicting soil erosion by water: A guide to conservation planning with the revised universal soil loss equation (RUSLE).**
Renard, Kenneth G. and United States. Agricultural Research Service.
Washington, D.C.: USDA, Agricultural Research Service; xix, 384 p.: ill., maps; Series: Agriculture handbook (United States. Dept. of Agriculture) no. 703. (1997)
Notes: "Issued January 1997"--P. [iii]. Shipping list no.: 97-0181-P. Includes bibliographical references (p. 367-384). "Supersedes Agricultural handbook no. 537, titled "Predicting rainfall erosion losses: a guide to conservation planning"--P. [iii]. SUDOCS: A 1.76:703.
NAL Call #: 1--Ag84Ah-no.703;
ISBN: 0160489385
Descriptors: Soil erosion prediction---United States/ Soil erosion---United States/ Geophysical prediction
This citation is from AGRICOLA.

1225. **Predicting the interaction between the effects of salinity and climate change on crop plants.**
Yeo, A.
Scientia Horticulturae 78 (1/4): 159-174. (Jan. 1999)
NAL Call #: SB13.S3;
ISSN: 0304-4238 [SHRTAH].
Notes: Special issue: Salinity and horticulture / edited by T.J. Flowers. Includes references.
Descriptors: crops/ salinity/ climatic change/ irrigation/ crop yield/ air pollution/ climatic zones/ salinization/ water use efficiency/ growth/ water availability/ evaporation/ air temperature/ evapotranspiration/ leaves/ salt/ plant composition/ photosynthesis/ ion uptake/ transpiration/ stomatal resistance/ literature reviews
This citation is from AGRICOLA.

1226. **Prediction of Downstream Geomorphological Changes After Dam Construction: A Stream Power Approach.**
Brandt, S. A.
International Journal of Water Resources Development 16 (3): 343-367. (2000)
NAL Call #: TD201.I56;
ISSN: 0790-0627
Descriptors: Prediction/ Downstream/ Geomorphology/ Dam Construction/ Literature Review/ Mathematical Equations/ Sediment Transport/ Regression Analysis/ Alluvial Rivers/ Reservoirs/ Channels/ Dams/ Reviews/ Transport/ Streams (in natural channels)/ Channels/ Ecological impact of water development/ Underground Services and Water Use/ Streamflow and runoff
Abstract: A literature survey on methods of computing stable river-channel geometry, demanding a small amount of work effort and few input data, has been made and is presented. Besides the use of empirical regime equations and the use of an extremal hypothesis in conjunction with a sediment-transport and a flow-friction theory, new regression equations have been formulated which are used together with a sediment-transport equation. These methods may prove efficient when predicting changes, such as after dam and reservoir construction, on an alluvial river. Calculations using the different methods have been exemplified on a natural river.

1227. **A preliminary synthesis of major scientific results during the SALSA program.**
Chehbouni, A.; Goodrich, D. C.; Moran, M. S.; Watts, C. J.; Kerr, Y. H.; Dedieu, G.; Kepner, W. G.; Shuttleworth, W. J.; and Sorooshian, S.
Agricultural and Forest Meteorology 105 (1/3): 311-323. (2000)
NAL Call #: 340.8-AG8;
ISSN: 0168-1923
This citation is provided courtesy of CAB International/CABI Publishing.

1228. **Prescribed fire effects on herpetofauna: Review and management implications.**
Russell, K. R.; Lear, D. H. van.; and Guynn, D. C. Jr.
Wildlife Society Bulletin 27 (2): 374-384. (Summer 1999)
NAL Call #: SK357.A1W5;
ISSN: 0091-7648 [WLSBA6]
Descriptors: prescribed burning/ amphibia/ reptiles/ wildlife management/ mortality
This citation is from AGRICOLA.

1229. **Prevention and control of losses of gaseous nitrogen compounds in livestock operations: A review.**
Jongebreur, A. A. and Monteny, G. J.
The Scientific World 1 (S1): 844-851. (2001)
NAL Call #: 472 SCI25;
ISSN: 1537-744X.
Notes: UID: 2001.01.339; Number of References: 68; From: Optimizing nitrogen management in food and energy production and environmental protection: Proceedings of the 2nd International Nitrogen Conference on Science and Policy 2001 / Potomac, MD, USA, 14-18 October 2001
This citation is provided courtesy of CAB International/CABI Publishing.

1230. **Prevention strategies for field traffic-induced subsoil compaction: A review. Part 1. Machine/soil interactions.**
Alakukku, L.; Weisskopf, P.; Chamen, W. C. T.; Tijink, F. G. J.; Linden, J. P. van der; Pires, S.; Sommer, C.; and Spoor, G.
Soil and Tillage Research 73 (1/2): 145-160. (2003)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1231. **Prevention strategies for field traffic-induced subsoil compaction: A review. Part 2. Equipment and field practices.**
Chamen, T.; Alakukku, L.; Pires, S.; Sommer, C.; Spoor, G.; Tijink, F.; and Weisskopf, P.
Soil and Tillage Research 73 (1/2): 161-174. (2003)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1232. **Primary succession on land: Community development and wildlife conservation.**
Usher, M. B.
Special Publications Series of the British Ecological Society (12): 283-293. (1993)
NAL Call #: QH540.S64;
ISSN: 0262-7027.
Notes: In the series analytic: Primary succession on land / edited by J. Miles and D.W.H. Walton. Proceedings of a symposium held September 5-7, 1989, Liverpool, England. Includes references.

Descriptors: plant ecology/ plant succession/ community ecology/ wildlife conservation/ nature reserves/ habitats/ literature reviews/ arthropods/ odonta
This citation is from AGRICOLA.

1233. **Principles for management of aquatic-breeding amphibians.**
Semlitsch, R. D.
Journal of Wildlife Management 64 (3): 615-631. (2000)
NAL Call #: 410 J827;
ISSN: 0022-541X
Descriptors: Wildlife management/ Conservation/ Population dynamics/ Wetlands/ Ecosystem management/ Breeding sites/ Hydrology/ Nature conservation/ Land use/ Amphibia/ Amphibians/ species diversity/ Conservation/ Habitat community studies / Conservation, wildlife management and recreation
Abstract: Coordinated efforts by ecologists and natural resource managers are necessary to balance the conservation of biological diversity with the potential for sustained economic development. Because some amphibians have suffered world-wide declines during the last 20 years, it is important to consider biologically based management strategies that will preserve local and regional populations. This paper provides a brief overview of potential threats to local and regional populations, the state of knowledge on population and landscape processes, and the critical elements needed for an effective management plan for amphibians. Local population dynamics and ecological connectivity of amphibian metapopulations must be considered in effective management plans. There are 3 critical factors to consider in a management plan (1) the number or density of individuals dispersing from individual wetlands, (2) the diversity of wetlands with regard to hydroperiod, and (3) the probability of dispersal among adjacent wetlands or the rescue and recolonization of local populations. Wetland losses reduce the total number of sites where pond-breeding amphibians can reproduce and recruit juveniles into the breeding population. Loss of small, temporary wetlands (<4.0 ha) may be especially harmful to amphibians because of their abundance and high species diversity. Alteration of wetlands, particularly hydrologic cycles, can severely impair completion of larval metamorphosis through either early pond drying (if hydroperiod is shortened) or through increased predation (if hydroperiod is lengthened or connections made with fish-infested lakes, rivers, or canals). Wetland loss also increases the distance between neighboring wetlands that is critical to metapopulation source-sink processes. Reduction in wetland density reduces the probablity that populations will be rescued from extinction by nearby source populations. Local populations cannot be considered independent of source-sink processes that connect wetlands at the landscape or regional level. Further the fragmentation of natural habitats from timber harvesting, agriculture, roads, drainage canals, or urban development impedes or prevents dispersal and decreases the probability of wetland recolonization. If our goal is to maintain or enhance present levels of amphibian diversity, then resource managers must incorporate critical elements into plans that protect population and landscape processes thereby maintaining viable populations and communities of amphibians.

1234. **Principles for managing nitrogen leaching.**
Meisinger, J. J. and Delgado, J. A.
Journal of Soil and Water Conservation 57 (6): 485-498. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: nitrogen / losses from soil/ leaching/ nitrogen fertilizers/ application rates/ low input agriculture/ pollution control/ cover crops/ rotations/ legumes/ irrigation scheduling/ riparian vegetation/ land banks/ fertilizer requirement determination/ remote sensing/ geographical information systems/ global positioning systems/ soil fertility/ cropping systems/ nutrient management plan
This citation is from AGRICOLA.

1235. **Probability of Nitrate Contamination of Recently Recharged Groundwaters in the Conterminous United States.**
Nolan, B. T.; Hitt, K. J.; and Ruddy, B. C.
Environmental Science and Technology 36 (10): 2138-2145. (2002)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: Nitrates / Groundwater recharge/ Contamination/ Measuring methods/ Mathematical models/ Risk assessment/ Statistical analysis/ Nitrate/ Recharge/ Contamination/ Determination/ Risk analysis/ Pollution (Groundwater)/ United States / Water Pollution Sources/ Groundwater Pollution/ Risk/ Fertilizers/ United States/ Freshwater pollution/ Water Quality/ Sources and fate of pollution
Abstract: A new logistic regression (LR) model was used to predict the probability of nitrate contamination exceeding 4 mg/L in predominantly shallow, recently recharged groundwaters of the United States. The new model contains variables representing (1) N fertilizer loading ($p < 0.001$), (2) percent cropland--pasture ($p < 0.001$), (3) natural log of human population density ($p < 0.001$), (4) percent well-drained soils ($p < 0.001$), (5) depth to the seasonally high water table ($p < 0.001$), and (6) presence or absence of unconsolidated sand and gravel aquifers ($p = 0.002$). Observed and average predicted probabilities associated with deciles of risk are well correlated (r super(2) = 0.875), indicating that the LR model fits the data well. The likelihood of nitrate contamination is greater in areas with high N loading and well-drained surficial soils over unconsolidated sand and gravels. The LR model correctly predicted the status of nitrate contamination in 75% of wells in a validation data set. Considering all wells used in both calibration and validation, observed median nitrate concentration increased from 0.24 to 8.30 mg/L as the mapped probability of nitrate exceeding 4 mg/L increased from less than or equal to 0.17 to >0.83.

1236. **The problem of irrigated horticulture: Matching the biophysical efficiency with the economic efficiency.**
Stirzaker, R. J.
Agroforestry Systems 45 (1/3): 187-202. (1999)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366 [AGSYE6].
Notes: Special issue: Agriculture as a mimic of natural ecosystems / edited by E.C. Lefroy, R.J. Hobbs, M.H. O'Connor and J.S. Pate. Paper presented at a workshop held September 2-6, 1997, Williams, Western Australia, Australia. Includes references.
Descriptors: horticulture/ irrigation/ efficiency/ economic analysis/ water/ leakage/ ecosystems/ eutrophication/ degradation/ farm management/ agriculture/ soil management/ literature reviews
This citation is from AGRICOLA.

1237. **The problems caused by chicken faeces and their resolution (a review).**
Baydan E and Yildiz G
Lalahan Hayvancilik Arastirma Enstitusu Dergisi 40 (1): 98-105; 31 ref. (2000)
This citation is provided courtesy of CAB International/CABI Publishing.

1238. **Process for assessing proper functioning condition for Lentic Riparian-Wetland Areas.**
Prichard, Don.; United States. Bureau of Land Management. Denver Service Center; and United States. Bureau of Land Management. Lentic Riparian Wetland Area. Proper Functioning Condition Work Group.
Denver, CO: U.S. Dept. of the Interior, Bureau of Land Management, Service Center; vi, 37 p.: ill., (some col.); Series: Riparian area management. Technical reference (United States. Bureau of Land Management) 1737-11. (1994)
Notes: "Supplement to Riparian area management TR 1737-9"--Report documentation p. Shipping list no.: 94-0393-P. "September 1994"--Report documentation p. "BLM/SC/ST-94/008+1737"--P. [2] of cover. Includes bibliographical references (p. 19).
SUDOCS: I 53.35:1737-11.
NAL Call #: QH541.5.R52P76--1994
Descriptors: Riparian ecology---United States/ Wetland conservation---United States/ Stream conservation---United States
This citation is from AGRICOLA.

1239. **Process, Form and Change in Dryland Rivers: A Review of Recent Research.**
Tooth, S.
Earth Science Reviews 50 (1-4): 67-107. (2000);
ISSN: 0012-8252
Descriptors: Australia/ Arid Lands/ Ephemeral Streams/ Rivers/ Research Priorities/ Hydrology/ Sediment Transport/ Fluvial Sediments/ Streamflow and runoff
Abstract: Many of the world's extensive warm dryland regions support numerous, albeit often infrequently flowing, rivers. Dryland rivers are increasingly a focus of scientific and applied interest but empirical research and fluvial theory for drylands need to be strengthened. Recent research in arid central Australia indicates greater diversity in dryland river process, form and change than has hitherto been appreciated, and highlights the need for a global review assessing the present state of knowledge. This review outlines the distinctive characteristics of dryland fluvial environments (hillslope and channel hydrological and sediment transport processes, river pattern and geometry, temporal and spatial aspects of channel change, sedimentary structures and bedforms), many of which contrast with more humid fluvial environments. Although features common to many dryland fluvial environments can be identified (extreme temporal and spatial variability of rainfall, runoff and sediment transport, poor integration between tributary and trunk channels, importance of large floods as a control on channel morphology, lack of equilibrium between process and form), the fluvial diversity that exists within drylands requires recognition of the limitations to these generalisations. In particular, research in central Australia illustrates the need to understand the rivers of this region using empirical relationships, terms, and concepts additional to those defined by earlier work in drylands. Key deficiencies in dryland fluvial research are identified, and relate to three main areas: limited study of some aspects of modern dryland rivers (floodplain characteristics, influence of vegetation, downstream changes, importance of scale); limited understanding of dryland river behaviour over longer (Cenozoic) timescales; and lack of integration between the results from short-term, process-form studies and studies of the longer term histories of river behaviour. Linking knowledge of past hydrological and channel changes to present-day changes in dryland rivers is suggested as a key research priority. This will help develop a sound theoretical basis for the assessment of future developments in dryland river systems which will contribute to their improved scientific understanding and environmentally sensitive management.
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1240. **Processes controlling ammonia emission from livestock slurry in the field.**
Sommer, S. G.; Génermont, S.; Cellier, P.; Hutchings, N. J.; Olesen, J. E.; and Morvan, T.
European Journal of Agronomy 19 (4): 465-486. (2003)
NAL Call #: SB13.E97;
ISSN: 1161-0301
This citation is provided courtesy of CAB International/CABI Publishing.

1241. **Processes controlling soil phosphorus release to runoff and implications for agricultural management.**
McDowell, R. W.; Sharpley, A. N.; Condron, L. M.; Haygarth, P. M.; and Brookes, P. C.
Nutrient Cycling in Agroecosystems 59 (3): 269-284. (2001)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: agricultural land/ groundwater/ phosphorus/ leaching/ eutrophication/ runoff/ land management/ manures/ erosion/ soil solution/ movement in soil
Abstract: Phosphorus (P) loss from agricultural land to surface waters is well known as an environmental issue because of the role of P in freshwater eutrophication. Much research has been conducted on the erosion and loss of Pin sediments and surface runoff. Recently, P loss in sub-surface runoff via agricultural drainage has been identified as environmentally significant. High soil P levels are considered as a potential source of P loss. However, without favourable hydrological conditions P will not

move. In this paper, we review the basis of soil P release into solution and transport in surface and sub-surface runoff. Our objectives are to outline the role of soil P and hydrology in P movement and management practices that can minimize P loss to surface waters. Remedial strategies to reduce the risk of P loss in the short-term are discussed, although it is acknowledged that long-term solutions must focus on achieving a balance between P inputs in fertilizers and feed and P outputs in production systems.
This citation is from AGRICOLA.

1242. **Processes of fluvial island formation, with examples from Plum Creek, Colorado and Snake River, Idaho.**
Osterkamp, W R
Wetlands 18 (4): 530-545. (1998)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: fluvial island formation: flooding/ riparian habitat/ riparian vegetation
Abstract: A fluvial island is a landform, elevated above and surrounded by stream-channel branches or waterways, that persists sufficiently long to establish permanent vegetation. Natural fluvial islands occur in any part of a drainage network but most commonly in montane, piedmont-valley, and coastal flood-plain environments. Processes, often interactive, by which islands form include avulsion (the sudden separation of land by a flood or by an abrupt change in the course of a stream), rapid and gradual channel incision, channel migration, dissection of both rapidly and slowly deposited bed sediment, and deposition of bed sediment on a vegetated surface or behind a channel obstruction. Products of high-energy conditions, fluvial islands typically lack stability over decades to millennia. Fluvial islands in Plum Creek, Colorado, USA, results of sorting processes following a recent high-magnitude flood, and in the Snake River, Idaho, USA, partly results of the Pleistocene Bonneville Flood, illustrate how islands form, develop, and disappear. The examples consider differing conditions of island shape, size, height, sediment, and vegetation.
© Thomson

1243. **The processes of species colonisation in wooded landscapes: A review of principles.**
Dolman, P. M. and Fuller, R. J.
In: The restoration of wooded landscapes: Proceedings of a conference. (Held 14 Sep 2000-15 Sep 2000 at Heriot Watt University, Edinburgh, UK.) Humphrey, J.; Newton, A.; Latham, J.; Gray, H.; Kirby, K.; Poulsom, E.; and Quine, C. (eds.); pp. 25-36; 2003.
ISBN: 0-85538-589-8
This citation is provided courtesy of CAB International/CABI Publishing.

1244. **Producing and using conditioned poultry litter in horticulture: Final report.**
Paulin, R.
Bentley, WA: Western Australian Dept. of Agriculture; 60 p.: ill.; Series: Miscellaneous publication (Western Australia. Dept. of Agriculture) 01/22. (2001)
Notes: Cover title. "August 2001." Includes bibliographical references.
NAL Call #: S397-.M57-no.-2001/22
This citation is from AGRICOLA.

1245. **Production of vegetables using cover crop and living mulches: A review.**
Masiunas JB
Journal of Vegetable Crop Production 4 (1): 11-31; 6 pp. of ref. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

1246. **Production, purification and properties of microbial phytases.**
Pandey, A.; Szakacs, G.; Soccol, C. R.; Rodriguez Leon, J. A.; and Soccol, V. T.
Bioresource Technology 77 (3): 203-214. (May 2001)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB].
Notes: Reviews issue. Includes references.
Descriptors: phytase/ feeds/ animal manures/ pollution control
This citation is from AGRICOLA.

1247. **Productive water use in rice production: Opportunities and limitations.**
Tuong, T. P.
Journal of Crop Production 2 (2): 241-264. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Water use in crop production / edited by M.B. Kirkham. Includes references.
Descriptors: oryza sativa/ water use efficiency/ water use/ water availability/ evapotranspiration/ fertilizers/ use efficiency/ labor/ weed control/ evaluation/ irrigation/ flooded rice/ percolation/ water balance/ crop growth stage/ growth period/ crop management/ planting date/ harvesting date/ cultivars/ transplanting/ crop yield/ permeability/ soil pore system/ depth/ duration/ flooding/ literature reviews
This citation is from AGRICOLA.

1248. **Profitability of Soil and Water Conservation in Canada: A Review.**
Stonehouse, D. P.
Journal of Soil and Water Conservation 50 (2): 215-219. (1995)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: Canada/ conservation/ resources management/ agricultural practices/ soil erosion/ fallowing/ wind erosion/ drought/ soil compaction/ erosion control/ pesticide residues/ manure/ fertilizers/ soil conservation/ water conservation/ economics/ resource management/ environmental degradation/ agriculture/ environmental impact/ Watershed protection/ Environmental action/ Conservation, wildlife management and recreation
Abstract: Canada has had a short-lived and low-key experience with agricultural activity-related resource degradation problems because its agricultural production potential began to be realized only during the last 100 years or so. The problems are nevertheless critical, given the small landbase suitable for agriculture and a precarious climate (Dumanski et al.). The bastion of Canadian agriculture in the prairies was opened to farming only early in the 20th century, but severe drought in the 1930s combined with farming activities to produce extensive erosion problems. More moderate climatic conditions and modified farming practices lessened degradation problems until the reemergence of severe drought conditions in the 1980s. Heightened concerns about degradation are associated with organic matter depletion, wind and water-borne erosion, and rising salinity resulting primarily from summer fallowing practices (Cann et al.; Rennie), but also from increasing cultivation of marginal lands, largely instigated by government support programs (Van Kooten and Kennedy).

Elsewhere in western Canada, degradation problems are associated with surfeits of livestock manures in southwestern British Columbia, pesticide residues from intensive fruit farming in the Okanagan Valley, and aquaculture wastes in coastal water bodies (Van Kooten and Kennedy).

1249. **Progress and Data Gaps in Quantitative Microbial Risk Assessment.**
Haas, C. N.
Water Science and Technology 46 (11-12): 277-284. (2002)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: Asian Waterqual 2001: IWA Asia-Pacific Regional Conference, Fukuoka [Japan], 12-15 Sep 2001; Source: Water Quality and Environmental Management in Asia; Editors: Kusuda, T. //Utsumi, H.;
ISBN: 18433984324
Descriptors: Water Pollution Effects/ Public Health/ Human Population/ Human Diseases/ Exposure/ Pathogens/ Reviews/ Research Priorities/ Microbiological Studies/ Pollution (Water)/ Risk analysis/ Pollution (Microbiological)/ Public health/ Pathogenic organism/ Water pollution/ risk assessment/ Effects of pollution/ Effects of Pollution/ Other water systems
Abstract: Quantitative microbial risk assessment (QMRA) has emerged as a useful tool to develop criteria for human exposures to pathogens. There is opportunity to extend the usefulness of this tool in water and other applications if new fundamental information can be obtained to complement existing data. Such information includes effects of strain and host differences, population level disease dynamics, and ability of animal data to serve as a predictor of human potency. This paper reviews the development of QMRA and outlines the nature of additional data that would be useful for its development.

1250. **Progress in wetland restoration ecology.**
Zedler, Joy B
Trends in Ecology and Evolution 15 (10): 402-407. (2000)
NAL Call #: QH540.T742;
ISSN: 0169-5347
Descriptors: biodiversity/ disturbance regimes/ habitat types/ invasive species/ landscape setting/ seed banks/ soil properties/ spatial scales/ temporal/ topography/ water preservation/ wetland restoration ecology

1251. **Projecting the bird community response resulting from the adoption of shelterbelt agroforestry practices in Eastern Nebraska.**
Pierce, R A; Farrand, D T; and Kurtz, W B
Agroforestry Systems 53 (3): 333-350. (2001)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
Descriptors: bird (Aves): community response, landscape variables/ tree (Spermatophyta)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ agroforestry: shelterbelt plantings
Abstract: Evolving agricultural policies have influenced management practices within agroecosystems, impacting available habitats for many species of wildlife. Enhancing wildlife habitat has become an explicit objective of existing agricultural policy. Thus, there is renewed focus on field borders and the use of shelterbelt agroforestry systems to achieve conservation goals in the Midwest. Two Representative Farms - a 283-ha dryland and 510-ha irrigated farm were created in Saunders County, Nebraska. The Habitat Analysis and Modeling System (HAMS) was used to describe the composition and spatial pattern of the existing farms and surrounding landscape, as well as for the landscapes surrounding selected Breeding Bird Survey (BBS) routes. Simulated land use changes resulting from the implementation of two shelterbelt scenarios, Agricultural and Wildlife, were incorporated on each Representative Farm and surrounding landscape. Landscape variables which influence breeding bird species richness and community composition as determined from BBS routes were measured on simulated farm landscapes. A more heterogeneous landscape results from implementing either scenario. The percent total woods was a significant determinant of bird species richness on the BBS routes and was important in influencing bird communities at the farm- and landscape-level. Other landscape metrics which influenced the bird community composition on BBS routes were woody edge percentages and edge density values. Policies promoting shelterbelts create edge habitats which ultimately favor birds within the Forest-edge/generalist guild while bird species in need of conservation such as grassland-field species would potentially be negatively affected.

1252. **Prospect for pathogen reductions in livestock wastewaters: A review.**
Hill, V. R.
Critical Reviews in Environmental Science and Technology 33 (2): 187-235. (2003)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389 [CRETEK.]
Descriptors: concentrated animal feeding operations/ excreta/ animal manures/ animal manure management/ disinfection/ constructed wetlands/ waste treatment
This citation is from AGRICOLA.

1253. **Prospects and limitations of phytoremediation for the removal of persistent pesticides in the environment.**
Chaudhry, Qasim; Schroeder, Peter; Werck, Reichhart Daniele; Grajek, Wlodzimierz; and Marecik, Roman
Environmental Science and Pollution Research International 9 (1): 4-17. (2002);
ISSN: 0944-1344
Descriptors: carbamate: pollutant/ organochlorine: pollutant/ organophosphate: pollutant/ plant (Plantae)/ Plants
Abstract: The environmental problems that have arisen from the use of persistent pesticides in the past, and potential sources of further contamination have been discussed. The potential and limitations of phytoremediation for removal of pesticides in the environment have been reviewed. The enzymatic processes in plants that are known to be involved in phytodegradation of pesticides, and possibilities for enhancing them have also been discussed.

1254. **Prospects for composts and biocontrol agents as substitutes for methyl bromide in biological control of plant diseases.**
De, Ceuster Tom J J and Hoitink, Harry A J
Compost Science and Utilization 7 (3): 6-15. (1999)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: methyl bromide: pollutant, soil fumigant/ organic matter/ plant nutrients/ biological control/ composts: disease supressive effects/ disease control
Abstract: Methyl bromide, an effective soil fumigant for control of soilborne plant pathogens, is scheduled to be phased out by 2005 because of its negative impacts on the environment. Many chemical alternatives to methyl bromide have been proposed but so far, none have proved as effective. Composts have long been recognized to provide a degree of control of diseases caused by soilborne plant pathogens. For this reason, disease-suppressive effects of composts have been investigated intensively over the past two decades. Many compost quality factors must be controlled to obtain consistent effects with these organic amendments. The composition of the organic matter from which the compost is prepared, the composting process itself, the stability or maturity of the compost, the quantity of available plant nutrients provided by the compost, loading rates, time of application, and other factors all must be controlled. These and other factors are reviewed in this paper. Despite these difficulties, the use of compost for disease control is increasing rapidly. The nursery industry for decades has taken advantage of this benefit associated with compost utilization. © Thomson

1255. **Prospects for minimizing phosphorus excretion in ruminants by dietary manipulation.**
Valk, H.; Metcalf, J. A.; and Withers, P. J. A.
Journal of Environmental Quality 29 (1): 28-36. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

1256. **Prospects for reducing environmental risk at the watershed level from pesticide loss from farm fields using alternative management practices.**
Bagdon, Joe; Plotkin, Steve; Hesketh, Eric; Kellogg, Robert L.; and Wallace, Susan.
In: 53rd Annual Soil and Water Conservation Service Conference. (Held 5 Jul 1998-9 Jul 1998 at San Diego, California.)
Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service; 1998.
Notes: Title from web page. Description based on content viewed May 16, 2003. "Poster presensted at the 53rd annual SWCS Conference, San Diego, California, July 5-9, 1998."
NAL Call #: aTD427.P35-P77-1998
http://www.nrcs.usda.gov/technical/land/pubs/naptext.html
Descriptors: Pesticides---Environmental aspects---United States/ Pesticides---Environmental aspects---United States---Measurement/ Pesticides---Toxicology---United States/ Watersheds---Environmental aspects---United States/ Watershed management---United States/ Pesticides Application---United States
This citation is from AGRICOLA.

1257. **Prospects for the drainage of clay soils.**
Rycroft, David W.; Amer, M. H.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; xii, 134 p.: ill., maps; Series: FAO irrigation and drainage paper 51. (1995)
Notes: "M-56."--T.p. verso. Includes bibliographical references (p. 123-134).
NAL Call #: S612.I754--no.51;
ISBN: 9251036241
Descriptors: Drainage/ Clay soils
This citation is from AGRICOLA.

1258. **Prospects for the recovery of phosphorus from animal manures: A review.**
Greaves J; Hobbs P; Chadwick D; and Haygarth P
Environmental Technology 20 (7): 697-708; 69 ref. (1999)
NAL Call #: TD1.E59
This citation is provided courtesy of CAB International/CABI Publishing.

1259. **Protecting and Restoring America's Watersheds: Status, Trends, and Initiatives in Watershed Management.**
U. S. Environmental Protection Agency, Office of Water Office of Wetlands Oceans and Watersheds.
U. S. Environmental Protection Agency [Also available as: EPA-B40-R-00-001], 2001 (application/pdf)
http://www.epa.gov/owow/protecting/restore725.pdf
Descriptors: watershed management/ ecological restoration/ environmental protection/ watershed hydrology/ water pollution/ chemical residues/ nutrient enrichment/ sediments/ runoff/ pathogens/ waterborne diseases/ invasive species/ environmental monitoring/ governmental programs and projects/ environmental education/ citizen participation/ partners (people)/ program planning/ program evaluation/ thermal pollution

1260. **Protecting surface water from pesticide contamination in North Dakota: Recommendations for assessment and management: A review and analysis of scientific literature.**
Seelig, Bruce Duane. and NDSU Extension Service.
Fargo, N.D.: NDSU Extension Service; 50 p.: ill., maps; Series: Extension report (NDSU Extension Service) no. 37. (1998)
Notes: Cover title. "April 1998." Includes bibliographical references (p. 19-25).
NAL Call #: S451.N9E98-no.37
Descriptors: Pesticides---Environmental aspects---North Dakota/ Pesticides Risk mitigation---North Dakota/ Water---Pollution---Research---North Dakota
This citation is from AGRICOLA.

1261. **Protocol for developing pathogen TMDLs.**
United States. Environmental Protection Agency. Office of Water.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Water; 1 v. (various pagings): ill. (2001)
Notes: 1st ed.; "January 2001." Includes bibliographical references.
NAL Call #: TD427.M53-P76-2001
http://www.epa.gov/owow/tmdl/pathogen_all.pdf

Descriptors: Pathogenic microorganisms---Environmental aspects---United States/ Water---Pollution---Total daily maximum load
This citation is from AGRICOLA.

1262. **Protocol for developing sediment TMDLs.**
Smith, David W.; Craig, John.; Sediment Protocol Development Team (U.S.); and United States. Environmental Protection Agency. Office of Water.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Water; 1 v. (various pagings): ill. (1999)
Notes: 1st ed.; "October 1999." This paper was written by EPA's Sediment Protocol TMDLs Team, led by David W. Smith, with assistance from John Craig. "EPA 841-B-99-004." Includes bibliographical references.
NAL Call #: TD423-.S65-1999
http://www.epa.gov/owow/tmdl/sediment/pdf/sediment.pdf
Descriptors: Water---Pollution---Total maximum daily load/ Sedimentation and deposition---United States
This citation is from AGRICOLA.

1263. **Public scholarship: Linking weed science with public work.**
Jordan, N.; Gunsolus, J.; Becker, R.; and White, S.
Weed Science 50 (5): 547-554. (Sept. 2002-Oct. 2002)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: weeds/ weed control/ sustainability/ agricultural research/ interdisciplinary research/ innovation adoption/ public works/ case studies/ guidelines/ integrated pest management/ literature reviews
Abstract: Weed scientists face complex and difficult challenges. Within our discipline, we must increase the sustainability of current weed management approaches and help respond to invasive plants as a component of global change. There also are major challenges that we share with other agricultural disciplines, such as mounting comprehensive efforts to address the problems of current agriculture. We believe that any effective response to these challenges will require public work, i.e., projects in which a diverse group of people work together-across lines of difference (professional, cultural, etc.)-to produce broad-based, systemic innovations that meet complex challenges. We propose that weed scientists should join relevant public-work projects by practicing "public scholarship." We define public scholarship as original, creative, peer-evaluated intellectual work that is fully integrated in a public-work project. By full integration we mean that the scholar's work serves to fuel the social (i.e., collective) learning of the public-work group. This condition requires that the scholar be a full participant in the group rather than just being in a consultative or advisory role. We present several case studies of weed scientists practicing public scholarship. These scientists found this mode of scholarship to be a highly effective means by which to address their professional priorities. Barriers to the practice of public scholarship include the lack of relevant guidelines and norms within academic culture, e.g., with regard to quality-assurance standards. But public scholarship offers weed scientists a new way of responding to increasingly urgent demands to show that our work. effectively produces public value in return for public investment. We believe that graduate programs in weed science should begin to offer students opportunities to learn skills that are relevant to public scholarship.
This citation is from AGRICOLA.

1264. **Pulse crop adaptation in the Northern Great Plains.**
Miller, P. R.; McConkey, B. G.; Clayton, G. W.; Brandt, S. A.; Staricka, J. A.; Johnston, A. M.; Lafond, G. P.; Schatz, B. G.; Baltensperger, D. D.; and Neill, K. E.
Agronomy Journal 94 (2): 261-272. (2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962
This citation is provided courtesy of CAB International/CABI Publishing.

1265. **The quality of our nation's waters: Nutrients and pesticides.**
Fuhrer, Gregory J. and Geological Survey (U.S.).
Reston, Va: U.S. Dept. of the Interior, U.S. Geological Survey. (1999)
Notes: Caption title.;
ISBN: 0607922966
http://water.usgs.gov/pubs/circ/circ1225/
Descriptors: Nutrient pollution of water---United States/ Pesticides---Environmental aspects---United States/ Water quality---United States
This citation is from AGRICOLA.

1266. **Quantification of compaction effects on soil physical properties and crop growth.**
Ahuja, L. R. and Hatano, R.
Geoderma 116 (1/2): 107-136. (2003)
NAL Call #: S590.G4;
ISSN: 0016-7061
This citation is provided courtesy of CAB International/CABI Publishing.

1267. **Quantifying and characterizing contemporary riparian sedimentation.**
Steiger, J.; Gurnell, A. M.; and Goodson, J. M.
River Research and Applications 19 (4): 335-352. (2003)
NAL Call #: TC530 R43;
ISSN: 1535-1459.
Notes: Number of References: 114
Descriptors: Environment/ Ecology/ sediment traps/ sedimentation/ river margins/ riparian wetlands/ floodplains / hydroecology/ fresh water wetlands/ floodplain sedimentation/ salt marsh/ overbank deposition/ inundation forest/ plant communities/ sand deposition/ extreme flood/ taruma mirim/ seed banks
Abstract: Fluvial processes of erosion, sediment transport and deposition determine the changing form and sedimentary structure of naturally adjusting riparian zones. Riparian sediment storage has both scientific and management importance in relation to: (i) the quantities of sediment that are involved; (ii) the quality of the sediment; and (iii) the dispersal of biological materials, notably the vegetation propagules that are transported and deposited in association with the sediment. After discussing the significance of riparian sedimentation processes, this paper reviews methods for quantifying contemporary sediment deposition within water bodies and their margins. Methods for investigating contemporary riparian sedimentation are given particular emphasis, and the extent to which different methods provide comparable estimates and have been used to support the analysis of different physical and chemical properties of the sediment are outlined. The importance of the following are stressed: (i) selecting a sampling method that is suited to the sedimentation environment; (ii) incorporating careful cross-calibration if measurements from different methods are to be combined; and (iii)

replicating measurements to give more robust estimates if small traps are employed. It is concluded that artificial turf mats provide a useful design of sediment trap across a range of environmental conditions because: (i) their surface roughness reduces problems of sediment removal by flood waters or rainfall; (ii) their pliability permits installation on irregular surfaces; (iii) they can be securely attached to the ground with metal pins to resist high shear stresses from river flows; (iv) they are robust and light and so easily manipulated in the field and laboratory; (v) it is possible to fully recover the deposited sediment to accurately determine the amount of sediment deposited and to support a range of other analyses. Results are presented to illustrate how artificial turf mats can be used to estimate the quantity and quality of deposited sediment and to explore the associated deposition of viable seeds. This provides one example of the important hydroecological role of riparian sedimentation processes and of the potential for the development of innovative, interdisciplinary research on riparian sediment dynamics.

1268. **Quantifying phosphorus losses from the agricultural system.**
Lemunyon, J. L. and Daniel, T. C.
Journal of Soil and Water Conservation 57 (6): 399-401. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: phosphorus/ losses from soil/ quantitative techniques/ measurement/ agricultural soils/ agricultural land/ water erosion/ sediment yield/ runoff/ leaching/ drainage/ crops/ harvesting
This citation is from AGRICOLA.

1269. **Quantifying the loss mechanisms of nitrogen.**
Delgado, J. A.
Journal of Soil and Water Conservation 57 (6): 389-398. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: nitrogen fertilizers/ nitrogen/ losses from soil/ nitrate/ leaching/ denitrification/ soil fertility/ measurement/ pollution control/ agricultural soils/ soil properties/ literature reviews/ nutrient management
This citation is from AGRICOLA.

1270. **A quantitative summary of attitudes toward wolves and their reintroduction (1972-2000).**
Williams, Christopher K; Ericsson, Goran; and Heberlein, Thomas A
Wildlife Society Bulletin 30 (2): 575-584. (2002)
NAL Call #: SK357.A1W5;
ISSN: 0091-7648
Descriptors: Canis [wolf] (Canidae)/ human (Hominidae)/ Animals/ Carnivores/ Chordates/ Humans/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Primates/ Vertebrates/ age/ attitudes towards wolves/ education/ experience/ farming / income/ negative attitudes/ positive attitudes/ ranching/ restoration/ rural residence/ urbanization/ wolf reintroduction
Abstract: This paper reports an analysis of support for wolves (Canis spp.) reported in 38 quantitative surveys conducted between 1972 and 2000. Of 109 records reported in these surveys, a majority (51%) showed positive attitudes toward wolves and 60% supported wolf restoration. Attitudes toward wolves had a negative correlation with age, rural residence, and ranching and farming occupations, and positive correlation with education and income. Thirty-five percent of ranchers and farmers surveyed had positive attitudes toward wolves. Among surveys of the general population samples, 61% expressed positive attitudes. Surveys of environmental and wildlife groups showed an average of 69% support. Surveys in the lower 48 states showed higher proportions of positive attitudes than surveys in Scandinavia and Western Europe, where a majority did not support wolves. Among all surveys, 25% of respondents had neutral attitudes toward wolves. Positive attitudes toward wolves did not appear to be increasing over time. Because attitudes toward wolves are often not strong among the general public, they have the potential to change rapidly if linked to other, stronger attitudes and beliefs. We expect that progress in education and urbanization will lead to increasingly positive attitudes over time. Negative attitudes associated with age are probably a cohort effect, and we should not expect the aging populations in the United States and Europe to lead to more negative wolf attitudes. Paradoxically, successful wolf reintroductions are likely to reduce general positive sentiment, since the presence of wolves gives people a more balanced experience with the animals. Traditionally, people with the most positive attitudes toward wolves have been those with the least experience.

1271. **Rainfall Intensity-Kinetic Energy Relationships: A Critical Literature Appraisal.**
Van Dijk, Aijm; Bruijnzeel, L. A.; and Rosewell, C. J.
Journal of Hydrology 261 (1-4): 1-23. (2002)
NAL Call #: 292.8 J82;
ISSN: 0022-1694
Descriptors: Erosion/ Rainfall Intensity/ Kinetic Energy/ Prediction/ Mathematical Equations/ Literature Review/ Comparison Studies/ Performance Evaluation/ Precipitation (Atmospheric)/ Kinetics/ Mathematical analysis/ Soil erosion/ Rainfall erosion/ Australia/ Erosion and sedimentation/ Water Resources and Supplies/ Intensity of precipitation/ Intensity
Abstract: Knowledge of the relationship between rainfall intensity and kinetic energy and its variations in time and space is important for erosion prediction. However, between studies considerable variations exist in the reported shape and coefficients of this relationship. Some differences can be explained by methods of measurement and interpretation and sample size, range and bias, while

part of the variability corresponds to actual differences in rainfall generating mechanisms. The present paper critically reviews published studies of rainfall intensity and kinetic energy with a view to derive a general predictive equation of an exponential form. The performance of this general equation is compared to that of existing equations using measured rainfall intensity and kinetic energy data for a site in southeastern Australia. It appeared that the energy of individual storms could only be predicted with limited accuracy because of natural variations in rainfall characteristics. By and large, the general equation produced energy estimates that were within 10% of predictions by a range of parameterisations of the exponential model fitted to specific data-sets. Re-calculation of rainfall erosivity factors as obtained by the older and revised USLE approaches does not seem warranted for most locations. However, in regions experiencing strong oceanic influence or at high elevations, overall rainfall energy appears to be considerably lower than predicted by the general or USLE equations. Conversely, data collected at semi-arid to sub-humid locations suggest that rainfall energy may be higher than expected under those conditions. Standardised measurements are needed to evaluate rainfall intensity-kinetic energy relationships for such areas.
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1272. **Rangeland cover types of the United States: Forest cover types of the United States and Canada.**
Shiflet, Thomas N. and Society for Range Management.
Denver, Colo.: Society for Range Management; xii, 152 p. (1994)
Notes: 1st ed.; "'Companion' publication to the 'Forest cover types of the United States and Canada (1980)'"--P. ix. Includes bibliographical references (p. [142]-152).
NAL Call #: QK115.R36--1994;
ISBN: 1884930018
Descriptors: Range plants---United States/ Rangelands---United States/ Range management---United States/ Range ecology---United States
This citation is from AGRICOLA.

1273. **Rangeland desertification.**
Olafur Arnalds. and Archer, Steve.
Dordrecht; Boston: Kluwer Academic Publishers; x, 209 p.: ill., maps; Series: Advances in vegetation science 19. (2000)
NAL Call #: QK1-.A48-v.-19;
ISBN: 0792360710 (HB: alk. paper)
Descriptors: Rangelands/ Desertification/ Range ecology
This citation is from AGRICOLA.

1274. **Rangeland ecology and management.**
Heady, Harold F.; Child, R. Dennis; and Heady, Harold F.
Boulder: Westview Press; xvi, 519 p.: ill.; 24 cm. (1994)
Notes: Rev. ed. of: Rangeland management. 1975. Includes bibliographical references and index.
NAL Call #: SF85.H39--1994;
ISBN: 0813320526 (alk. paper):
Descriptors: Range management/ Range ecology
This citation is from AGRICOLA.

1275. **Rangeland handbook for British Columbia.**
Campbell, C. W.; Bawtree, A. H.; and British Columbia Cattlemen's Association.
Kamloops, BC: British Columbia Cattlemen's Association; 203 p.: ill. (some col.), col. maps. (1998)
Notes: "December 1998." Includes bibliographical references.
NAL Call #: SF85.4.C2-C34-1998;
ISBN: 0968402402
Descriptors: Range management---British Columbia/ Range ecology---British Columbia
This citation is from AGRICOLA.

1276. **Rangeland health attributes and indicators for qualitative assessment.**
Pyke, D. A.; Herrick, J. E.; Shaver, P.; and Pellant, M.
Journal of Range Management 55 (6): 584-597. (Nov. 2002)
NAL Call #: 60.18-J82;
ISSN: 0022-409X [JRMGAQ]
Descriptors: grasslands/ grassland condition/ range condition/ range management/ assessment/ rapid methods/ hydrological factors/ soil structure/ rill erosion/ overland flow/ ground cover/ gullied land/ wind erosion/ litter plant/ flow resistance/ soil morphology/ soil compaction/ vegetation/ mortality/ biomass production/ introduced species/ perennials/ data collection/ ecological balance/ literature reviews/ United States/ soil surface/ invasive species
Abstract: Panels of experts from the Society for Range Management and the National Research Council proposed that status of rangeland ecosystems could be ascertained by evaluating an ecological site's potential to conserve soil resources and by a series of indicators for ecosystem processes and site stability. Using these recommendations as a starting point, we developed a rapid, qualitative method for assessing a moment-in-time status of rangelands. Evaluators rate 17 indicators to assess 3 ecosystem attributes (soil and site stability, hydrologic function, and biotic integrity) for a given location. Indicators include rills, water flow patterns, pedestals and terracettes, bare ground, gullies, wind scour and depositional areas, litter movement, soil resistance to erosion, soil surface loss or degradation, plant composition relative to infiltration, soil compaction, plant functional/structural groups, plant mortality, litter amount, annual production, invasive plants, and reproductive capability. In this paper, we detail the development and evolution of the technique and introduce a modified ecological reference worksheet that documents the expected presence and amount of each indicator on the ecological site. In addition, we review the intended applications for this technique and clarify the differences between assessment and monitoring that lead us to recommend this technique be used for moment-in-time assessments and not be used for temporal monitoring of rangeland status. Lastly, we propose a mechanism for adapting and modifying this technique to reflect improvements in understanding of ecosystem processes. We support the need for quantitative measures for monitoring rangeland health and propose some measures that we believe may address some of the 17 indicators.
This citation is from AGRICOLA.

1277. **Rangeland health: New methods to classify, inventory, and monitor rangelands.**
National Research Council (U.S.). Committee on Rangeland Classification.
Washington, D.C.: National Academy Press; xvi, 180 p.: ill. (1994)
Notes: Includes bibliographical references (p. 158-168) and index.

NAL Call #: SF85.3.R36--1994;
ISBN: 0309048796
http://books.nap.edu/books/0309048796/html/
Descriptors: Range management---United States/ Rangelands---United States/ Range ecology---United States / Range management/ Rangelands/ Range ecology
This citation is from AGRICOLA.

1278. **Rangeland monitoring: Water quality and riparian systems.**
Skinner, Q.
Arid Land Research and Management 17 (4): 407-428. (2003)
NAL Call #: S592.17.A73 A74.
Notes: 1532-4982
Descriptors: Environment/ Ecology/ monitoring/ water quality/ riparian zones/ sediment/ bacteria/ vegetative filter strips/ overland flow/ bacterial populations/ sediment deposition/ simulated rainfall/ stubble height/ grass filters/ management/ areas/ zones
Abstract: Ecological concepts serve as a foundation for developing a monitoring program to evaluate water quality and associated riparian systems. Ecological concepts used for developing a monitoring plan must be supported by scientific literature and related to streamflow dynamics and channel interactions. These interactions help determine natural or background habitat quality within and along river longitudinal and environmental gradients from mountains through basins in the western United States. In addition stream size, position in the watershed, and flow are related to sediment sorting, channel bank strength, and channel configuration. These relationships determine channel substrate habitat for aquatic organisms and population diversity. These habitat features may be modified by a channel's ability to store and transport sediment and associated pollutants within a watershed's drainage pattern. Sediment supply, delivery, and timing are altered by differences in snowmelt along elevation gradients, runoff from convective storms, water development history, and stream channel succession. Potential impairment of reference or background aquatic habitat in the western United States is generally sediment related and should be greater in basin river segments and during base flow conditions. Impairment sources can be shown to originate in the steep and first order tributaries of foothill and basin watersheds, and not from valley slopes where supply must cross established riparian zones. Water column, substrate disturbance, and channel bank disturbances may alter amount of sediment and bacteria pollution measured in basins and during base flow conditions.
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1279. **Rangeland resource trends in the United States: A technical document supporting the 2000 USDA Forest Service RPA assessment.**
Mitchell, John E. and Rocky Mountain Research Station
Fort Collins, CO: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station; 84 p.: ill. (some col.), maps (some col.); Series: General technical report RMRS GTR-68. (2000)
Notes: Cover title. "December 2000"--P. 4 of cover. Includes bibliographical references (p. 75-84).
NAL Call #: aSD144.A14 G46-no. 68
http://www.fs.fed.us/rm/pubs/rmrs%5Fgtr68.html
Descriptors: Range management---United States/ Rangelands---United States
This citation is from AGRICOLA.

1280. **Rangeland wildlife.**
Krausman, Paul R.
Denver, Colo.: Society of Range Management; xi, 440 p.: ill. (1996)
Notes: 1st ed.; Includes bibliographical references.
NAL Call #: SK361.R36--1996;
ISBN: 1884930050
Descriptors: Wildlife management---West---United States/ Rangelands---West---United States
This citation is from AGRICOLA.

1281. **Rapid on-farm analysis of manure nutrients using quick tests.**
Van Kessel, J. S.; Thompson, R. B.; and Reeves, J. B.
Journal of Production Agriculture 12 (2): 215-224. (Apr. 1999-June 1999)
NAL Call #: S539.5.J68;
ISSN: 0890-8524 [JPRAEN]
Descriptors: animal manures/ nutrient content/ quantitative analysis/ qualitative analysis/ techniques/ evaluation/ errors/ measurement/ equipment/ ammonium/ nitrogen content/ phosphorus/ dry matter/ specific gravity/ electrical conductivity/ potassium/ ammonium nitrogen / color/ slurries/ costs/ literature reviews/ manure management
Abstract: Quick tests enabling rapid, on-farm assessment of manure nutrient content could appreciably enhance manure management. The objectives of this study were to review the literature on the accuracy of quick tests, describe their operation, and to assess their ease of use and their suitability for routine on-farm use. These quick tests are the hydrometer, electrical conductivity (EC), ammonia electrode, reflectometer, Agros N Meter (or Nova meter), and Quantofix-N-Volumeter. The ammonia electrode provided accurate direct measurement of slurry ammonium; however, its fragility and the difficulty of setting it up, suggested limited suitability for on-farm use. The hydrometer indirectly measures total N and total P based on relationships with dry matter (total solids) content and specific gravity. Results have been variable between regions and species. Electrical conductivity is used as an indirect measurement of ammonium and K; the limited results to date have been consistently good for ammonium N, and variable for K. The Agros N Meter and Quantofix-N-Volumeter both directly measure ammonium N and possibly some organic N. For both, agreement with lab analyses of ammonium N has been generally very good. The reflectometer measures the color intensity of test strips; limited results with ammonium N in slurries are promising. Several quick tests have the potential for accurately measuring manure nutrients on the farm. They generally were more effective with slurries than solid manures. For each quick test, single farm or regional calibrations with lab analysis are recommended, and in some cases necessary.
This citation is from AGRICOLA.

1282. **Rationale and methods for conserving biodiversity in plantation forests.**
Hartley, M. J.
Forest Ecology and Management 155 (1-3): 81-95. (2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127.
Notes: Publisher: Elsevier Science
Descriptors: Plantations/ Reviews/ Conservation/ Biological diversity/ Forest management/ Management
Abstract: Industrial forest managers

and conservation biologists agree on at least two things: (1) plantation forests can play a role in conserving biodiversity, and (2) plantations will occupy an increasing proportion of future landscapes. I review literature from around the world on the relationship between biodiversity and plantation management, structure, and yield. The dynamics of plantation ecology and management necessarily differ by landscape, geographic area, ecosystem type, etc. This review provides a broad array of management recommendations, most of which apply to most regions, and many patterns are evident. I suggest a new plantation forest paradigm based on the hypothesis that minor improvements in design and management can better conserve biodiversity, often with little or no reduction in fiber production. There is ample evidence that these methods do benefit biodiversity, and can also entail various economic benefits. Adherence to these recommendations should vary by plantation type, and depending on the proportion of the surrounding landscape or region that is or will be planted. Stand-level variables to consider include socio-economic factors, native community type and structure, crop species composition, and pest dynamics. During establishment, managers should consider innovations in snag and reserve tree management (e.g. leave strips), where mature native trees and/or understory vegetation are left unharvested or allowed to regenerate. Polycultures should be favored over monocultures by planting multiple crop species and/or leaving some native trees unharvested. Native species should generally be favored over exotics. Site-preparation should favor methods that reflect natural disturbances and conserve coarse woody debris. Plantations that have already been established by traditional design can also conserve biodiversity via small modifications to operations. Earlier thinning schedules or longer rotations can strongly affect biodiversity, as can reserve trees left after plantation harvest to remain through a second rotation.

1283. **RCA III effects of sediment on the aquatic environment: Potential NRCS actions to improve aquatic habitat.**
Castro, Janine.; Reckendorf, Frank.; and United States. Natural Resources Conservation Service.
Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service, 1995. Working paper (United States. Soil Conservation Service) No. 6.
Notes: Title from web page. "August 1995." Description based on content viewed May 3, 2002. Includes bibliographical references.
NAL Call #: aQH541.5.W3-C37-1995
http://www.nrcs.usda.gov/technical/land/pubs/wp06text.html
Descriptors: Aquatic ecology---Environmental aspects---United States/ Aquatic resources conservation---United States/ Soil erosion---United States/ Soil conservation---United States/ Sediment transport---United States/ Aquatic organisms, Effect of contaminated sediments on---United States
This citation is from AGRICOLA.

1284. **RCA III sedimentation in irrigation water bodies, reservoirs, canals, and ditches.**
Reckendorf, Frank. and United States. Natural Resources Conservation Service.
Washington, D.C.: U.S. Dept. of Agriculture, NRCS, 1995. Working paper (United States. Natural Resources Conservation Service) No. 5.
Notes: Title from web page. "July 1995." Description based on content viewed May 3, 2002. Includes bibliographical references.
NAL Call #: aTC175.2-.R43-1995
http://www.nrcs.usda.gov/technical/land/pubs/wp05text.html
Descriptors: Sediment transport---United States/ Irrigation water---United States/ Irrigation water---Pollution---United States/ Irrigation---Environmental aspects---United States
This citation is from AGRICOLA.

1285. **A re-appraisal of Painter's mechanisms of plant resistance to insects, with recent illustrations.**
Manglitz, George R. and Danielson, Stephen D.
Agricultural Zoology Reviews 6: 259-276. (1994);
ISSN: 0269-0543
Descriptors: Arthropoda (Arthropoda Unspecified)/ animals/ arthropods/ invertebrates/ Biological Control/ Integrated Pest Management/ Agronomy (Agriculture)/ Economic Entomology/ Physiology

1286. **Re-engineering irrigation management and system operations.**
Renault, D.
Agricultural Water Management 47 (3): 211-226. (Apr. 2001)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774 [AWMADF]
Descriptors: water management/ irrigation systems/ canals/ literature reviews
This citation is from AGRICOLA.

1287. **Reactions of phosphorus with sediments in fresh and marine waters.**
House, W A; Jickells, T D; Edwards, A C; Praska, K E; and Denison, F H
Soil Use and Management 14 (supplement): 139-146. (1998)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: phosphorus/ coastal waters/ estuaries/ freshwater/ marine water/ rivers/ salinity/ sediment reactions/ soil erosion/ transport processes
Abstract: The interactions of P with soils and sediments are examined in the context of transport processes from land, through rivers to estuaries and coastal waters. In soil erosion, selective size fractionation and preferential sorption to finer solids is crucial in the transport of P to water courses. Problems in quantifying the sorption affinity and equilibrium phosphate concentration (EPC) of mixtures of different soils and sediments are identified. Riverine transport of P by suspended solids is usually very important and examples of the changes in the amount and composition of particulate P (PP) concentration during storm events are discussed. Increased P content of solids during the first autumn storms, probably reflect the resuspension of accumulated stream bed-deposits. The fate of P in estuaries and their importance as possible long-term sinks of P are discussed. The relatively high concentrations of dissolved P associated with riverine inputs are to some extent buffered by the relatively high concentrations of suspended sediments resulting from

tidal flows. Phosphorus may be released during transport to the sea due to decreases in the EPC, increases in salinity and release from bottom sediments as a result of low oxygen conditions.

1288. **Realizing the potential of integrated irrigation and drainage water management for meeting crop water requirements in semi-arid and arid areas.**
Ayars, J. E.; Hutmacher, R. B.; Schoneman, R. A.; Soppe, R. W. O.; Vail, S. S.; and Dale, F.
Irrigation and Drainage Systems
13 (4): 321-347. (1999)
NAL Call #: TC801.I66;
ISSN: 0168-6291 [IRDSEG]
Descriptors: crops/ gossypium hirsutum/ lycopersicon esculentum/ groundwater/ water uptake/ plant water relations/ saline water/ irrigation/ drainage systems/ salinity/ water quality/ irrigation water/ irrigation scheduling/ evapotranspiration/ leaf water potential/ high water tables/ literature reviews/ subsurface drainage/ arid lands/ semiarid zones/ shallow groundwater
Abstract: In situ use of ground water by plants is one option being considered to reduce discharge of subsurface drainage water from irrigated agriculture. Laboratory, lysimeter, and field studies have demonstrated that crops can use significant quantities of water from shallow ground water. However, most studies lack the data needed to include the crop water use into an integrated irrigation and drainage water management system. This paper describes previous studies which demonstrated the potential use of ground water to support plant growth and the associated limitations. Included are results from three field studies which demonstrated some of the management techniques needed to develop an integrated system. The field studies demonstrated that approximately 40 to 45% of the water requirement for cotton can be derived from shallow saline ground water. That regulation of the outflow will result in increasing use. Implementation of integrated management of irrigation and subsurface drainage systems is a viable and sustainable alternative in the management of subsurface drainage water from arid and semi-arid areas only if soil salinity can be managed and if the system is profitable.
This citation is from AGRICOLA.

1289. **Recent advances in the residue analysis of N-methylcarbamate pesticides.**
Yang, S S; Goldsmith, A I; and Smetena, I
Journal of Chromatography A
754 (1-2): 3-16. (1996)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: analytical method/ gas chromatography/ GC/ high performance liquid chromatography/ HPLC/ immunoassay/ methodology/ N methylcarbamate pesticides/ pesticides/ residue analysis/ spectrophotometry/ supercritical fluid chromatography/ thin layer chromatography/ TLC
Abstract: This paper highlights recent advances in the determination of methylcarbamate residues in water, soil and plant tissues. Chromatographic analyses (e.g., HPLC, GC, supercritical fluid chromatography and TLC) with various sample pretreatment procedures and detection methods are reviewed. More generally, some non-chromatographic techniques such as immunoassay, biosensor and spectrophotometry are included.

1290. **Recent advances in the thin-layer chromatography of pesticides: A review.**
Sherma, J.
Journal of AOAC International
86 (3): 602-611. (2003);
ISSN: 1060-3271
This citation is provided courtesy of CAB International/CABI Publishing.

1291. **Recent advances in thin-layer chromatography of pesticides.**
Sherma, J.
Journal of AOAC International
84 (4): 993-999. (July-Aug. 2001)
NAL Call #: S583.A7;
ISSN: 1060-3271 [JAINEE]
Descriptors: pesticides/ pesticide residues/ thin layer chromatography/ food contamination/ polluted water/ polluted soils/ literature reviews/ high performance thin layer chromatography
Abstract: Advances in the applications of thin-layer chromatography (TLC) and high-performance thin-layer chromatography (HPTLC) for the separation, detection, and qualitative and quantitative determination of pesticides, other agrochemicals, and related compounds are reviewed for the period 1998-2000. Analyses are covered for a variety of samples, such as food, biological, and environmental, and for residues of pesticides of various types, including insecticides, herbicides, and fungicides, belonging to different chemical classes. References on formulation analysis, hydrophobicity studies, and the use of TLC and thin-layer radiochromatography (TLRC) for studies of pesticide metabolism, degradation, uptake, and related studies are also included.
This citation is from AGRICOLA.

1292. **Recent and future developments of liquid chromatography in pesticide trace analysis.**
Hogendoorn, Elbert and Zoonen, Piet van
Journal of Chromatography A
892 (1-2): 435-453. (2000)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: pesticides: analysis
Abstract: Until recently, the application of liquid chromatography (LC) in pesticide analysis was usually focused on groups of compounds or single compounds for which no suitable conditions were available for analysis with gas chromatography (GC). However, recent developments in both detection and column material technology show that LC significantly enlarged its scope in this field of analysis. Obviously, the most striking example is the rather abrupt transition of LC coupled to mass spectrometric detection (MS) from an experimental and scientifically fashionable technique to a robust, sensitive and selective detection mode rendering LC-MS being increasingly used in pesticide trace analysis. Other recent major developments originate from the innovation of new LC column packing materials, viz. immuno-affinity sorbents, restricted access medium materials and molecular imprinted polymers improving considerably the screening of polar pesticides by means of reversed-phase LC with UV detection. In this review the merits and perspectives of these important LC developments and their impact to

current and future applications in pesticide trace analysis are presented and discussed.

1293. **Recent development in poultry waste digestion and feather utilization: A review.**
Shih, J. C. H.
Poultry Science 72 (9): 1617-1620. (Sept. 1993)
NAL Call #: 47.8-Am33P;
ISSN: 0032-5791 [POSCAL]
Descriptors: feathers/ anaerobic digesters/ poultry manure/ bacillus licheniformis/ proteinases/ feather meal/ digestibility/ feed additives/ literature reviews/ keratinase
Abstract: The intensive and large-scale production of food animals and animal products has generated an enormous waste disposal problem for the animal industry. These wastes, which include animal excreta, mortalities, hair, feathers, and processing wastes, are largely organic materials and are convertible to useful resources. Making the conversion processes efficient and economical presents a great challenge to modern biotechnology. An efficient thermophilic anaerobic digester system has been developed that converts animal manure to methane for an energy source, solid residues for feed supplements, and liquid nutrients for aquaculture. This digester system also destroys pathogens and thus protects environmental health. During the development of this system, a feather-degrading bacterium was discovered and identified as a thermophilic Bacillus licheniformis, Strain PWD-1. The bacterium can ferment and convert feathers to feather-lysate, a digestible protein source for feed use. An enzyme, keratinase, secreted by this bacterium was purified and characterized. This keratinase is a potent protease that hydrolyzes all proteins tested, including collagen, elastin, and feather keratin. When the enzyme was mixed as an additive in feed, it significantly enhanced the digestibility of feather meal in chickens. In addition to feed technology, the bacterium and the enzyme are believed to have many other industrial and environmental applications.
This citation is from AGRICOLA.

1294. **Recent developments in broadly applicable structure-biodegradability relationships.**
Jaworska, J. S.; Boethling, R. S.; and Howard, P. H.
Environmental Toxicology and Chemistry 22 (8): 1710-1723. (2003)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
This citation is provided courtesy of CAB International/CABI Publishing.

1295. **Recommendations of the Commission on 21st Century Production Agriculture.**
Young E and Effland A
Agricultural Outlook (AO) 280: 20-23. (2001)
NAL Call #: aHD1751.A422
This citation is provided courtesy of CAB International/CABI Publishing.

1296. **Recovery in complex ecosystems.**
O'Neill, Robert V
Journal of Aquatic Ecosystem Stress and Recovery 6 (3): 181-187. (1998)
NAL Call #: QH541.5.W3 J68;
ISSN: 1386-1980
Descriptors: acid particulates/ pollutants/ toxins/ copper/ nickel/ acid damaged lakes/ aquatic ecosystems/ biological communities/ chemical recovery/ ecotoxicology/ emission reductions/ habitat quality/ lake catchments/ lake water quality/ metal damaged lakes/ sediments/ weather related variations
Abstract: Current ecosystem theory has a deceptively simple representation of recovery. In actual practice, recovery is affected by the frequency and extent of disturbances and by the spatial heterogeneity of the ecological system. Environmental changes may pass through thresholds causing recovery to a different plant and animal community. The sheer complexity of the system combined with unanticipated synergistic effects can make recovery trajectories difficult or impossible to predict. New theoretical constructs, based on stochastic nonlinear theory, will be needed to guide research and applications.

1297. **Recycled poultry bedding as cattle feed.**
Rankins, D. L. Jr.; Poore, M. H.; Capucille, D. J.; and Rogers, G. M.
Veterinary Clinics of North America, Food Animal Practice 18 (2): 253-266. (2002);
ISSN: 0749-0720
This citation is provided courtesy of CAB International/CABI Publishing.

1298. **Reducing erosion and nutrient loss with perennial grasses.**
Hairsine, P. and Prosser, I.
Australian Journal of Soil and Water Conservation 10 (1): 8-14. (1997)
NAL Call #: 56.8 Au7;
ISSN: 1032-2426
This citation is provided courtesy of CAB International/CABI Publishing.

1299. **Reducing nitrate in water resources with modern farming systems: MSEA water quality.**
Wiese, Richard A.; Flowerday, A. Dale; and Power, J. F.
Ames: Iowa State University, University Extension; 18 p.: col. ill., col. map. (2000)
Notes: On cover: MSEA water quality, Management Systems Evaluation Areas. "December 1998." Sponsor: USDA Management Systems Evaluation Areas (Project).
NAL Call #: S587.5.N5-W53-2000
Descriptors: Nitrogen in agriculture---Middle West/ Water quality management---Middle West/ Water Nitrogen content---Middle West/ Agricultural systems---Middle West
This citation is from AGRICOLA.

1300. **Reducing nitrogen flow to the Gulf of Mexico: Strategies for agriculture.**
Peters, M.; Ribaudo, M.; Claassen, R.; and Heimlich, R.
Agricultural Outlook (AO) 266: 20-24. (Nov. 1999)
NAL Call #: aHD1751.A42;
ISSN: 0099-1066 [AGOUD7]
Descriptors: pollution control/ United States
This citation is from AGRICOLA.

1301. **Reducing nutrient loads, especially nitrate-nitrogen, to suface water, ground water, and the Gulf of Mexico: Topic 5, Report for the integrated assessment on hypoxia in the Gulf of Mexico.**
Mitsch, W. J.; Day, J. W.; Gilliam, J. W.; Groffman, P. M.; Hey, D. L.; Randall, G. W.; and Wang, N.
NOAA Coastal Ocean Program, 1999.
Notes: 111 p. (application/pdf)
http://www.nos.noaa.gov/products/hypox_t5final.pdf
Descriptors: pollution load/ nitrate nitrogen/ surface water/ groundwater/ Gulf of Mexico/ hypoxia/ nonpoint source pollution/ agricultural runoff/ water pollution/ nitrate fertilizers/ fertilizer application/ precipitation/ riparian buffers/ pollution control

1302. **Reducing phosphorus runoff and improving poultry production with alum.**
Moore, P. A. Jr.; Daniel, T. C.; and Edwards, D. R.
Poultry Science 78 (5): 692-698. (May 1999)
NAL Call #: 47.8-Am33P;
ISSN: 0032-5791 [POSCAL]
Descriptors: poultry manure/ phosphorus/ runoff water/ solubility/ ammonia/ aluminum sulfate/ volatile compounds/ cost benefit analysis/ pH/ air quality/ broiler production/ slaughter weight/ production costs/ application to land
Abstract: This is a review paper on the effects of aluminum sulfate (alum) on ammonia volatilization and P runoff from poultry litter. Initially, laboratory studies were conducted that showed P solubility could be reduced in poultry litter with Al, Ca, and Fe amendments, indicating that these amendments may reduce P runoff. These results were confirmed in small plot studies in which alum applications to litter were shown to decrease P concentrations in runoff by as much as 87%, while improving tall fescue yields. Leaf tissue analyses indicated that the yield improvements were due to increased N availability, which we hypothesized was due to reduced NH(3) volatilization. This result was confirmed in laboratory studies that showed that alum was one of the most effective (and cost-effective) compounds for reducing NH(3) volatilization. Field trials conducted at commercial broiler farms in conjunction with the Environmental Protection Agency showed that alum additions to poultry litter lowered litter pH, particularly during the first 3 to 4 wk of each growout, which resulted in less NH(3) volatilization and lower atmospheric NH(3). Ammonia volatilization rates were reduced by 97% for the first 4 wk of the growout. Broilers grown on alum-treated litter were heavier than the controls (1.73 vs 1.66 kg) and had lower mortality (3.9 vs 4.2%) and better feed efficiency (1.98 vs 2.04). Electricity and propane use were lower for alum-treated houses. As a result of these economic benefits to the integrator and grower, the benefit:cost ratio of alum addition was 1.96. Phosphorus concentrations in runoff from small watersheds were 75% lower from alum-treated litter than normal litter over a 3-yr period. Long-term small plot studies on alum use have shown that alum-treated litter results in lower soil test P levels than normal litter and does not increase Al availability in soils or uptake by plants.
This citation is from AGRICOLA.

1303. **Reducing rumen methane emissions through elimination of rumen protozoa.**
Hegarty, R S
Australian Journal of Agricultural Research 50 (8): 1321-1327. (1999)
NAL Call #: 23 Au783;
ISSN: 0004-9409
Descriptors: hydrogen / methane: control, emission/ methanogen (Methanogenic Archaeobacteria)/ protozoa (Protozoa)/ ruminant (Artiodactyla): host/ Animals/ Archaebacteria/ Artiodactyls/ Bacteria/ Chordates/ Invertebrates/ Mammals/ Microorganisms/ Nonhuman Mammals/ Nonhuman Vertebrates/ Protozoans/ Vertebrates/ defaunation/ protozoal elimination/ symbiosis
Abstract: Methanogens living on and within rumen ciliate protozoa may be responsible for up to 37% of the rumen methane emissions. In the absence of protozoa, rumen methane emissions are reduced by an average of 13% but this varies with diet. Decreased methane emissions from the protozoa-free rumen may be a consequence of: (1) reduced ruminal dry matter digestion; (2) a decreased methanogen population; (3) an altered pattern of volatile fatty acid production and hydrogen availability; or (4) increased partial pressure of oxygen in the rumen. The decline in methanogenesis associated with removal of protozoa is greatest on high concentrate diets and this is in keeping with protozoa being relatively more important sources of hydrogen on starch diets, because many starch-fermenting bacteria do not produce H2. Because protozoa also decrease the supply of protein available to the host animal, their elimination offers benefits in both decreasing greenhouse gas emissions and potentially increasing livestock production. Strategies for eliminating protozoa are reviewed. None of the available techniques is considered practical for commercial application and this should be addressed.
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1304. **Reducing tillage intensity: A review of results from a long-term study in Germany.**
Tebrugge, F. and During, R. A.
Soil and Tillage Research 53 (1): 15-28. (1999)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1305. **Reference materials for the monitoring of the aquatic environment: A review with special emphasis on organic priority pollutants.**
Bercaru, O.; Gawlik, B. M.; Ulberth, F.; and Vandecasteele, C.
Journal of Environmental Monitoring 5 (4): 697-705. (2003);
ISSN: 1464-0325
This citation is provided courtesy of CAB International/CABI Publishing.

1306. **Reforestation of bottomland hardwoods and the issue of woody species diversity.**
Allen, J. A.
Restoration Ecology 5 (2): 125-134. (June 1997)
NAL Call #: QH541.15.R45R515;
ISSN: 1061-2971
Descriptors: trees/ reforestation/ species diversity/ spatial distribution/ river basins/ Mississippi/ Reclamation/ Temperate forests/ United States
Abstract: Bottomland hardwood forests in the southcentral United States have been cleared extensively for agriculture, and many of the remaining forests are fragmented and degraded. During the last decade, however, approximately 75,000 ha of land - mainly agricultural fields - have been replanted or contracted for replanting, with many more acres likely to be reforested in the near

future. The approach used in most reforestation projects to date has been to plant one to three overstory tree species, usually Quercus spp. (oaks), and to rely on natural dispersal for the establishment of other woody species. I critique this practice by two means. First, a brief literature review demonstrates that moderately high woody species diversity occurs in natural bottomland hardwood forests in the region. This review, which relates diversity to site characteristics, serves as a basis for comparison with stands established by means of current reforestation practices. Second, I reevaluate data on the invasion of woody species from an earlier study of 10 reforestation projects in Mississippi, with the goal of assessing the likelihood that stands with high woody species diversity will develop. I show that natural invasion cannot always be counted on to produce a diverse stand, particularly on sites more than about 60 m from an existing forest edge. I then make several recommendations for altering current reforestation practices in order to establish stands with greater woody species diversity, a more natural appearance, and a more positive environmental impact at scales larger than individual sites.

1307. **Regional and global hydrology and water resources issues: The role of international and national programs.**
Sorooshian, Soroosh; Whitaker, Martha P L; and Hogue, Terri S
Aquatic Sciences 64 (4): 317-327. (2002);
ISSN: 1015-1621
Descriptors: Global Energy and Water Cycle Experiment Program [GEWEX Program]/ climate change/ climate variability/ hydrology: global, regional/ international programs/ national programs/ population growth/ precipitation measurements/ riparian areas/ satellite methods/ semiarid regions/ water cycles/ water policy/ water resources issues
Abstract: This paper presents an overview of water resources issues in the context of world population growth, climate change, and variability, and provides examples of how these issues affect local and regional water policy concerns. Also discussed is the associated research of the international scientific community in regard to physically-based modeling of the hydrological cycle, with special focus on the Global Energy and Water cycle EXperiment (GEWEX) Programme. The critical role of precipitation measurements for climate model accuracy is emphasized, with a review of several satellite methods and strategies for improving precipitation measurements. Finally, the impact of semiarid regions on global hydrologic issues is underscored with a review of research conducted by SAHRA, the National Science Foundation Science and Technology Center dedicated to Sustainability of semi-Arid Hydrology and Riparian Areas.

1308. **Regional monitoring for disease prediction and optimization of plant protection measures: The IPM wheat model.**
Verreet, J. A.; Klink, H.; and Hoffmann, G. M.
Plant Disease 84 (8): 816-826. (2000)
NAL Call #: 1.9-P69P;
ISSN: 0191-2917 [PLDIDE]
Descriptors: triticum aestivum/ plant diseases/ monitoring/ prediction/ integrated pest management/ intensive production/ plant pathogens/ epidemiology/ developmental stages/ diagnosis/ plant disease control/ symptoms/ literature reviews/ Germany
This citation is from AGRICOLA.

1309. **Regional producer workshops: Constraints to the adoption of integrated pest management.**
Sorensen, A. Ann.; United States. Environmental Protection Agency; and National Foundation for Integrated Pest Management Education (U.S.).
Austin, Tex.: National Foundation for IPM Management Education; 60 p. (1993)
Notes: "March-April, 1993." "Sponsored by the U.S. Environmental Protection Agency"--P. 1. Partially funded by the Office of Pesticide Programs, Office of Prevention, Pesticides and Toxic Substances, U.S. Environmental Protection Agency. CR820822; Contents note: "California Fruit and Vegetable IPM Workshops were held at: Monterey, California, March 4, 1993: Fresno, California, March 5, 1993 -- Illinois/Iowa/Indiana Corn and Soybean IPM Workshop: Bloomington, Illinois, March 16 1993 -- Pennsylvania Apple IPM Workshop: Gettysburg, Pennsylvania, April 1, 1993 -- Texas/Oklahoma Cotton IPM Workshop: Lubbock, Texas, April 7, 1993."
NAL Call #: SB950.A2S67--1993
Descriptors: Pests---Integrated control---Congresses
This citation is from AGRICOLA.

1310. **Regulation of irrigation canals: Characterisation and classification.**
Malaterre, P. O.
Irrigation and Drainage Systems 9 (4): 297-327. (Nov. 1995)
NAL Call #: TC801.I66;
ISSN: 0168-6291 [IRDSEG]
Descriptors: irrigation channels/ canals/ water flow/ regulation/ hydrology/ hydraulics/ literature reviews
This citation is from AGRICOLA.

1311. **Rehabilitation of aging watershed projects.**
Caldwell LW.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers; 15 p.; 1998.
Notes: ASAE Paper no. 982017
NAL Call #: S671.3 .A54
This citation is provided courtesy of CAB International/CABI Publishing.

1312. **Rehabilitation strategies involving woody vegetation for degraded stream corridors: Research opportunities.**
Shields, F. D. and Bernard, J. M.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); 14 p.; 1998.
Notes: ASAE Paper no. 982130
This citation is provided courtesy of CAB International/CABI Publishing.

1313. **A reintroduction to integrated weed management.**
Elmore, C. L.
Weed Science 44 (2): 409-412. (Apr. 1996-June 1996)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6].
Notes: Special section: Successes of integrated weed management--a symposium. Includes references.
Descriptors: weed control/ integrated pest management/ cropping systems/

crop management/ literature reviews/ integrated control
Abstract: Integrated Weed Management (IWM), a long time practice by farmers has become more commonly discussed as a total weed management system. Whether an off shoot of Integrated Pest Management (IPM) or a further recognition of integrating weed control measures within the cropping and farming system, it has become more widespread. IWM is being practiced using many of the same components, from croplands to forests and rangeland. A weed management hierarchy has been developed by degree of diversity of management practices. IWM researchers and educators should invite other pest management specialists to join us in striving for Integrated Crop Management systems.
This citation is from AGRICOLA.

1314. **Relating Nitrogen Sources and Aquifer Susceptibility to Nitrate in Shallow Ground Waters of the United States.**
Nolan, B. T.
Ground Water 39 (2): 290-299. (2001)
NAL Call #: TD403.G7;
ISSN: 0017-467X
Descriptors: USA/ Groundwater Pollution/ Nitrates/ Aquifer Characteristics/ Regression Analysis/ Multivariate Analysis/ Model Studies/ Model Testing/ Prediction/ Land Use/ Pollution Load/ Pollution (Groundwater)/ Nitrate/ Modelling (Multivariate)/ Loading/ Aquifers/ Water analysis/ Contamination/ Nitrogen/ Fertilizers/ Statistical analysis/ Geology/ United States/ Sources and fate of pollution/ Water Quality/ Freshwater pollution/ Characteristics, behavior and fate
Abstract: Characteristics of nitrogen loading and aquifer susceptibility to contamination were evaluated to determine their influence on contamination of shallow ground water by nitrate. A set of 13 explanatory variables was derived from these characteristics, and variables that have a significant influence were identified using logistic regression (LR). Multivariate LR models based on more than 900 sampled wells predicted the probability of exceeding 4 mg/L of nitrate in ground water. The final LR model consists of the following variables: (1) nitrogen fertilizer loading (p-value = 0.012); (2) percent cropland-pasture ($p < 0.001$); (3) natural log of population density ($p < 0.001$); (4) percent well-drained soils ($p = 0.002$); (5) depth to the seasonally high water table ($p = 0.001$); and (6) presence or absence of a fracture zone within an aquifer ($p = 0.002$). Variables 1-3 were compiled within circular, 500 m radius areas surrounding sampled wells, and variables 4-6 were compiled within larger areas representing targeted land use and aquifers of interest. Fitting criteria indicate that the full logistic-regression model is highly significant ($p < 0.001$), compared with an intercept-only model that contains none of the explanatory variables. A goodness-of-fit test indicates that the model fits the data well, and observed and predicted probabilities of exceeding 4 mg/L nitrate in ground water are strongly correlated (r super(2) = 0.971). Based on the multivariate LR model, vulnerability of ground water to contamination by nitrate depends not on any single factor but on the combined, simultaneous influence of factors representing nitrogen loading sources and aquifer susceptibility characteristics.

1315. **The relation between particle path length distributions and channel morphology in gravel-bed streams: A synthesis.**
Pyrce, R. S. and Ashmore, P. E.
Geomorphology 56 (1-2): 167-187. (2003);
ISSN: 0169-555X
Descriptors: Earth Sciences/ bed load transport/ channel morphology/ path length/ field experiment/ sediment tracers/ sediment transport/ British Columbia/ river/ distance/ clasts/ travel/ movement
Abstract: The path length (downstream displacement over a given time period) of individual bed particles in gravel-bed rivers is central to morphological methods for measuring bed load transport rate and is also fundamental to understanding the bed load transport process and the development of channel morphology. Previous studies of particle movement using tracers report predominantly strongly positively skewed frequency distributions of path length with modes close to the point of entrainment. However, gravel-bed rivers often have regularly spaced erosion (scour pools) and deposition (channel bars) sites that are several channel widths apart and it is reasonable to expect that particle path length would reflect this morphological scale, at least during flows large enough to create and modify the morphology. Here, we synthesize and re-analyze results from published bed load tracing experiments in gravel-bed rivers to identify the variety of possible path length distributions for differing channel morphology, channel dimensions, bed particle size, and particle mobility (i.e. flow magnitude) and to look for occurrences of path length coinciding with the length scale of the morphology. The results show that path length distributions may be positively skewed, symmetrical, and uni-, bi-, or multi-modal and may include modes that coincide with known or expected pool-bar spacing. Primary path length modes equivalent to possible pool-bar spacing are more probable at higher non-dimensional bed shear stress, from which it is inferred that both particle mobility and channel morphology exert an influence on particle path lengths and that particle movement is unlikely to be stochastic except at relatively low particle mobility. Existing data are inadequate for more than a preliminary analysis of this problem consequently there is a need for new data collected explicitly and systematically to confirm these preliminary results, isolate the effect of the several variables that influence the characteristics of path length frequency distributions and identify the conditions under which path length coincides with the length scale of the dominant morphology.

1316. **The relationship between contracting and livestock waste pollution.**
Vukina, T.; Lichtenberg, E.; and Yoder, J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1317. **The relationship between forest management and amphibian ecology: A review of the North American literature.**
DeMaynadier, P. G. and Hunter, M. L. Jr.
Environmental Review 3 (3/4): 230-261. (1995)
NAL Call #: GE140.E59;
ISSN: 1181-8700
Descriptors: amphibia/ species diversity/ geographical distribution/ microhabitats/ forests/ clearcutting/ age/ natural regeneration/ forest plantations/ prescribed burning/ roads/ riparian forests/ forest management/ plant succession/ nature conservation/ literature reviews/ North America/ species abundance/ biodiversity/ logging roads
This citation is from AGRICOLA.

1318. **Relationship of soil organic matter dynamics to physical protection and tillage.**
Balesdent, J.; Chenu, C.; and Balabane, M.
Soil and Tillage Research 53 (3/4): 215-230. (2000)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1319. **The Relative Impacts of Nest Predation and Brood Parasitism on Seasonal Fecundity in Songbirds.**
Schmidt, K. A. and Whelan, C. J.
Conservation Biology 13 (1): 46-57. (Feb. 1999)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
Descriptors: Fecundity/ brood parasitism/ Habitat fragmentation/ Nesting behavior/ Passeriformes/ Perching birds/ Birds
Abstract: The impacts of nest predation and brood parasitism on the seasonal fecundity of birds are strongly dependent on the number of nesting attempts, and thus seasonal fecundity is responsive to behavioral traits that increase the number of opportunities to nest. We developed simple models to investigate the relative impacts of nest predation and brood parasitism on seasonal fecundity in songbirds. In particular, we asked to what extent songbirds can ameliorate the negative effects of high nest predation and brood parasitism often typical of fragmented, urbanized, and agricultural landscapes through (1) renesting following predation, (2) abandoning and renesting following parasitism, and (3) double brooding--renesting following a successful brood. Our model assigned probabilities to all possible fates of breeding females and calculated seasonal fecundity by summing up the individual probabilities. We analyzed the model through the use of fecundity isopleths, which allow one to visually determine the impact of predation and parasitism simultaneously over the entire range of probabilities. Our analysis indicates that (1) nest predation has a greater impact on seasonal fecundity over a larger range of parameter space than does parasitism, especially when brood loss due to parasitism is low; (2) songbird populations experiencing nest predation probabilities typical of fragmented landscapes (>0.65) are unlikely to be self-sustaining; and (3) amelioration of nest predation through frequent renesting or double brooding may be insufficient to establish self-sustaining populations. These results suggest that predator control should be at least as high a priority as parasitism control, particularly for species that suffer moderate to low brood reduction due to parasitism and that are single-brooded. Programs aimed solely at managing cowbirds likely will be of limited success.
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1320. **Relative nutrient requirements of plants suitable for riparian vegetated buffer strips.**
Ducnuigeen, Jan.; Williard, Karl.; Steiner, Roland C.; Virginia. Dept. of Environmental Quality; and Interstate Commission on the Potomac River Basin.
Rockville, Md. Interstate Commission on the Potomac River Basin; Series: ICPRB report 97-4; 16 leaves. (1997)
Notes: "September 1997." Includes bibliographical references (leaves 10-15). For Virginia Department of Environmental Quality with funding under Section 604(b) of the Clean Water Act.
NAL Call #: QK115-.D93-1997
Descriptors: Riparian plants---United States---Nutrition/ Buffer zones---Ecosystem management---United States/ Streambank planting---United States/ Grassed waterways---United States/ Nutrient pollution of water---United States
This citation is from AGRICOLA.

1321. **Relevance of integrated disease management to resistance durability.**
Mundt, C. C.; Cowger, C.; and Garrett, K. A.
Euphytica 124 (2): 245-252. (2002)
NAL Call #: 450-Eu6;
ISSN: 0014-2336 [EUPHAA].
Notes: Special issue: Durable resistance / edited by F. Gover, R.E. Niks, and H. van der Beek. Paper presented at a symposium held November 28-December 1, 2000, Wageningen, The Netherlands. Includes references.
Descriptors: plants/ disease resistance/ durability/ genetic resistance/ disease control/ integrated pest management/ epidemiology/ evolution/ plant pathogens/ literature reviews
This citation is from AGRICOLA.

1322. **Relevance of soil testing to agriculture and the environment.**
Kamprath, E. J. Council for Agricultural Science and Technology (CAST); Issue Paper No. 15, 2000. 12 p.
http://www.cast-science.org/cast-science.lh/pdf/soiltest_ip.pdf
Descriptors: soil analysis/ fertilizer application/ nutrient management/ soil nutrients

1323. **Remediating river margin vegetation along fragmented and regulated rivers in the north: What is possible?**
Nilsson, C.
Regulated Rivers 12 (4/5): 415-431. (1996)
NAL Call #: TC530.R43;
ISSN: 0886-9375
This citation is provided courtesy of CAB International/CABI Publishing.

1324. **Remediation of herbicide-contaminated soil by combinations of landfarming and biostimulation.**
Felsot, A. S.; Mitchell, J. K.; and Dzantor, E. K.
Bioremediation Science and Applications 43: 237-257. (1995)
NAL Call #: S590.S62-no.43
Descriptors: polluted soils/ contamination/ alachlor/ pesticide residues/ fuels/ petroleum/ sludges/ waste disposal/ application to land/ bioremediation/ nutrients/

supplements/ organic matter/ reviews/ soil pollution/ pollution control/ land spreading
This citation is from AGRICOLA.

1325. **Remediation techniques for manure nutrient loaded soils.**
Zhang, H; Dao, T. H.; Basta, N. T.; Dayton, E. A.; and Daniel, T. C.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1326. **Remote sensing for crop management.**
Pinter, P. J. Jr.; Hatfield, J. L.; Schepers, J. S.; Barnes, E. M.; Moran, M. S.; Daughtry, C. S. T.; and Upchurch, D. R.
PE and RS: Photogrammetric Engineering and Remote Sensing 69 (6): 647-664. (2003)
NAL Call #: 325.28 P56;
ISSN: 0099-1112
This citation is provided courtesy of CAB International/CABI Publishing.

1327. **Remote sensing for nitrogen management.**
Scharf, P. C.; Schmidt, J. P.; Kitchen, N. R.; Sudduth, K. A.; Hong, S. Y.; Lory, J. A.; and Davis, J. G.
Journal of Soil and Water Conservation 57 (6): 518-524. (2002)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: nitrogen/ soil fertility/ remote sensing/ reflectance/ soil organic matter/ soil water/ nitrogen fertilizers/ fertilizer requirement determination/ site specific crop management/ crops/ color/ nitrogen content
This citation is from AGRICOLA.

1328. **Remote sensing of soil salinity: Potentials and constraints.**
Metternicht, G. I. and Zinck, J. A.
Remote Sensing of Environment 85 (1): 1-20. (2003)
NAL Call #: Q184.R4;
ISSN: 0034-4257
This citation is provided courtesy of CAB International/CABI Publishing.

1329. **The report of the EPA/State Feedlot Workgroup.**
United States. EPA/State Feedlot Workgroup.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Wastewater Enforcement and Compliance; vii, v, 156 p.: ill., maps. (1993)
Notes: Cover title. "September 1993." "PB95-201752." Includes bibliographical references.
NAL Call #: TD223.U524--1993
Descriptors: Water---Pollution---United States/ Groundwater---Pollution---United States/ Feedlot runoff---United States
This citation is from AGRICOLA.

1330. **Report of the Technical Advisory Committee for plant nutrient management.**
California. State Water Resources Control Board.
Sacramento, Calif.: State Water Resources Control Board; 19, 16 p. (1994)
Notes: Cover title. "November 1994." Includes bibliographical references.
NAL Call #: TD428.A37R46--1994
Descriptors: Plant nutrients---Environmental aspects---California/ Crops and water---Environmental aspects---California/ Agricultural pollution California/ Nonpoint source pollution California/ Water quality management California
This citation is from AGRICOLA.

1331. **Research advance in forest restoration on the burned blanks.**
Kong FanHua; Li XiuZhen; Zhao ShanLun; and Yin HaiWei
Journal of Forestry Research 14 (2): 180-184. (2003);
ISSN: 1007-662X
This citation is provided courtesy of CAB International/CABI Publishing.

1332. **Research needs for conserving California's rare plants.**
Skinner, M. W.; Tibor, D. P.; Bittman, R. L.; Ertter, B.; Ross, T. S.; Boyd, S.; Sanders, A. C.; Shevock, J. R.; and Taylor, D. W.
Madrono 42 (2): 211-241. (Apr. 1995-June 1995)
NAL Call #: 450-M26;
ISSN: 0024-9637 [MADRAU].
Notes: In the Special Issue: The Future of California floristics and systematics: research, education, conservation. Proceedings of a symposium held June 3-5, 1994, Berkeley, California. Includes references.
Descriptors: wild plants/ species/ endangered species/ nature conservation/ research/ information needs/ California/ rare species/ endemic species
This citation is from AGRICOLA.

1333. **Research needs for forest and rangeland management in Arizona and New Mexico.**
Evans, Keith E. and Rocky Mountain Forest and Range Experiment Station
Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; iii, 27 p.: ill.; Series: General technical report RM 291. (1997)
Notes: Cover title. Author statement from p. [i]. Shipping list no.: 97-0831-M. "March 1997"--P. [2] of cover. Includes bibliographical references (p. 19). SUDOCS: A 13.88:RM-GTR-291.
NAL Call #: Fiche-S-133-A-13.88:RM-GTR-291-
Descriptors: Forest management---Research---Arizona/ Forest management---Research---New Mexico/ Range management---Research---Arizona/ Range management---Research---New Mexico
This citation is from AGRICOLA.

1334. **Research Needs for Water Quality Management in the 21st Century: A Spatial Decision Support System.**
Lovejoy, S. B.; Lee, J. G.; Randhir, T. O.; and Engel, B. A.
Journal of Soil and Water Conservation 52 (1): 18-22. (Feb. 1997)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: watershed management/ water quality management/ decision

making/ computers/ information systems/ research priorities/ future planning/ water management/ computer applications/ decision support systems/ water use/ resource management/ Internet/ Techniques of planning/ Freshwater pollution
Abstract: How can we better manage watersheds so that they can produce the products and services we desire? Most individuals want a product /service mix that includes production of food and fiber, housing, urban services, industrial sites, wildlife habitat, water quality, etc. Many individuals, communities and states are struggling with how to manage the resources within the watershed to achieve an acceptable mix of products and services (e.g. making the right trade-offs). Making these decisions requires greater thought about what types of data and information are needed in making informed choices. In addition, the data, information and knowledge needs to be easily accessible and usable by the decision makers and not constrained to one type of operating system or particular brand of hardware or software. One viable option is to make this data, information and decision aids accessible via the Internet where the data and decision aids reside on a central server and users can interact with them for analysis. This paper details our ideas concerning the research needs (information and knowledge) as well as the decision making supports necessary for individuals and communities to make better choices regarding the trade-offs among potential goods, services and levels of environmental amenities.
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1335. **Research on Society & Natural Resources: A content analysis of the first decade.**
Culhane, P. J.
Society and Natural Resources 14 (5): 365-384. (May 2001-June 2001)
NAL Call #: HC10.S63;
ISSN: 0894-1920 [SNREEI]
Descriptors: natural resources/ journals/ literature reviews
This citation is from AGRICOLA.

1336. **Research opportunities to improve nutrient-use efficiency in rice cropping systems.**
Lafitte, H. R.
Field Crops Research 56 (1/2): 223-236. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: In the special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: oryza sativa/ cropping systems/ nutrients/ use efficiency/ agricultural research/ nutrient availability/ irrigation/ soil fertility / crop yield/ crop management/ water/ cultivars/ intensive cropping/ genetic improvement/ simulation models/ plant breeding/ literature reviews
This citation is from AGRICOLA.

1337. **Reservoir System Management and Environmental Flows.**
Mcmahon, T. A. and Finlayson, B. L.
Lakes and Reservoirs: Research and Management 1 (1): 65-76. (1995);
ISSN: 1320-5331
Descriptors: reservoir operation/ ecological effects/ alteration of flow/ water management/ river regulations/ dams/ beneficial use/ reservoirs/ reviews/ management/ Australia/ reservoirs (water)/ environmental impact/ environmental protection/ ecosystem management/ Control of water on the surface/ Management/ Environmental action/ Mechanical and natural changes
Abstract: Considerable attention has been paid to the downstream effects of reservoirs on the ecology of rivers, streams and wetlands. However, most reservoirs were constructed well before ecological concerns became prominent. Little attention has been given to the question of what extent existing structures and management systems can accommodate changes. The paper discusses this matter and a range of associated issues. It is concluded that many problems can be rectified by structural means but that such rectification will be very expensive. While based primarily on Australian systems, the conclusions and examination are considered to be globally applicable.
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1338. **Residue management, conservation tillage and soil restoration for mitigating greenhouse effect by CO2-enrichment.**
Lal, R.
Soil and Tillage Research 43 (1/2): 81-107. (1997)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1339. **Residue management impact on the environment.**
Sims, G. K.; Buhler, D. D.; and Turco, R. F.
In: Managing agricultural residues/ Unger, P. W.
Boca Raton, Fla.: Lewis Publishers, 1994; pp. 77-98.
ISBN: 0-87371-730-9
This citation is provided courtesy of CAB International/CABI Publishing.

1340. **Resilience and restoration of lakes.**
Carpenter, Stephen R and Cottingham, Kathryn L
Conservation Ecology 1 (1)(1997)
NAL Call #: QH75.A1C67.
Notes: No page numbers; Online version cited: April 25, 2004; Table of contents available: http://www.ecologyandsociety.org/vol1/iss1/index.html
Descriptors: phosphorus/ agricultural runoff/ conservation/ ecological economics/ eutrophication/ food web structures/ humic production/ lake restoration/ nutrient retention/ phosphorus/ riparian forests/ urban runoff/ water quality/ watershed resilience/ wetlands
Abstract: Lake water quality and ecosystem services are normally maintained by several feedbacks. Among these are nutrient retention and humic production by wetlands, nutrient retention and woody habitat production by riparian forests, food web structures that channel phosphorus to consumers rather than phytoplankton, and biogeochemical mechanisms that inhibit phosphorus recycling from sediments. In degraded lakes, these resilience mechanisms are replaced by new ones that connect lakes to larger, regional economic and social systems. New controls that maintain degraded lakes include runoff from agricultural and urban areas, absence of wetlands and riparian forests, and changes in lake food webs and biogeochemistry

that channel phosphorus to blooms of nuisance algae. Economic analyses show that degraded lakes are significantly less valuable than normal lakes. Because of this difference in value, the economic benefits of restoring lakes could be used to create incentives for lake restoration.
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1341. **Resistance: A threat to the insecticidal crystal proteins of Bacillus thuringiensis.**
Bauer, L. S.
Florida Entomologist 78 (3): 414-443. (Sept. 1995)
NAL Call #: 420-F662;
ISSN: 0015-4040 [FETMAC].
Notes: Paper presented at the symposium "The Myths of Managing Resistance," 1994 Annual meeting of the Florida Entomological Society, August 8-11, 1994, Stuart, Florida. Includes references.
Descriptors: bacillus thuringiensis/ biological control agents/ endotoxins/ genetic resistance/ insecticide resistance/ transgenic plants/ cross resistance/ mode of action/ resistance mechanisms/ integrated pest management/ literature reviews/ resistance management
This citation is from AGRICOLA.

1342. **Resistance as a concomitant of modern crop protection.**
Urech, P. A.; Staub, T.; and Voss, G.
Pesticide Science 51 (3): 227-234. (1997)
NAL Call #: SB951.P47;
ISSN: 0031-613X
Descriptors: pesticide resistance/ agricultural practices/ chemical control/ Insecta/ Fungi/ Acari/ Agricultural & general applied entomology
Abstract: This paper reviews the impact of resistance to fungicides and insecticides/acaricides on the way crop protection is practised. It is now clear that resistance can develop to virtually any crop-protection product, in any pest, fungal pathogen or even weed. As a limiting factor in crop protection, it is a fact of life. A positive side-effect is the precision with which products are used today, with increasing implementation of Integrated Pest Management (IPM) programmes. This is a vital step towards sustainability. This paper describes: past experiences; current status of resistance; how resistance management influences current crop protection practices; regulatory aspects; and the outlook for the future. It concludes that EU regulations on resistance management must be simple and workable. Chemicals will continue to have a central role in optimising yields from the world's crops, as new tools, including biotechnology, become available for crop protection and resistance management. The crop-protection industry's innovations and product stewardship programmes will contribute to sustainable agriculture. This will provide continued benefits to users, the environment and society.
© Cambridge Scientific Abstracts (CSA)

1343. **Response of a Zooplankton Community to Insecticide Application in Experimental Ponds: A Review and the Implications of the Effects of Chemicals on the Structure and Functioning of Freshwater Communities.**
Hanazato, T.
Environmental Pollution 101 (2): 361-373. (1998)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: Reviews/ Zooplankton/ Food chains/ Insecticides/ Ponds/ Freshwater pollution/ Chemical pollutants/ Pollution effects/ Toxicity tolerance/ Freshwater crustaceans/ Population dynamics/ Body size/ Chemical pollution/ Community structure/ Daphnia/ Water Pollution/ Pesticides/ Pesticide applications/ Daphnia/ Japan/ Experimental research/ Environmental impact/ Effects on organisms/ Freshwater pollution/ Effects of pollution/ Pollution effects
Abstract: A review is presented of experimental studies in outdoor experimental ponds to investigate the effects of various insecticide exposures on natural zooplankton communities. Large zooplankton species, which generally are superior to small zooplankton species in competition, are also more sensitive to insecticides. Relatively low insecticide concentrations, which damage only large taxa (Daphnia), may affect the population dynamics of other zooplankton indirectly through altered competitive relationships. The effects of insecticide on the zooplankton community are also influenced by factors such as temperature, chemical properties (e.g. degradation rate), population trends among the organisms, community structure (presence or absence of predators), and timing of the chemical application. These factors modify interrelationships between organisms and, therefore, control the recovery process of the zooplankton community following insecticide impacts. Results to date suggest that insecticide stress decreases the average size of the organisms, reduces energy transfer efficiency, elongates the food chain and sometimes increases species richness.
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1344. **Response of potato (Solanum tuberosum L.) to nitrogen and farmyard manure: A review.**
Ramanjit Kaur; Nathu Singh; Kler DS; Kaur R; and Singh N
Environment and Ecology 19 (1): 87-105; 104 ref. (2001)
This citation is provided courtesy of CAB International/CABI Publishing.

1345. **Response of soil and irrigated fruit trees to fertigation or broadcast application of nitrogen, phosphorus, and potassium.**
Neilsen, G. H.; Neilsen, D.; and Peryea, F.
HortTechnology 9 (3): 393-401. (July 1999-Sept. 1999)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198.
Notes: Paper presented at the American Society for Horticultural Science. Workshop on Conservation tillage for vegetables held July 11-16, 1998, Charlotte, North Carolina. Includes references.
Descriptors: fruit trees/ irrigation/ fertigation/ broadcasting/ nitrogen fertilizers/ phosphorus fertilizers/ potassium fertilizers/ roots/ spatial distribution/ acidification/ soil solution/ monitoring/ foliar application/ microirrigation/ malus pumila/ crop yield/ leaves/ nutrient content/ fruits/ literature reviews/ high density planting
Abstract: Traditionally, broadcast or foliar fertilizer applications have been used to improve or sustain the nutrition of many irrigated, deciduous fruit tree orchards in western North America. Recent developments, including adoption of low-pressure microirrigation systems and planting at higher densities [especially for apple (Malus domestica Borkh.)], have increased interest in controlled application of fertilizers directly with

irrigation (fertigation). Recent fertigation research in western North America is reviewed, emphasizing results from high-density apple orchards. Fertigation and traditional broadcast application methods are examined with respect to mobility of N, P, and K in the soil and response of fruit trees to application of these nutrients.
This citation is from AGRICOLA.

1346. **Restoration Experiments in Middle European Wet Terrestrial Ecosystems: An Overview.**
Pfadenhauer, J. and Kloetzli, F.
Vegetatio 126 (1-4): 101-115. (Sept. 1996);
ISSN: 0042-3106.
Notes: Conference: 6. International Congress of Ecology, Manchester (UK), Aug 1994
Descriptors: peat/ wetlands/ agriculture/ man induced effects/ ecosystem management/ nature conservation/ restoration/ environmental/ Europe/ environmental effects/ drainage/ flooding/ Europe/ fens/ water retention/ Habitat community studies/ Protective measures and control/ Reclamation/ Effects on water of human nonwater activities
Abstract: Most wetlands in the central European lowlands have been severely altered by cultivation. As a consequence they no longer fulfil their function as habitats for specialised species and communities, nor as retention areas for water and solid materials. Therefore, a number of renaturation experiments are in progress, which intend to develop and test strategies and measures to improve this defect in landscape diversity. For this purpose experiments on re-wetting, nutrient depletion of eutrophicated areas and re-establishment of typical wetland plant species and phytocoenoses have been performed. An ecological development concept defining the aims and describing their feasibility precedes such experiments. Preliminary results indicate that the reconstruction of the former state (regeneration) is impossible within reasonable time spans. In drained raised bogs overgrown with heather, as well as in those which have been industrially exploited, the primary aim must always be to restore efficient peat formation as far as possible; as a rule one succeeds only with well-growing and nutrient-demanding fen and transitional bog species. In cultivated fens the aim is to reduce peat loss. As a first step this is accomplished by converting arable fields and sown meadows into permanent grassland, if possible with reduced fertilization and low mowing or grazing frequencies, and accompanied by rewetting during winter. Many experiments have sought to impoverish eutrophicated fen soils and introduce typical fen species by sowing or planting, so well tested techniques are available. However, the total prevention of peat loss is only possible by permanent rewetting throughout the year, so that peat accumulation can start again. Only in this way could fens regain their former function as sinks in landscape processes.
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1347. **Restoration of aquatic macrophyte vegetation in acidified and eutrophicated shallow soft water wetlands in the Netherlands.**
Roelofs, J G M; Brouwer, E; and Bobbink, R
Hydrobiologia 478: 171-180 (2002)
NAL Call #: 410 H992;
ISSN: 0018-8158
Descriptors: carbon/ carbon dioxide/ aquatic macrophyte (Plantae)/ Plants/ alkalinization/ anthropogenic processes/ atmospheric deposition/ catchment acidification/ colonization rates/ conservation strategies/ drainage/ environmental degradation/ eutrophication/ geographic distribution/ hydrology/ lake types/ nutrient inputs/ soft water wetlands/ vegetation restoration
Abstract: Soft water lakes possess a highly characteristic vegetation adapted to limitation of carbon. Based upon hydrology, vegetation and geographic distribution, boreal and Atlantic lake types can be distinguished. Reducing the input of nutrients or liming, or both, the stream or its catchment is generally sufficient to restore typical soft water vegetation of boreal soft water lakes. The vegetation of Atlantic soft water lakes is subject to many anthropogenic degradation processes. Therefore, spontaneous recovery in the near future is not expected and restoration is urgently required. Removal of nutrient-rich, anoxic, organic sediments is a prerequisite for restoration of these lakes. In acidified or acid-sensitive lakes, additional measures against acidification are required. Controlled supply of calcareous, nutrient-poor water is much better than direct liming. The effects of these restoration measures strongly depend on the detrimental effects of processes such as atmospheric deposition, drainage, catchment acidification, eutrophication and reduced colonisation rates.
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1348. **Restoration of brook valley meadows in the Netherlands.**
Grootjans, A P; Bakker, J P; Jansen, A J M; and Kemmers, R H
Hydrobiologia 478: 149-170 (2002)
NAL Call #: 410 H992;
ISSN: 0018-8158
Descriptors: organism (Organisms): Red List species, protected species/ agricultural fields/ atmospheric deposition/ brook valley meadows/ drainage/ groundwater discharge/ hydrological systems/ restoration management/ seed banks/ seed dispersal mechanisms/ soil properties: chemical, physical/ topsoil removal/ wetlands conservation
Abstract: Until recently, restoration measures in Dutch brook valley meadows consisted of re-introducing traditional management techniques, such as mowing without fertilisation and low-intensity grazing. In the Netherlands, additional measures, such as rewetting and sod cutting, are now carried out on a large scale to combat negative influences of drainage and acidifying influences by atmospheric deposition. An analysis of successful and unsuccessful projects shows that restoration of brook valley meadows is most successful if traditional management techniques are applied in recently abandoned fields that had not been drained or fertilised. Large-scale topsoil removal in former agricultural fields that had been used intensively for several decades is often unsuccessful since seed banks are depleted, while hydrological conditions and seed dispersal mechanisms are sub-optimal. In areas with an organic topsoil, long-term drainage had often led to irreversible changes in chemical and physical properties of the soil. Successful sites were all characterised by a regular discharge of calcareous groundwater provided by local or regional hydrological systems, and, where not very long ago, populations of target species existed. On mineral soils, in

particular, sod removal in established nature reserves was a successful measure to increase the number of endangered fen meadow species. It is argued that attempts to restore species-rich meadows should be avoided on former agricultural fields, where pedological processes have led to almost irreversible changes in the soil profile and where soil seed banks have been completely depleted. From a soil conservation point of view, such areas should be exploited as eutrophic wetlands that are regularly flooded.

1349. **Restoration of degraded lands in the interior Columbia River basin: Passive vs. active approaches.**
McIver, J. and Starr, L.
Forest Ecology and Management 153 (1/3): 15-28. (Nov. 2001)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW].
Notes: Special issue: The science basis for ecosystem management in the interior Columbia River basin / edited by R. Haynes, T. Quigley, T. Spies, and J. Clifford. Includes references.
Descriptors: degraded forests/ afforestation/ reclamation/ riparian vegetation/ steppes/ altitude/ plant communities/ weeding/ prescribed burning/ thinning/ fuel appraisals/ stand structure/ botanical composition/ literature reviews/ Washington/ Oregon/ idaho/ Nevada/ Wyoming/ Montana/ Utah
This citation is from AGRICOLA.

1350. **Restoration of floodplain forests in Britain.**
Peterken, G. F. and Hughes, F. M. R.
Forestry 68 (3): 187-202. (1995)
NAL Call #: 99.8-F767;
ISSN: 0015-752X [FRSTAH]
Descriptors: floodplains/ bottomland forests/ riparian forests/ forestry development/ forest management/ river regulation/ land use planning/ forest policy/ forest influences/ forest resources/ literature reviews/ UK
Abstract: Floodplain forests have almost completely disappeared from Britain. Throughout the temperate regions of Europe and North America they have been greatly reduced and many of the remainder are threatened. River control has altered the natural flooding and disturbance regime. However, changes in agricultural requirements and attitudes to river management and the need to water quality have created an opportunity for restoring some more natural river dynamics habitats. This paper presents a case for including managed and natural floodplain forests in river and floodplain restoration projects. Benefits would accrue for timber production, reduction of agricultural surpluses, nature conservation, fishing, water quality, river control and landscape quality. Limited practical experience of floodplain forest restoration in North America and continental Europe suggests that practical problems can be overcome.
This citation is from AGRICOLA.

1351. **Restoration of riparian vegetation in the south-western United States: Importance of flow regimes and fluvial dynamism.**
Stromberg, J. C.
Journal of Arid Environments 49 (1): 17-34. (2001)
NAL Call #: QH541.5.D4J6;
ISSN: 0140-1963
This citation is provided courtesy of CAB International/CABI Publishing.

1352. **Restoration of sustainability of physically degraded fish habitats: The Model of Intermediate Restoration.**
Zalewski, Maciej and Welcomme, Robin
Ecohydrology and Hydrobiology 1 (3): 279-282. (2001);
ISSN: 1642-3593
Descriptors: fish (Pisces)/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ abiotic factors/ biodiversity/ biogeochemical cycles/ ecohydrology/ ecological restoration: intermediate/ ecosystem productivity/ eutrophication/ forestation/ freshwater ecosystems/ habitat degradation/ habitat quality/ human impact/ impoverishment/ nutrient cycling/ nutrient pools: control, regulation/ physical modification/ phytotechnologies/ plant cover/ riparian ecotones/ river basins/ stock rehabilitation/ wilderness
Abstract: Freshwater ecosystems are situated in depressions in the landscape. As a result they accumulate the impacts of human activities. The quality of fish habitat depends to a great extent on the density of the human population and its activities within the basin. Anthropogenic impacts on fish habitats can be defined both technologically and ecologically. Emission of pollutants can be controlled by technology. Modification of hydrological and biogeochemical cycles, that have negative consequences for the biota, can only be reduced by an integrated approach. The Restoration Ecohydrology Concept serves as an integrating mechanism for the restoration of physically modified freshwater habitats. There are two main approaches to restoration and mitigation: Firstly actions at the catchment level connected with integrated management of abiotic factors including, landscape planning, catchment management, forestation, phytotechnologies and hydrology by impoundment. Secondly actions at the level of the aquatic ecosystem itself, particularly those linked to fisheries management, including restoration of the diversity and connectivity of habitats by rehabilitation of the river channel and floodplains, and rehabilitation of the fish stock itself by stocking and introductions. These measures have to be oriented toward the control and regulation of the dynamic pool of nutrients, maintaining a fine line between eutrophication and impoverishment, to manipulate the productivity and diversity of the biota, especially the fish assemblages, for the goals of society. The definition of societal goals is fundamental in determining policies for the restoration of physically modified fish habitat in the broad sense of modification of biogeochemical cycles. The papers presented at the EIFAC Workshop "Ecohydrology as a tool for restoration of physically degraded habitats" conclude that the highest biodiversity and productivity of fish assemblages appears at an intermediate level of human disturbances, which, in the case of the biogeochemical cycle, has usually been connected with limited degradation of catchment cover. The increase of fish biomass and diversity under these conditions apparently results firstly from nutrient enrichment and improved energy influxes to the stream arising from the more rapid cycling of nutrients of terrestrial origin cycling, and secondly from the intermediate complexity of the riparian ecotones. The maximum of biomass might appear under different conditions than those that favour maximum biodiversity due to this ecosystem enrichment and amplified access to energy. The data presented at the symposium lead to three

conclusions: 1. Restoration of river systems to pristine conditions is not realistic but is also not necessary. (In Europe the separation in time between present conditions and the wilderness state is much greater than in other areas of the world such as the USA or Australia) 2. The target of restoration of physically degraded habitats should lie somewhere in the range between maximum biodiversity and maximum productivity of fish communities. 3. If the connectivity of the river system is maintained, the "patchy" restoration of physically degraded fish habitats at the river basin scale might be sufficient (See Cowx, Welcomme 1998 for a definition of the bead concept as applied to floodplain restoration). Further investigations are needed to develop standards for fish habitat restorations in different the geographic regions as determined by the geology, hydrology and degree of human modification of the plant cover. Research is also needed to define the societal goals that will determine the type of restoration undertaken.

1353. **Restoration of temperate wetlands.**
Wheeler, Bryan D.
Chichester; New York: Wiley; xiv, 562 p.: ill. (1995)
Notes: Papers from a symposium held at the University of Sheffield, England in Sept. 1993. Includes bibliographical references and index.
NAL Call #: QH541.5.M3R47--1995;
ISBN: 0471951056
Descriptors: Wetland ecology---Congresses/ Restoration ecology---Congresses/ Wetland conservation---Congresses
This citation is from AGRICOLA.

1354. **Restoring prairie wetlands: An ecological approach.**
Galatowitsch, Susan M.; Valk, Arnoud van der; and Institute for Wetland and Waterfowl Research.
Ames: Iowa State University Press; x, 246 p.: ill. (1994)
Notes: 1st ed.; "A special publication of Ducks Unlimited's Institute for Wetland and Waterfowl Research." Includes bibliographical references and index.
NAL Call #: QH75.G35--1994;
ISBN: 0813824990 (alk. paper)
Descriptors: Wetland conservation/ Wetland conservation---Prairie Pothole Region/ Restoration ecology/ Restoration ecology---Prairie Pothole Region/ Wetland ecology/ Wetland ecology---Prairie Pothole Region
This citation is from AGRICOLA.

1355. **Results of long-term trials with fertilizers.**
Boinchan B and Lykov A
Mezhdunarodnyi Sel'skokhozyaistvennyi Zhurnal 6: 42-45. (1999)
This citation is provided courtesy of CAB International/CABI Publishing.

1356. **Resuspension in lakes and its ecological impact: A review.**
Weyhenmeyer, Gesa A
Ergebnisse der Limnologie (51): 185-200. (1998);
ISSN: 0071-1128
Descriptors: ecological impact/ eutrophication/ lake ecosystem/ sediment resuspension/ total organic settling material/ water pollution
Abstract: To determine geochemical, toxicological and biological impacts of sediment resuspension on lake ecosystems, this review tackles the questions where, why, when, how much, how often and what kind of sediment is resuspended and how resuspended material is distributed in the water column. Due to internal seiche activities sediment resuspension may occur in very deep areas. In the moderately deep Lake Erken in south-eastern Sweden (mean depth: 9 m, maximum depth: 21 m) internal seiche activities are, for example, one of the explanations why, as an annual average, 85% of the total settling material in the water column was determined to be resuspended sediment. The annual averages of resuspended sediment in 16 other shallow and deep lakes spread throughout the world were 15-92%. Also large amounts of organic sediment are resuspended (annual averages: 25-84% of total organic settling material was resuspended organic sediment in 9 lakes). These large amounts of resuspended sediment, especially of organic resuspended sediment, have such an important influence on lake ecosystems that the flux of newly produced planktonic particulate matter was observed to be significantly related to the flux of resuspended sediment. It is suggested that the flux of resuspended sediment is not only related to planktonic production and thereby eutrophication but also to the degree of water pollution by contaminants.

1357. **A review and synthesis of habitat use by breeding birds in agricultural landscapes of Iowa.**
Best, L. B.; Freemark, K. E.; Dinsmore, J. J.; and Camp, M.
American Midland Naturalist 134 (1): 1-29. (July 1995)
NAL Call #: 410-M58;
ISSN: 0003-0031 [AMNAAF]
Descriptors: wild birds/ species diversity/ breeding places/ habitat selection/ vegetation types/ agricultural land/ checklists/ conservation/ Iowa/ species abundance
This citation is from AGRICOLA.

1358. **Review: Denitrification in temperate climate riparian zones.**
Martin, T. L.; Kaushik, N. K.; Trevors, J. T.; and Whiteley, H. R.
Water, Air and Soil Pollution 111 (1-4): 171-186. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: Denitrification/ Riparian environments/ Agricultural runoff/ Water pollution control/ Nitrates/ Reviews/ Watersheds/ Biofiltration/ Pollution control/ Flood plains/ Water pollution/ Temperate Zone/ Riparian Land/ Research Priorities/ Assay/ Freshwater pollution/ Behavior and fate characteristics/ Water quality control
Abstract: Excess nitrate (NO sub(3) super(-)) in lakes and streams has deleterious effects for environmental and human health. Nitrate concentrations have become problematic in agricultural watersheds due to increased use of fertilizers and improper management of livestock wastes. Research has indicated that the planting and/or preservation of riparian buffer zones can be an effective means of reducing pollution from agricultural fields. Biological denitrification is the most desirable means of nitrate attenuation as the microbial conversion of NO sub(3) super(-) removes nitrate from the watershed in the form of N gases. Despite the inherent value of biological denitrification, a comprehensive review discussing the role of this process in removing nitrate from riparian zones is lacking. In this paper we examine the results and conclusions of past research on the

topic of denitrification in riparian zones and make recommendations for future research in this area. The need for subsurface denitrification assays in riparian zones is emphasized.

1359. **A review of ammonia emissions from confined swine feeding operations.**
Arogo, J.; Westerman, P. W.; and Heber, A. J.
Transactions of the ASAE 46 (3): 805-817. (2003)
NAL Call #: 290.9 Am32T;
ISSN: 0001-2351.
Notes: Number of References: 92
Descriptors: Agriculture/ Agronomy/ ammonia emission/ confined animal feeding operations/ emission factors/ swine feeding operations/ growing finishing pigs/ wind tunnel technique/ livestock buildings/ hydrogen sulfide/ nitrous oxide/ sprinkler irrigation/ excretory behavior/ odorous compounds/ treatment lagoons/ UK
Abstract: Ammonia emissions from swine feeding operations depend on the housing type; animal size, age, and type; manure management, storage, and treatment; climatic variables; and manure utilization or land application techniques. Techniques or methods for estimating or quantifying NH3 flux from a source to the atmosphere include nitrogen mass balance, micrometeorology, flux chambers, models, and emission factors. Of these techniques, emission factors, once established, provide the most convenience in estimating emissions. However, it is important to understand how a particular emission factor is determined and whether it accurately reflects a composite or average emission for all the variable conditions. Using an average ammonia emission factor multiplied by pig inventory to determine a regional or national ammonia emission inventory may be misleading, especially in the U.S. where existing emission factors were developed using data from swine facilities in Western Europe. Housing, manure management practices, and climate vary among different regions of the U.S. and can be very different from those in Western Europe. In addition, ammonia concentrations and emission estimations have been determined with a variety of methods, making it difficult to compare results. To determine representative ammonia emissions from confined swine feeding operations, it is important that emission factors be specific enough to account for animal type and size, housing system, manure storage and treatment, land application, and climatic effects. This article describes the strengths and limitations of emission factors as currently used and provides recommendations for determining realistic ammonia emission factors for swine feeding operations. Because of the limited nature of the data published in the literature, emission factors for different animal management systems could not be presented. Regulators, consultants, cooperative extension personnel, and other leaders in the agricultural community with interest in ammonia emissions should be aware of the lack of reliable U.S. data available for calculating accurate emission factors. The scientific research community should standardize methods for measurement, calculation, and reporting of ammonia emissions.

1360. **A review of aquatic impact associated with turbidity.**
Edwards, C. J.
In: Technical workshop on sediments: Proceedings. (Held 3 Feb 1992-7 Feb 1992 at Corvallis, Oregon.) Washington, D.C.: Terrene Institute; pp. 109-112; 1993.
NAL Call #: QE571.T42-1992
Descriptors: erosion/ sediment/ turbidity/ logging/ logging effects/ aquatic organisms
This citation is from AGRICOLA.

1361. **A review of aquatic weed biology and management research conducted by the United States Department of Agriculture-Agricultural Research Service.**
Anderson, Lars W J
Pest Management Science 59 (6-7): 801-813. (2003)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: aquatic herbicides: environmental effects, fate, modes of action/ aquatic weed (Plantae): biology, ecology, invasive, management research, physiology/ Plants/ collaborations/ field level studies/ host specificity / natural aquatic habitat protection/ plant competition/ riparian habitats protection/ specific biochemical work/ specific molecular work/ water demand/ weed management strategies
Abstract: Ever-increasing demand for water to irrigate crops, support aquaculture, provide domestic water needs and to protect natural aquatic and riparian habitats has necessitated research to reduce impacts from a parallel increase in invasive aquatic weeds. This paper reviews the past 4-5 years of research by USDA-ARS covering such areas as weed biology, ecology, physiology and management strategies, including herbicides, biological control and potential for use of natural products. Research approaches range from field-level studies to highly specific molecular and biochemical work, spanning several disciplines and encompassing the most problematic weeds in these systems. This research has led to new insights into plant competition, host-specificity, and the fate of aquatic herbicides, their modes of action and effects on the environment. Another hallmark of USDA-ARS research has been its many collaborations with other federal, state action and regulatory agencies and private industry to develop new solutions to aquatic weed problems that affect our public natural resources and commercial enterprises.

1362. **A Review of Bioremediation of Contaminated Soils and Groundwater.**
Ritter, W. F. and Scarborough, R. W.
Journal of Environmental Science and Health, Part A: Environmental Science and Engineering and Toxic and Hazardous Substance Control A30 (2): 333-357. (1995);
ISSN: 1077-1204
Descriptors: soil remediation/ groundwater/ bioremediation/ polycyclic aromatic hydrocarbons/ fungi/ Phanerochaete chrysosporium/ explosives/ reviews / soil pollution/ ground water/ water pollution/ sediment pollution/ groundwater pollution/ pollution control/ water pollution treatment/ aromatic hydrocarbons/ Soil Contamination/ Hydrocarbons/ Phanerochaete chrysosporium/ Land pollution/ Freshwater pollution/ Utilization/ Methods and instruments/ Water quality control
Abstract: The paper discusses bioremediation of contaminated

groundwater and soils. Research needs for bioremediation are also discussed. Forms of bioremediation practiced today are the microbiological approach, which involves augmentation of the contaminated site with one or more species of contaminant-specific degrading organisms, and the microbial ecology approach, which involves adjusting certain physical and chemical factors at a site to enhance degradation. The microbial approach can be used at most sites. Contaminated soils may be bioremediated by in-situ techniques, landfarming, composting or in slurry bioreactors. Anaerobic biodegration may offer an effective alternative to aerobic in-situ bioremediation for some compounds. Chlorinated aliphatic and hetercyclics have been degraded anaerobically. Petroleum hydrocarbons are the most easily bioremediated compounds. White rot fungus Phanerochaete chrysosporium will degrade many PAH compounds found in cresote. Bioremediation is also being used to remediate soils contaminated with explosives.

1363. **A Review of Canadian Remote Sensing Applications in Hydrology, 1995-1999.**
Pietroniro, A. and Leconte, R.
Hydrological Processes 14 (9): 1641-1666. (2000)
NAL Call #: GB651.H93;
ISSN: 0885-6087.
Notes: DOI: 10.1002/1099-1085(20000630)14:9<1641::AID-HYP75>3.3.CO;2-9
Descriptors: Canada/ Remote Sensing/ Water Resources Management/ Satellite Technology/ Hydrology/ Watersheds/ Hydrologic Data/ Hydrologic Aspects/ Water resources/ Water management/ Data collections/ Satellite imagery/ Catchment areas/ Canada/ Data acquisition/ Monitoring and Analysis of Water and Wastes
Abstract: The potential of remote sensing for providing information to hydrologists and water resources practitioners has been recognized since the 1970s. The variety of satellite and airborne platforms and the greater ease of access to imagery now make it possible to evaluate and quantify an increasingly large number of watershed physical characteristics and state variables. Canadian scientists have been very active over the last 5 years creating algorithms to extract hydrological information from remotely sensed data and to develop new, or adapt existing, hydrological methods capable of making efficient use of this new information. Over the years, research and applications of remote sensing in Canadian hydrology have embraced a variety of topics and recent research has placed significant emphasis on radar remote sensing as the Canadian RADARSAT satellite was launched successfully on 4 November 1995. This paper reviews recent (1995-99) remote sensing contributions in hydrology by Canadians, specifically focusing on the usefulness and applicability of current remote sensing technology for water management purposes. A very brief description of the theory underlying each application as well as relevant sensors is presented.

1364. **Review of compost process-control for product function.**
Szmidt, R. A.
In: Microbiology of composting/ Insam, H.; Riddech, N.; and Klammer, S.
New York: Springer-Verlag, 2002; pp. 217-230.
ISBN: 354067568X; Conference: International Conference on Microbiology of Composting, Innsbruck, Austria, October 18-20, 2000
Descriptors: compost/ contamination/ safety/ control parameters/ engineering/ feedstock/ microbial dynamics/ pollution/ product function/ product use/ Agriculture / Bioprocess Engineering/ Pollution Assessment Control and Management/ Soil Science / Waste Management (Sanitation)/ composting/ waste processing method/ environmental management/ organic waste recycling/ waste management method/ waste management industry

1365. **A review of concepts and criteria for assessing agroecosystem health including a preliminary case study of southern Ontario.**
Xu, W. and Mage, J. A.
Agriculture, Ecosystems and Environment 83 (3): 215-233. (2001)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agriculture/ ecosystems/ agricultural research/ ecological balance/ indicators/ species diversity/ nutrient availability/ water availability/ interactions/ land use/ literature reviews/ Ontario
This citation is from AGRICOLA.

1366. **A review of conservation tillage strategies for humid temperate regions.**
Carter, M. R.
Soil and Tillage Research 31 (4): 289-301. (1994)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1367. **A review of decision support systems for fertiliser application and manure management.**
Falloon, P. D.; Smith, J. U.; and Smith, P.
Acta Agronomica Hungarica 47 (2): 227-236. (1999);
ISSN: 0238-0161
This citation is provided courtesy of CAB International/CABI Publishing.

1368. **Review of design and performance of the Pelenna wetland systems.**
Nuttall, C. A. and Connelly, R.
Land Contamination and Reclamation 11 (2): 293-300. (2003);
ISSN: 0967-0513
This citation is provided courtesy of CAB International/CABI Publishing.

1369. **A review of dissolved oxygen modelling techniques for lowland rivers.**
Cox, B. A.
Science of the Total Environment 314-316: 303-334. (2003)
NAL Call #: RA565.S365;
ISSN: 0048-9697.
Notes: Special issue: Land Ocean Interaction: processes, functioning and environmental management: A UK perspective
Descriptors: Environment/ Ecology/ dissolved oxygen/ biochemical oxygen demand/ photosynthesis/ respiration/ mass balance model/ rate parameter/ atmospheric reaeration/ water quality/ streams/ prediction/ coefficient/ rates/ respiration/ equations/ sediment/ systems
Abstract: This review introduces the methods used to simulate the processes affecting dissolved oxygen (DO) in lowland rivers. The important processes are described and this

provides a modelling framework to describe those processes in the context of a mass-balance model. The process equations that are introduced all require (reaction) rate parameters and a variety of common procedures for identifying those parameters are reviewed. This is important because there is a wide range of estimation techniques for many of the parameters. These different techniques elicit different estimates of the parameter value and so there is the potential for a significant uncertainty in the model's inputs and therefore in the output too. Finally, the data requirements for modelling DO in lowland rivers are summarised on the basis of modelling the processes described in this review using a mass-balance model. This is reviewed with regard to what data are available and from where they might be obtained.

1370. **Review of emission factors and methodologies to estimate ammonia emissions from animal waste handling: Research and development.**
Doorn, Michiel R. J.; Natschke, David F.; Meeuwissen, Pieter C.; North Carolina. Dept. of Environment and Natural Resources; United States. Environmental Protection Agency. Office of Air and Radiation; United States. Environmental Protection Agency. Office of Research and Development; and National Risk Management Research Laboratory (U.S.).
Washington, D.C.: Environmental Protection Agency. (2002)
Notes: Title from web page. "April 2002." "EPA/600/R-02/017." Prepare by National Risk Management Research Laboratory, for Office of Air and Radiation, U.S. Environmental Protection Agency, Office of Research and Development and State of North Carolina, Division of Air Quality, Department of Environment and Natural Resources. Description based on content viewed May 21, 2003. Includes bibliographical references. No. 68-C-99-201.
NAL Call #: TD930.2-D66-2002
http://www.epa.gov/ORD/NRMRL/Pubs/600R02017/600R02017.pdf
Descriptors: Animal waste---United States---Management---Methodology/ Animal waste Netherlands---Management---Methodology/ Ammonia---Environmental aspects
This citation is from AGRICOLA.

1371. **A review of environmental applications of bioluminescence measurements.**
Steinberg, S. M.; Poziomek, E. J.; Engelmann, W. H.; and Rogers, K. R.
Chemosphere 30 (11): 2155-2197. (1995)
NAL Call #: TD172.C54;
ISSN: 0045-6535
This citation is provided courtesy of CAB International/CABI Publishing.

1372. **Review of environmental monitoring methods: Survey designs.**
McDonald, T. L.
Environmental Monitoring and Assessment 85 (3): 277-292. (2003)
NAL Call #: TD194.E5;
ISSN: 0167-6369
This citation is provided courtesy of CAB International/CABI Publishing.

1373. **A Review of Factors Affecting Productivity of Bald Eagles in the Great Lakes Region: Implications for Recovery.**
Bowerman, W. W.; Giesy, J. P.; Best, D. A.; and Kramer, V. J.
Environmental Health Perspectives 103 (4 Supp.): 51-59. (1995)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765.
Notes: Conference: Work Session on Environmentally Induced Alterations in Development: A Focus on Wildlife, Racine, WI (USA), 10-12 Dec 1993 Source: Wildlife Development., 1995; Editors: Rolland, R. //Gilbertson, M. //Colborn, T.; Document number: NIH 95-218
Descriptors: DDT/ reproduction/ Haliaeetus leucocephalus/ United States, Great Lakes/ pesticides (organochlorine)/ PCB/ TCDD/ PCB compounds/ birds/ mortality/ water pollution/ eggs/ environmental quality/ polychlorinated biphenyls/ aquatic birds/ pollution effects/ Freshwater pollution/ North America, Great Lakes/ pesticides/ Environmental impact/ Toxicology and health/ Effects of pollution/ Effects on organisms
Abstract: The bald eagle (Haliaeetus leucocephalus) population in North America declined greatly after World War II due primarily to the eggshell thinning effects of p,p'-DDE, a biodegradation product of DDT. After the banning of DDT in the United States and Canada during the early 1970s, the bald eagle population started to increase. However, this population recovery has not been uniform. Eagles nesting along the shorelines of the North American Great Lakes and rivers open to spawning runs of anadromous fishes from the Great Lakes still exhibit impaired reproduction. We have explored both ecological and toxicological factors that would limit reproduction of bald eagles in the Great Lakes region. Based on our studies, the most critical factors influencing eagle populations are concentrations of environmental toxicants. While there might be some continuing effects of DDE, total PCBs and most importantly 2,3,7,8-tetrachlordibenzo-p-dioxin equivalents (TCDD-EQ) in fishes from the Great Lakes and rivers open to spawning runs of anadromous fishes from the Great Lakes currently represent a significant hazard to bald eagles living along these shorelines or near these rivers and are most likely related to the impaired reproduction in bald eagles living there.

1374. **A review of farm-scale nutrient budgets for organic farms as a tool for management of soil fertility.**
Watson, C A; Bengtsson, H; Ebbesvik, M; Loes, A K; Myrbeck, A; Salomon, E; Schroder, J; and Stockdale, E A
Soil Use and Management 18 ([supplement]): 264-273. (2002)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: nitrogen: budgets, fixation, nutrient, use efficiency/ nutrients: input output balance/ phosphorus: budgets, nutrient/ potassium: budgets, nutrient/ arable systems/ beef systems/ estimate bias sources/ farm scale nutrient budgets: soil fertility management tool/ horticultural systems/ long term sustainability/ management system diversity/ measurement bias sources/ organic farms/ purchased manure/ short term productivity
Abstract: On organic farms, where the importation of materials to build/maintain soil fertility is restricted, it is important that a balance between inputs and outputs of nutrients is achieved to ensure both short-term productivity and long-term

sustainability. This paper considers different approaches to nutrient budgeting on organic farms and evaluates the sources of bias in the measurements and/or estimates of the nutrient inputs and outputs. The paper collates 88 nutrient budgets compiled at the farm scale in nine temperate countries. All the nitrogen (N) budgets showed an N surplus (average 83.2 kg N ha-1 yr-1). The efficiency of N use, defined as outputs/inputs, was highest (0.9) and lowest (0.2) in arable and beef systems respectively. The phosphorus (P) and potassium (K) budgets showed both surpluses and deficits (average 3.6 kg P ha-1 yr-1, 14.2 kg K ha-1 yr-1) with horticultural systems showing large surpluses resulting from purchased manure. The estimation of N fixation and quantities of nutrients in purchased manures may introduce significant errors in nutrient budgets. Overall, the data illustrate the diversity of management systems in place on organic farms, and suggest that used together with soil analysis, nutrient budgets are a useful tool for improving the long-term sustainability of organic systems.

1375. **A Review of Field Lysimeter Studies to Describe the Environmental Fate of Pesticides.**
Winton, K. and Weber, J. B.
Weed Technology 10 (1): 202-209. (1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: lysimeters/ fate of pollutants/ pesticides/ transpiration/ leaching/ Sources and fate of pollution
Abstract: A brief review is presented for the use of soil lysimeters in studying transpiration, evapotranspiration, moisture, and nutrient movement in earlier times and pesticide dissipation and movement, and mass-balance of pesticide dissipation in more recent times. The important factors needed to understand research findings and to model pesticide dissipation such as key soil and site characteristics, climatic conditions, and the methods involved are discussed. Several case studies carried out by Ciba and North Carolina State University are discussed and current developments in soil column field lysimeters are presented.

1376. **A review of field scale phosphorus dynamics models.**
Lewis, D. R. and McGechan, M. B.
Biosystems Engineering 82 (4): 359-380. (Aug. 2002)
NAL Call #: S671-.B567;
ISSN: 1537-5110
Descriptors: phosphorus/ cycling/ simulation models/ transport processes/ phosphorus fertilizers/ manures/ slurries/ immobilization/ mineralization/ soil flora/ absorption/ desorption/ leaching/ runoff/ nutrient uptake/ crops/ losses from soil/ water erosion/ overland flow/ literature reviews
Abstract: In order to ascertain the limitations of current soil phosphorus models, three dynamic models are reviewed and compared, along with a more general contaminant transport model which has been applied to phosphorus dynamics. These models are ANIMO from the Netherlands, GLEAMS and DAYCENT from the USA, and MACRO from Sweden. The model concepts and constituent processes are analysed with particular reference to the equations used. Processes considered are the transport of soluble and particulate phosphorus, surface application (as fertilizer, manure or slurry, atmospheric deposition, and deposition or incorporation of dead plant material), mineralization/immobilization (between organic and inorganic forms), absorption/desorption, leaching, runoff and uptake by plants. All the models considered have a partial representation of these processes. In order to improve our understanding and simulation of phosphorus in soils, further P modelling work is required, which should be focussed on constructing a new hybrid version of the four models described here. Such a model is likely to include a description of both soluble and particulate P flow through micropores and macropores as in the MACRO model framework, combined with a full representation of the C/N/P cycle as described by GLEAMS, with manure and slurry components as described by ANIMO, and plant residue decay equations taken from the DAYCENT model. Finally, the overland flow and erosion losses should be represented by components from the GLEAMS model.
This citation is from AGRICOLA.

1377. **Review of GIS Applications in Hydrologic Modeling.**
Devantier, B. A. and Feldman, A. D.
Journal of Water Resources Planning and Management 119 (2): 246-261. (1993)
NAL Call #: TC401.A45
Descriptors: Flood forecasting/ Geographic information systems/ Information systems/ Model studies/ Streamflow forecasting/ Computer models/ Computer programs/ Costs/ Databases/ Digital map data/ Erosion control/ Hydrologic models/ Numerical analysis/ Reviews/ Terrain analysis/ Topographic mapping/ Water management/ Water quality/ Watershed management / Streamflow and runoff/ Watershed protection/ Evaluation, processing and publication
Abstract: Geographic information systems (GIS) provide a digital representation of watershed characteristics used in hydrologic modeling. Past efforts and current trends in using digital terrain models and GIS to perform hydrologic analyses were summarized. GIS data types may be topographic or topologic. Three methods of geographic information storage are: raster or grid, triangulated irregular network, and contour-based line networks. Remotely-sensed data are used in GIS and hydrologic modeling. Lumped parameter, physics-based, and hybrid approaches to hydrologic rainfall-runoff modeling all use geographic data inputs. General indices of the tendency to produce runoff include imperviousness, natural land cover, and watershed delineation and stream networks. Some end uses of GIS hydrologic prediction are floodplain management and flood forecasting, erosion prediction/control, water quality prediction/control, and drainage utility implementations. Since the cost of implementing a GIS can be significant, especially when the cost of data collection and manipulation is considered, it is best when the database can be shared for several related purposes. With less limitation from computing power, the focus of future advancements may be

improved data collection, expanded databases, and advances in numerical modeling approaches. (Fish-PTT)

1378. **A review of information on interactions between vegetation and groundwater.**
Maitre, D. C. le; Scott, D. F.; and Colvin, C.
Water SA (Pretoria) 25 (2): 137-152. (1999);
ISSN: 0378-4738
This citation is provided courtesy of CAB International/CABI Publishing.

1379. **Review of Information on Pesticide Residues in the Canadian Environment.**
Sangodoyin, A. Y. and Smith, D. W.
Environmentalist 16 (3): 187-196. (1996);
ISSN: 0251-1088
Descriptors: Canada/ Reviews/ Pesticides/ Monitoring/ Developing Countries/ Compliance/ Safety/ Assessments/ Spatial Distribution/ Temporal Distribution/ Pesticide residues/ Wildlife/ Pollution monitoring/ Food contamination/ Water pollution/ Air pollution/ Government regulations/ Sediment pollution/ Pollution control/ Pollution dispersion/ Identification of pollutants/ Environmental action/ Behavior and fate characteristics
Abstract: Pesticide residues in soil, water, food, wildlife and other media have been analysed in several monitoring studies. The purpose was to establish the distribution of these residues across a defined area, ascertain their trend over a specific period and use the results to assess environmental compliance and safety. In the present review the availability of information on pesticide residues in various Canadian environmental components was sought. With the possible exception of localized pesticide contamination of some private water supply wells, ground and surface water, most analyses revealed concentrations below guideline limits. Only a few cases were reported of mishandling, misuse and poisoning from pesticides. Continuing surveillance programmes and in-depth and well-organized monitoring studies, with special focus on areas that are vulnerable to contamination, by both provincial and federal governments, are largely responsible for the encouraging results. This experience in the control of pesticide use and monitoring of residues in the environment should be of particular interest in developing countries.

1380. **A review of irrigation performance assessment in California.**
Purkey, D. R. and Wallender, W. W.
Irrigation and Drainage Systems 8 (4): 233-249. (1994)
NAL Call #: TC801.I66;
ISSN: 0168-6291 [IRDSEG]
Descriptors: irrigation/ irrigated farming/ irrigation systems/ irrigation requirements/ hydraulic structures/ performance/ irrigability surveys/ California
This citation is from AGRICOLA.

1381. **A review of methods for measuring emission rates of ammonia from livestock buildings and slurry or manure stores, part 1: Assessment of basic approaches.**
Phillips VR; Scholtens R; Lee DS; Garland JA; and Sneath RW
Journal of Agricultural Engineering Research 77 (4): 355-364; 39 ref. (2000)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

1382. **A review of methods for measuring emission rates of ammonia from livestock buildings and slurry or manure stores, part 2: Monitoring flux rates, concentrations and airflow rates.**
Phillips VR; Lee DS; Scholtens R; Garland JA; and Sneath RW
Journal of Agricultural Engineering Research 78 (1): 1-14; Many ref. (2001)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

1383. **A Review of Methods Used to Measure Sediment Resuspension.**
Bloesch, J.
Hydrobiologia 284 (1): 13-18. (1994)
NAL Call #: 410 H992;
ISSN: 0018-8158.
Notes: Conference: Special Session at the 25. Cong. of the Int. Association of Limnology, Barcelona (Spain), 21-27 Aug 1992; Source: Sediment Resuspension., 1994; Editor: Bloesch, J.
Descriptors: sediments/ suspended sediments/ bottom sediments/ lakes/ lake sediments/ measuring instruments/ wind/ cores/ turbidity/ measurement/ resuspension/ resuspended sediments/ sedimentation/ lacustrine sedimentation/ Erosion and sedimentation/ Lakes/ Methods and instruments
Abstract: Resuspension of bottom sediments is an important lake-internal process with regard to particle cycling and sedimentation. Current methods to measure sediment resuspension are reviewed, such as optical and acoustical instruments, instantaneous multiple point water samplers, sediment traps, sediment cores and grabs, radiotracers such as Pb super(210), Cs super(137) and Be super(7), mass balance calculations, various modelling approaches, statistical methods (correlation analysis), and laboratory experiments. For the quantification of resuspension, the combined use of sediment traps, sediment cores, near bottom current meters, and turbidity meters to measure suspended and settling particulate matter in the hypolimnion of lakes is recommended; in addition, wind stress, seiches, slumping and sliding, and riverine input may be monitored to elucidate the mechanisms behind the process.

1384. **A review of microbiology in swine manure odor control.**
Zhu, Jun
Agriculture, Ecosystems and Environment 78 (2): 93-106. (2000)
NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: volatile organic compounds/ Clostridium (Endospore forming Gram Positives)/ Eubacterium (Irregular Nonsporing Gram Positive Rods)/ Bacteria/ Eubacteria/ Microorganisms/ low temperature/ swine manure: odor control
Abstract: Generation of odors is a complex process that involves many bacterial species, producing an extensive array of volatile organic compounds under different manure storage systems currently used. A lack of understanding of the basic microbiology in manure leads to a poor odor prevention and control from animal wastes. This review covers

pertinent available information about the indigenous bacterial genera in swine manure and their potentials of producing odorous volatile compounds. It addresses not only the odorous compounds in swine manure but also the inherent relations between the bacterial species and the related compounds. It also discusses several odor control techniques that have been developed based on microbial activities and the limitations with these techniques. Two bacterial genera, Eubacterium and Clostridium, are most likely the major contributors to odorous volatile fatty acids. It appears that anaerobic lagoons may not be an appropriate choice for treating swine manure for odor control due to the reduced methonogenic activities resulted from the low temperatures in lagoon liquid. Also, it seems questionable that the microbial-based manure additives will work, without aeration, in a real storage system for the purpose of odor control.
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1385. **Review of modelling crop growth, movement of water and chemicals in relation to topsoil and subsoil compaction.**
Lipiec, J.; Arvidsson, J.; and Murer, E.
Soil and Tillage Research 73 (1/2): 15-29. (2003)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1386. **A review of New Zealand research measuring phosphorus in runoff from pasture.**
Gillingham, A. G. and Thorrold, B. S.
Journal of Environmental Quality 29 (1): 88-96. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

1387. **A review of pesticide effects upon immature aphid parasitoids within mummified hosts.**
Longley, M.
International Journal of Pest Management 45 (2): 139-145. (Apr. 1999-June 1999)
NAL Call #: SB950.A1P3;
ISSN: 0967-0874
Descriptors: aphidoidea/ parasitoids/ parasites of insect pests/ pesticides/ nontarget organisms/ nontarget effects/ toxicity/ mortality/ longevity/ fecundity/ sublethal effects/ insect control/ integrated pest management/ literature reviews/ aphid mummies
This citation is from AGRICOLA.

1388. **Review of Phosphorus Control Measures in the United States and Their Effects on Water Quality.**
Litke, D. W.
U. S. Department of the Interior, U. S. Geological Survey [Also available as: USGS Water-Resources Investigations Report 99-4007], 1999 (application/pdf)
http://water.usgs.gov/nawqa/nutrients/pubs/wri99-4007/wri99-4007.pdf
Descriptors: phosphorus/ environmental management/ water quality analysis/ wastewater treatment/ pollution load/ nonpoint source pollution/ agricultural runoff/ eutrophication/ detergents/ National Water Quality Assessment Program / United States/ phosphorus detergents/ NWQAP
Abstract: Historical information on phosphorus loadings to the environment and the effect on water quality are summarized in this report, which was produced as part of the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program. Phosphorus is a water-quality constituent of concern because it is often the limiting nutrient responsible for accelerated eutrophication in water bodies.

1389. **A review of plant disease, pathogen interactions and microbial antagonism under conservation tillage in temperate humid agriculture.**
Sturz, A. V.; Carter, M. R.; and Johnston, H. W.
Soil and Tillage Research 41 (3/4): 169-189. (1997)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1390. **A review of prescribed burning effectiveness in fire hazard reduction.**
Fernandes, P. M. and Botelho, H. S.
International Journal of Wildland Fire 12 (2): 117-128. (2003);
ISSN: 1049-8001
This citation is provided courtesy of CAB International/CABI Publishing.

1391. **A review of processes responsible for metal removal in wetlands treating contaminated mine drainage.**
Sobolewski, A.
International Journal of Phytoremediation 1 (1): 19-51. (1999)
NAL Call #: TD192.75-.I58;
ISSN: 1522-6514
Descriptors: mine spoil/ contaminants/ waste water treatment/ biogeochemistry/ wetlands/ bioremediation/ pollution control/ literature reviews/ constructed wetlands
This citation is from AGRICOLA.

1392. **A review of rainfall simulators for soil erosion studies.**
Shrivastava, P. K. and Ghanshyam Das
Indian Journal of Soil Conservation 26 (2): 76-80. (1998)
NAL Call #: S625.I47S6
This citation is provided courtesy of CAB International/CABI Publishing.

1393. **Review of selected literature on indicators of irrigation performance.**
Rao, P. S. and International Irrigation Management Institute.
Colombo, Sri Lanka: International Irrigation Management Institute; xiii, 75 p.: ill. (1993)
Notes: "Research paper." Includes bibliographical references (p. 65-67).
NAL Call #: S619.E34R36--1993;
ISBN: 9290901985
Descriptors: Irrigation efficiency/ Irrigation---Bibliography
This citation is from AGRICOLA.

1394. **A review of soil erosion potential associated with biomass crops.**
Kort, J.; Collins, M.; and Ditsch, D.
Biomass and Bioenergy 14 (4): 351-359. (1998);
ISSN: 0961-9534
This citation is provided courtesy of CAB International/CABI Publishing.

1395. **Review of Strategies for Modelling the Environmental Fate of Pesticides Discharged Into Riverine Systems.**
Petit, V.; Cabridenc, R.; Swannell, R. P. J.; and Sokhi, R. S.
Environment International 21 (2): 167-176. (1995)
NAL Call #: TD169.E54;
ISSN: 0160-4120.
Notes: Conference: Inland and Coastal Water Quality '93 --

Measurement and Modelling, Stevenage (UK), 29 Sep 1993; Source: Proceedings of the Inland and Coastal Water Quality '93 -- Measurement and Modelling; Editors: Sokhi, R. S. //Ellis, J. B. //Burton, J. D. //Leeks, G. J. L.
Descriptors: fate of pollutants/ pesticides/ rivers/ model studies/ agricultural chemicals/ water pollution sources/ herbicides/ aquatic environment/ agrochemicals/ aquatic environment/ biodegradation/ sorption/ aquatic microorganisms/ pollutant persistence/ pollution dispersion/ models/ fate/ degradation/ Sources and fate of pollution/ Freshwater pollution/ Microbial degradation/ Characteristics, behavior and fate
Abstract: Pesticides are often produced and stored in large quantities near rivers posing a potential hazard for the aquatic environment. Accidental incidents such as storage facility fires are of major concern as significant amounts of pesticide chemicals can enter the nearby riverine system, possibly causing considerable environmental damage. This paper discusses and reviews the major physical, chemical, and microbiological fate processes of selected herbicides in riverine systems. Glyphosate, paraquat, and diquat herbicides have been selected for discussion as they are widely used and because they degrade in freshwater mainly by well-defined fate processes. The paper concentrates on biodegradation, sorption, and photolysis, the primary fate processes by which these herbicides degrade. Strategies for mathematically modelling the environmental fate of pesticides in rivers are reviewed and areas of future work identified.

1396. **A review of stream restoration techniques and a hierarchical strategy for prioritizing restoration in Pacific Northwest watersheds.**
Roni, P.; Beechie, T. J.; Bilby, R. E.; Leonetti, F. E.; Pollock, M. M.; and Pess, G. R.
North American Journal of Fisheries Management 22 (1): 1-20. (2002)
NAL Call #: SH219.N66;
ISSN: 0275-5947
This citation is provided courtesy of CAB International/CABI Publishing.

1397. **A review of the aquatic environmental fate of triclopyr and its major metabolites.**
Petty, D. G.; Getsinger, K. D.; and Woodburn, K. B.
Journal of Aquatic Plant Management 41: 69-75. (2003)
NAL Call #: SB614.H9;
ISSN: 0146-6623.
Notes: Number of References: 37
Descriptors: Aquatic Sciences/ Garlon 3A/ Renovate 3/ metabolite/ toxicology/ aquatic plant control/ herbicide dissipation/ Rhodamine WT dye/ triethylamine salt/ lake minnetonka/ dissipation/ toxicity/ 3,5,6 trichloro 2 pyridinol
Abstract: The triethylamine salt formulation of triclopyr was recently registered for use in aquatic sites by the U.S. Environmental Protection Agency for selective control of invasive aquatic and wetland weed species. Research shows that this herbicide and its metabolites have an environmentally compatible degradation scenario, an excellent toxicological profile, and the ability to selectively control a variety of exotic weed species, making it a valuable tool for restoring and managing aquatic ecosystems. Laboratory studies show that photolytic processes rapidly degrade triclopyr, indicating a major role in dissipation from aquatic sites. However, subsequent field studies indicate that photolysis has a more limited role in the aquatic degradation, likely due to sunlight attenuation in natural waters, and show that metabolic degradation processes assume a more important role. Laboratory investigations show aerobic and anaerobic degradation in hydrosoils is a slower process, and hydrolysis plays a minor role in triclopyr degradation. Field studies conducted in California, Georgia, Minnesota, Missouri, Texas and Washington have shown triclopyr and its TCP and TMP metabolites dissipated from water with half-lives ranging from 0.5 to 7.5, 4.2 to 10.0, and 4.0 to 8.8 days, respectively. Sediment dissipation half-lives ranged from 2.7 to 13.3 days for the same compounds. Half-lives for fish and shell fish ranged from 1.6 to 15.1 days. Results from laboratory and field studies indicate dissipation rates of the parent triclopyr and its metabolites are similar and relatively rapid.

1398. **A Review of the Design and Performance of Vertical-Flow and Hybrid Reed Bed Treatment Systems.**
Cooper, P.
Water Science and Technology 40 (3): 1-9. (1999)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: 6. International Conference on Wetland Systems for Water Pollution Control, Aguas de Sao Pedro, SP (Brazil), 27 Sep-2 Oct 1998
Source: Wetland Systems for Water Pollution Control; Editor: Cooper, P.;
ISBN: 008043424X
Descriptors: Vertical Flow/ Reviews/ Wetlands/ Oxygen Transfer/ Denitrification/ Water Treatment/ reed beds/ Wastewater treatment processes
Abstract: The paper reviews the different options for the combination of vertical- and horizontal-flow beds used in hybrid reed bed/wetland systems. The design and performance of these systems are briefly described. The importance of the oxygen transfer capacity of the different arrangements to their performance and their size is discussed. Alternative methods for denitrification are briefly described.

1399. **Review of the effect of ammonia and dust concentrations on broiler performance.**
Al-Homidan, A.; Robertson, J. F.; and Petchey, A. M.
World's Poultry Science Journal 59 (3): 340-349. (2003)
NAL Call #: 47.8-W89;
ISSN: 0043-9339
This citation is provided courtesy of CAB International/CABI Publishing.

1400. **A review of the effect of N fertilizer type on gaseous emissions.**
Harrison, R. and Webb, J.
Advances in Agronomy *73: 65-108.* (2001)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: nitrogen fertilizers/ nutrient sources/ nitrogen/ air pollutants/ air pollution/ ammonia/ volatilization/ nitrous oxide/ nitric oxide/ urease inhibitors/ measurement/ nitrification/ literature reviews
This citation is from AGRICOLA.

1401. **Review of the effects of non-point nutrient loading on coastal ecosystems.**
Gabric, A. J. and Bell, P. R. F.
Australian Journal of Marine and Freshwater Research 44 (2): 261-283. (1993);
ISSN: 0067-1940
Descriptors: pollution effects/ nutrients (mineral)/ literature reviews/ coastal waters/ eutrophication/ ecosystem management/ runoff/ erosion/ land use/ coastal zone management/ man induced effects/ human factors/ coastal water/ nutrients/ nonpoint pollution/ non point pollution/ Ecosystems and energetics/ Effects on organisms/ Pollution Environment/ Coastal zone management/ Pollution effects/ Marine Pollution
Abstract: In many coastal regions (e.g. parts of the North Sea, northern Adriatic Sea, Baltic Sea, Great Barrier Reef lagoon, wider Caribbean, coastal areas of the USA) there is large-scale, and in some cases chronic, eutrophication. In some regions, the link between eutrophication and the destruction of an ecosystem is obvious, with excessive algal growth and water-column anoxia. In other cases, particularly in more fragile ecosystems such as coral-reef and seagrass areas, the links are not so obvious, yet the impacts of eutrophication in such regions can be devastating. Eutrophication can have more insidious effects such as contributing directly to the mortality of fish, marine mammals and sea birds and indirectly to disease or death in humans owing to the accumulation of biotoxins in seafoods. Increased development and changes in land-use patterns in the coastal zone have increased the loading of diffuse or non-point nutrients. In areas subject to runoff and soil erosion, most of the nutrient load is transported in particulate form. In such cases, the loads of nutrients discharged from cropping lands are typically an order of magnitude greater than those discharged from pristine forested areas. Nutrient export from pasture lands, whether these are fertilized or not, is also significantly greater than that from pristine areas, and in many cases the total loads from such areas are far higher than those from intensively farmed areas. A reduction in nutrient discharges to coastal waters will require careful land-use planning. The importance of the particulate fraction in the nutrient load necessitates effective control of soil erosion. The hydrological and nutrient linkage between terrestrial and marine ecosystems must be emphasized. Collective management of hinterland and coastal-zone resources could initiate remediation of a serious and growing problem.

1402. **A review of the environmental effects of different livestock manure storage systems, and a suggested procedure for assigning environmental ratings.**
Nicholson, R. J.; Webb, J.; and Moore, A.
Biosystems Engineering 81 (4): 363-377. (Apr. 2002)
NAL Call #: S671-.B567;
ISSN: 1537-5110
Descriptors: animal manures/ storage/ structures/ odor emission/ water pollution/ groundwater pollution/ ammonia/ methane/ nitrous oxide/ nitric oxide/ pathogens/ emission/ risk assessment/ literature reviews/ manure storage structures
Abstract: There are concerns over a range of adverse environmental effects resulting from the storage of livestock manures on farms. The objectives of this study were to examine all the likely environmental effects of different storage methods, and to recommend which were the most desirable options. Literature reviews were undertaken to identify the likely environmental consequences of each commonly used storage method, in terms of water pollution risks, odor and ammonia emissions, greenhouse gas emissions and survival of microorganisms during storage. Planning and landscape aspects were considered and the most feasible options for abatement of ammonia emissions were identified. An 'environmental rating' for different storage systems was then devised, with the aim of obtaining a balance between water pollution, aerial emissions and other concerns. The environmental rating exercise favored the more sophisticated and hence most expensive storage methods. No large differences emerged between ratings for slurry systems and solid systems when ease of adding ammonia control measures was excluded. For pigs, slurry systems appear to have a slight advantage, because of the greater ammonia emissions from the solid pig manure. The use of such a rating system could be developed further as more data become available. Whilst the method indicates the relative desirability of systems at a national scale it could be adapted to take account of local considerations or those of individual farm sites.
This citation is from AGRICOLA.

1403. **A Review of the Evidence for Endocrine Disruption in Canadian Aquatic Ecosystems.**
Mcmaster, M. E.
Water Quality Research Journal of Canada 36 (3): 215-231. (2001);
ISSN: 1201-3080.
Notes: Theme Issue: Endocrine Disrupting Substances in the Canadian Environment
Descriptors: Endocrine system/ Reviews/ Aquatic environment/ Pesticides/ Heavy metals/ Industrial pollution/ Canada/ Water pollution/ Chemical pollution/ Research programs/ Contaminants/ endocrine disruptors/ Pollution effects/ Wildlife/ Toxicity/ Trout (Freshwater)/ Effluent/ Pulping/ Endocrine glands/ Chemicals/ Pulp and paper industry waste waters (Sulphate)/ Salmon/ Tin (Organic compounds)/ Trout/ Salmon/ Water Pollution Effects/ Effluents/ Pulp Wastes/ Kraft Mills/ Fish Populations/ Pisces/ Canada/ endocrine disruptors/ Freshwater pollution/ Effects of Pollution/ Effects of pollution
Abstract: Endocrine disrupting substances in the environment and the potential affects they have on wildlife species has recently received increased public attention. This paper provides background information on research that has addressed the endocrine disruption issue in the Canadian aquatic environment as well as information on studies that are presently being conducted within the country to address this issue. Two of the three studies from across the world often cited as presenting sufficient evidence for connecting contaminants and endocrine disruption in fish populations are Canadian -- Lake Ontario lake trout and TCDD and related compounds, and white sucker exposed to bleached kraft pulp mill effluent. Several other Canadian examples exist, including altered stress responses in yellow perch exposed to heavy metals, altered smoltification in Atlantic salmon exposed to 4-

nonylphenol and imposex in dogwelks exposed to tributyltin. While other Canadian studies suggest alterations in reproductive function in fish, direct links to contaminants have not been made. Other studies have identified endocrine active compounds in the receiving environments but have yet to link these to alterations in endocrine function in resident fish populations. The strength of Canada's research programs lies in the breadth and depth of their field related research. It is this world-recognized expertise and strength that Canada can contribute to the international effort to address the endocrine disruptor issue.

1404. **A review of the export of carbon in river water: Fluxes and processes.**
Hope, D.; Billett, M. F.; and Cresser, M. S.
Environmental Pollution 84 (3): 301-324. (1994)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491 [ENPOEK]
Descriptors: carbon/ organic compounds/ transport processes/ river water/ watersheds/ upland areas/ flow/ land use/ acidification/ global warming/ carbon cycle
This citation is from AGRICOLA.

1405. **A review of the Federal Clean Water Act and the Maryland Water Quality Improvement Act: The rationale for developing a water and nutrient management planning process for container nursery and greenhouse operations.**
Lea Cox, J. D. and Ross, D. S.
Journal of Environmental Horticulture 19 (4): 226-229. (Dec. 2001)
NAL Call #: SB1.J66;
ISSN: 0738-2898 [JEHOD5]
Descriptors: nurseries/ greenhouse crops/ water quality/ pollution/ water conservation/ economic analysis/ leaching/ environmental protection/ nitrogen/ phosphorus/ eutrophication/ United States/ Maryland
This citation is from AGRICOLA.

1406. **Review of the methods to determine the hazard and toxicity of pesticides to bumblebees.**
Steen, Jozef J. M. van der
Apidologie 32 (5): 399-406. (2001);
ISSN: 0044-8435
Descriptors: pesticides: toxin/ bumblebees (Hymenoptera): adult, nontarget organism/ Animals/ Arthropods/ Insects/ Invertebrates/ acute toxicity/ apiculture/ field hazards/ sublethal effects
Abstract: Methods to determine the impact of pesticides on bumblebees are described. They are classified into laboratory tests to determine the acute toxicity and the hazard to bumblebees, (semi) field tests, and brood tests. The reproducibility and the significance of the data for practical purpose are discussed. Standardized laboratory toxicity tests supply reproducible data. In hazard tests, both in the laboratory and semi field tests, the exposure is not proportionate to the number of adult insects and the brood. Field tests provide realistic data on the hazard of a pesticide to bumblebee colonies but when the results are interpreted it must be taken in account that the test plot is only a portion of the total foraging area of a bumblebee colony. In a brood nest, due to the disorderly structure, only major effects can be recognized. Laboratory rearing of bumblebee brood should be developed to produce a standardized brood test that supplies reproducible data.

1407. **A review of the scientific literature on riparian buffer width, extent and vegetation.**
Wenger, Seth. and University of Georgia. Institute of Ecology. Office of Public Service & Outreach.
Athens, Ga.: University of Georgia Institute of Ecology (Rev. version (Mar. 5, 1999)). (1999)
Notes: Caption title.
NAL Call #: QH541.15.B84-W45-1999
http://outreach.ecology.uga.edu/tools/buffers/lit_review.pdf
Descriptors: Buffer zones---Ecosystem management---Georgia
This citation is from AGRICOLA.

1408. **Review of the small watershed program: Hearing before the Subcommittee on Environment, Credit, and Rural Development of the Committee on Agriculture, House of Representatives, One Hundred Third Congress, second session on H.R. 1634, H.R. 2460, H.R. 4213, H.R. 4289, September 27, 1994.**
United States. Congress. House. Committee on Agriculture. Subcommittee on Environment, Credit and Rural Development.
Washington: U.S. G.P.O.; iv, 208 p.: ill. (1995)
Notes: Distributed to some depository libraries in microfiche. Shipping list no.: 95-0090-P. "Serial no. 103-94." Includes bibliographical references. SUDOCS: Y 4.AG 8/1:103-94.
NAL Call #: KF27-.A3338-1994b;
ISBN: 0160468337
Descriptors: Watersheds---United States/ Watershed management---United States/ Water resources development---United States
This citation is from AGRICOLA.

1409. **Review of the Use of Swine Manure in Crop Production: Effects on Yield and Composition and on Soil and Water Quality.**
Choudhary, M.; Bailey, L. D.; and Grant, C. A.
Waste Management and Research 14 (6): 581-595. (Dec. 1996)
NAL Call #: TD896.W37;
ISSN: 0734-242X
Descriptors: manure/ animal wastes/ land application/ crops/ agriculture/ nutrients/ water quality/ soil/ fertilizers/ Canada/ waste disposal/ livestock/ waste management/ Waste management/ Ultimate disposal of wastes
Abstract: The world swine population produces about 1.7 billion tonnes of liquid manure annually. At an application rate of 20 tonnes per hectare, this could fertilize about 85 million hectares of land annually. Storage and disposal of this material presents a challenge to producers because of the potential for environmental pollution. However, because swine manure contains essential plant nutrients, use of swine manure as a soil amendment for crop production is a practical method to solve the disposal problem. The composition and effectiveness of swine manure as a source of plant nutrients depends on several factors including type of ration fed, housing system, method of manure collection, storage and handling. Research has shown that manure application increased soil N, P, K, Ca, Mg and Na. However, heavy or excessive application of manure increased leaching of NO sub(3)-N, P and Mg. Swine manure is reported to be effective in increasing the yields of cereals, legumes, oilseeds, vegetables and pastures, and in increasing plant nutrient

concentration, especially N, P and K. The efficient use of swine manure can be an agronomically and economically viable management practice for sustainable crop production in temperate regions such as the Canadian prairies where the swine industry is expanding rapidly.

1410. **A review of tillage effects on crop residue management, seedbed conditions and seedling establishment.**
Guérif, J.; Richard, G.; Dürr, C.; Machet, J. M.; Recous, S.; and Roger-Estrade, J.
Soil and Tillage Research 61 (1/2): 13-32. (2001)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1411. **A review of trout management in southeast Minnesota streams.**
Thorn, W. C.; Anderson, C. S.; Lorenzen, W. E.; Hendrickson, D. L.; and Wagner, J. W.
North American Journal of Fisheries Management 17 (4): 860-872. (1997)
NAL Call #: SH219.N66;
ISSN: 0275-5947
Descriptors: Fishery management/ Sport fishing/ Man induced effects/ habitat/ Minnesota/ Habitats/ Trout/ Fish Management/ Fishing/ Stream Biota/ Watershed Management/ Salvelinus fontinalis/ Salmo trutta/ Minnesota/ historical account/ Habitat/ Sport fishing/ Management/ Watershed protection/ United States
Abstract: Agricultural development after 1850 in southeast Minnesota degraded instream habitat, and by 1900, the native brook trout Salvelinus fontinalis was extirpated from most streams. By the 1940s, after 60-70 years of stocking, the exotic brown trout Salmo trutta was the most common trout, but abundance was low and limited by lack of reproductive habitat. Soil conservation practices of the 1930s and 1940s and watershed management under Public Law (PL) 566 in the 1950s and 1960s reduced flooding, erosion, and sedimentation and increased infiltration and base flow. By the 1970s, brown trout reproduction was common, but abundance was still low. Fisheries managers of the Minnesota Department of Natural Resources assumed that adult habitat limited abundance, so they improved instream habitat in streams with public access, which increased brown trout abundance in some streams. Experimental management since 1975 has shown that the lack of adult habitat did limit trout abundance. This management regime has also enabled the quantification of habitat quality and has developed a decision key for brown trout management. When land management has degraded stream habitat, land treatments, acquisition of riparian corridors, and instream management are necessary to rehabilitate habitat and provide recreational fisheries.

1412. **A Review of Water Quality Concerns in Livestock Farming Areas.**
Hooda, P. S.; Edwards, A. C.; Anderson, H. A.; and Miller, A.
Science of the Total Environment 250 (1-3): 143-167. (2000)
NAL Call #: RA565.S365;
ISSN: 0048-9697.
Notes: DOI: 10.1016/S0048-9697(00)00373-9
Descriptors: Water quality/ Livestock/ Fertilizers/ Agrochemicals/ Animal wastes/ Pesticides/ Nutrient loss/ Manure/ Pathogens/ Water Pollution Sources/ Farming/ Agricultural Chemicals/ Water quality (Natural waters)/ Pollution (Water)/ Livestock/ Farms and farming/ Animal manures/ Pathogenic organism/ Pesticides/ Freshwater pollution/ Sources and fate of pollution/ Water Quality
Abstract: Post-war changes in farming systems and especially the move from mixed arable-livestock farming towards greater specialisation, together with the general intensification of food production have had adverse affects on the environment. Livestock systems have largely become separated into pasture-based (cattle and sheep) and indoor systems (pigs and poultry). This paper reviews water quality issues in livestock farming areas of the UK. The increased losses of nutrients, farm effluents (particularly livestock wastes), pesticides such as sheep-dipping chemicals, bacterial and protozoan contamination of soil and water are some of the main concerns regarding water quality degradation. There has been a general uncoupling of nutrient cycles, and problems relating to nutrient loss are either short-term direct losses or long-term, related to accumulated nutrient surpluses. Results from several field studies indicate that a rational use of manure and mineral fertilisers can help reduce the pollution problems arising from livestock farming practices. Several best management practices are suggested for the control of nutrient loss and minimising release of pathogen and sheep-dip chemicals into agricultural runoff.

1413. **A Review of Wetlands Remote Sensing and Defining New Considerations.**
Rundquist, D. C.; Narumalani, S.; and Narayanan, R.
Remote Sensing Reviews 20 (3): 207-226. (2001);
ISSN: 0275-7257
Descriptors: Wetlands research/ Spectral reflectance measurements/ Wetlands climate relationships/ Remote sensing of water resources/ Remote sensing/ Wetlands/ Data handling/ Spectral analysis/ Soil/ water systems/ Soil Water/ Data Collections/ Spectral Analysis/ Aquatic plants/ Water resources/ Environmental monitoring/ Classification systems/ Identification/ Reflectance/ Spectral composition / Plantae/ spectral signatures/ Observation methods/ Monitoring and Analysis of Water and Wastes/ Data acquisition/ Remote geosensing/ Ecological techniques and apparatus/ Swamps and Marshes
Abstract: Significant progress has been made in using remote sensing as a means of acquiring information about wetlands. This research provides a brief review of selected previous works, which address the issues of wetland identification, classification, biomass measurement, and change detection. Suggested new research emphases include compiling basic spectral-reflectance characteristics for individual wetland species by means of close-range instrumentation, analyzing canopies architectures to facilitate species identification, and assessing the impact on composite spectral signatures of wet soils and variable depths of standing water beneath emergent canopies. These research foci are justifiable when considered in

the context of environmental change / variability and the production of trace gases.

1414. **A Review of Whole-Plant Water Use Studies in Trees.**
Wullschleger, S. D.; Meinzer, F. C.; and Vertessy, R. A.
Tree Physiology 18 (8-9): 499-512. (1998)
NAL Call #: QK475.T74;
ISSN: 0829-318X.
Notes: Conference: International Symposium on Forests at the Limit: Environmental Constraints of Forest Function, Kruger National Park (South Africa), 11-17 May 1997
Descriptors: Plants/ Water Use/ Trees/ Surveys/ Lysimeters/ Measuring Instruments/ Water and plants
Abstract: Weighing lysimeters, large-tree potometers, ventilated chambers, radioisotopes, stable isotopes and an array of heat balance/heat dissipation methods have been used to provide quantitative estimates of whole-tree water use. A survey of 52 studies conducted since 1970 indicated that rates of water use ranged from 10 kg day super(-1) for trees in a 32-year-old plantation of Quercus petraea L. ex Liebl. in eastern France to 1,180 kg day super(-1) for an overstory Euperua purpurea Bth. tree growing in the Amazonian rainforest. The studies included in this survey reported whole-tree estimates of water use for 67 species in over 35 genera. Almost 90% of the observations indicated maximum rates of daily water use between 10 and 200 kg day super(-1) for trees that averaged 21 m in height. The thermal techniques that made many of these estimates possible have gained widespread acceptance, and energy-balance, heat dissipation and heat-pulse systems are now routinely used with leaf-level measurements to investigate the relative importance of stomatal and boundary layer conductances in controlling canopy transpiration, whole-tree hydraulic conductance, coordinated control of whole-plant water transport, movement of water to and from sapwood storage, and whole-plant vulnerability of water transport to xylem cavitation. Techniques for estimating whole-tree water use complement existing approaches to calculating catchment water balance and provide the forest hydrologist with another tool for managing water resources. Energy-balance, heat dissipation and heat-pulse methods can be used to compare transpiration in different parts of a watershed or between adjacent trees, or to assess the contribution of transpiration from overstory and understory trees. Such studies often require that rates of water use be extrapolated from individual trees to that of stands and plantations. The ultimate success of this extrapolation depends in part on whether data covering short time sequences can be applied to longer periods of time. We conclude that techniques for estimating whole-tree water use have provided valuable tools for conducting basic and applied research. Future studies that emphasize the use of these techniques by both tree physiologists and forest hydrologists should be encouraged.

1415. **Review on emissions of ammonia from housing systems for laying hens in relation to sources, processes, building design and manure handling.**
Koerkamp PWGG and Groot Koerkamp PWG
Journal of Agricultural Engineering Research 59 (2): 73-87; 81 ref. (1994)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

1416. **A review on environmental impacts of nutritional strategies in ruminants.**
Tamminga, S.
Journal of Animal Science 74 (12): 3112-3124. (Dec. 1996)
NAL Call #: 49-J82;
ISSN: 0021-8812 [JANSAG].
Notes: Paper presented at the symposium "Ruminant Nutrition from an Environmental Perspective" at the ASAS 87th Annual Meeting, July 1995, Orlando, Florida. Includes references.
Descriptors: ruminant feeding/ nutrient balance/ energy sources/ net energy/ energy content/ feeds/ carbon/ nitrogen/ phosphorus/ potassium/ ratios/ excretion/ losses/ nitrogen fertilizers/ dairy cows/ milk yield/ cattle manure/ urine/ literature reviews/ Netherlands
Abstract: Primary (plant), secondary (animal), and tertiary (human) biological systems are driven by energy, either fossil or renewable energy in biomass. Their ratio shifts from about 10:90 in primary, via 25:75 in secondary, to 90:10 in tertiary systems. Energy input in ruminant production is mainly as plants and plant parts from primary production, and the amount needed per unit product (milk, meat) primarily depends on its digestibility. This is high in young, leafy, whole plants, in roots and tubers, and in reproductive organs (whole seeds) or organ parts (by-products) of mature plants. Use of fossil energy per kilogram of DM for primary production ranges from 1 to 3 MJ in forage to over 8 MJ in concentrate feeds, whereas input per kilogram of milk is 1 to 10 MJ. Biomass energy used in ruminant production contains nitrogen (N), phosphorus (P), and potassium (K), but in a ratio rarely balanced to the animals requirements. In secondary systems, energy is partitioned between foods of animal origin and waste. The latter contains OM, N, P, K, and gases (CO2, CH4), which may cause environmental problems. Losses per kilograms of milk vary and are 10 to 45 g for N, 0 to 3 g for P, and 2 to 20 g for K. Environmental impacts of animal production can be reduced by varying the use of inorganic fertilizer and changing the forage to concentrate ratio. Digestibilities can be improved by proper harvest management. Level and ratio of dietary N, P, and K can be adjusted to requirements by selecting proper ingredients, reducing their loss in waste. Limited scope exists to reduce losses in respiration and fermentation gases.
This citation is from AGRICOLA.

1417. **A review on sustainable nitrogen management in intensive vegetable production systems.**
Neeteson, J. J.; Booij, R.; and Whitmore, A. P.
Acta Horticulturae (506): 17-26. (Dec. 1999)
NAL Call #: 80 Ac82;
ISSN: 0567-7572 [AHORA2]
Descriptors: vegetables/ intensive cropping/ nitrogen
This citation is from AGRICOLA.

1418. **Review: Plant Life in Extremely Acidic Waters.**
Nixdorf, B.; Fyson, A.; and Krumbeck, H.
Environmental and Experimental Botany 46 (3): 203-211. (2001); *ISSN:* 0098-8472.
Notes: Special Issue: Plants and Organisms in Wetland Environments
Descriptors: Reviews/ Acidity/ pH effects/ Algae/ Phytoplankton/ Primary production/ Autotrophy/ Phototrophy/ Nutrients/ Water column/ Sediments/ Water Pollution Effects/ Acidic Water/ Ecological Effects/ Aquatic Plants/ Ecosystems/ Ecological Distribution/ Interfaces/ Primary Productivity/ Adaptation/ Adaptations/ Wetlands/ Plant metabolism/ Photosynthesis/ Limiting factors/ Bacteria/ Algae/ Plantae/ Bacteria/ Algae/ Effects of pollution/ Physiology, biochemistry, biophysics/ Mechanical and natural changes
Abstract: In acidic waters, a variety of autotrophic organisms are found including phototrophic bacteria, phytoplankton, filamentous- and micro-benthic algae and macrophytes. To explain the occurrence and distribution of primary producers we must answer the following question. What is acidity and where and how does it influence autotrophic metabolism in aquatic ecosystems? The very low pH per se will have profound effects on the survival and growth of organisms and therefore influence biodiversity. On the other hand, we observed a spatial structuring of phototrophic colonization according to the supply of nutrients at interfaces or specific layers. These are interfaces between sediment and water and the chemocline of meromictic lakes or in the case of planktonic development, chlorophyll maxima in the hypolimnion. Therefore, we attempt to analyze the growth conditions for different types of autotrophic organism in relation to resource demands and the distribution of limiting nutrients in sediments and the water column. Adaptations may be morphological (e.g. size, shape, surface area), physiological (e.g. heterotrophic or mixotrophic metabolism, CO sub(2) concentrating mechanisms, low intrinsic growth rates), behavioral (e.g. diurnal migration) or ecological (low grazing pressure, low losses through sedimentation).

1419. **A Review: Pyrite Oxidation Mechanisms and Acid Mine Drainage Prevention.**
Evangelou, V. P. B. and Zhang, Y. L.
Critical Reviews in Environmental Science and Technology 25 (2): 141-199. (1995)
NAL Call #: QH545.A1C7; *ISSN:* 1064-3389
Descriptors: review/ oxidation/ acid mine drainage/ sulfur/ heavy metals/ pyrite/ ores/ mineral industry/ mine drainage/ mine tailings/ drainage water/ acidification/ environmental impact/ water pollution/ pollution control/ Water quality control/ Freshwater pollution/ Prevention and control
Abstract: Sulfide oxidation, part of sulfur's biotic/abiotic cycle, is an important natural phenomenon. However, because of the sulfide's association with metallic ores and fossil fuels in the form of pyrite (FeS sub(2)) and the world's increasing demand for metals and fossil fuels, sulfide oxidation in nature is in some state of perturbation. This perturbation, which results from land disturbances (e.g., mining, and/or ore processing), produces acid drainage often enriched with heavy metals. This acid drainage, commonly referred to as acid mine drainage (AMD), has become an economic and environmental burden. This review deals with abiotic/biotic modes of pyrite oxidation and the mechanistic involvement of OH super(-), O sub(2), and Fe super(3+) in the pyrite oxidation process in low/high pH environments. Also included is recent evidence on the potential involvement of CO sub(2) in catalyzing pyrite oxidation in near-neutral and alkaline environments. Finally, the review deals with various pyrite-oxidation control approaches, the merits of these approaches, and some new and promising pyrite microencapsulation techniques currently under development in our laboratory.

1420. **Review the impact of wetlands and nonpoint source pollution regulations on agricultural land: Hearing before the Subcommittee on Environment, Credit, and Rural Development of the Committee on Agriculture, House of Representatives, One Hundred Third Congress, second session, March 23, 1994.**
United States. Congress. House. Committee on Agriculture. Subcommittee on Environment, Credit and Rural Development.
Washington: U.S. G.P.O.; iv, 234 p.: ill. (1994)
Notes: Distributed to some depository libraries in microfiche. Shipping list no.: 94-0333-P. "Serial no. 103-61." Includes bibliographical references (p. 146-148). SUDOCS: Y 4.AG 8/1:103-61.
NAL Call #: KF27.A3338--1994; *ISBN:* 016045929X
Descriptors: Agricultural laws and legislation---United States/ Nonpoint source pollution---United States/ Wetlands---United States/ Agricultural resources---United States---Management
This citation is from AGRICOLA.

1421. **Rice fields as temporary wetlands: A review.**
Lawler, S. P.
Israel Journal of Zoology 47 (4): 513-528. (2001); *ISSN:* 0021-2210
Descriptors: Wetlands / Agricultural land/ Oryza sativa/ Rice/ Wetlands/ Aquatic entomology
Abstract: Rice fields are temporary wetlands that harbor many of the same species that breed in natural temporary ponds. Therefore the rice agroecosystem has the potential to help sustain the regional biodiversity of many invertebrates and vertebrates. Like natural areas of wetlands, rice cultivation provides a habitat mosaic of temporary and more permanent waters. Because of their low floral diversity and because their species composition will rarely overlap completely with that of natural ponds, rice fields are not substitutes for natural temporary ponds. However, they are important in sustaining populations of several species, including wading birds and frogs. Farming methods vary widely, and different practices can alter the suitability of rice fields as habitats. Farmers use water management, pesticides, and sometimes fish to

control crop pests and mosquitoes, and other taxa may be affected as well. Farmers may irrigate rice intermittently to control pests, and intermittent habitat holds fewer species than areas that are flooded for longer periods. Broad-spectrum pesticides may harm invertebrates and other wildlife, and may even cause pest resurgences if they have greater effects on predator populations than on the pests. Fish often decrease the abundance of invertebrate predators, but fish farming in rice fields often discourages the use of harmful pesticides. Because farming practices can affect the conservation value of rice fields, ecologists are encouraged to work with farmers and study the role of rice fields in the population dynamics of temporary pond species, and how changing farming methods alter this role.
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1422. **Riparian area responses to changes in management.**
Borman, M. M.; Massingill, C. R.; and Elmore, E. W.
Rangelands 21 (3): 3-7. (1999)
NAL Call #: SF85.A1R32;
ISSN: 0190-0528
This citation is provided courtesy of CAB International/CABI Publishing.

1423. **Riparian areas: Functions and strategies for management.**
Committee on Riparian Zone Functioning and Strategies for Management; Water Science and Technolgy Board; Board on Environmental Studies and Toxicology; Division on Earth and Life Studies; and National Research Council.
National Academy Press, 2002.
ISBN: 0309082951
http://www.nap.edu/books/0309082951/html/
Descriptors: riparian areas/ environmental management/ laws and regulations/ land use

1424. **Riparian buffer systems in crop and rangelands.**
Schultz, R. C.; Isenhart, T. M.; and Colletti, J. P.
In: Agroforestry and sustainable systems symposium proceedings. (Held 7 Aug 1994-10 Aug 1994 at Fort Collins, Colorado.)
Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 13-27; 1995.
NAL Call #: aSD11.A42-no.261
Descriptors: riparian forests/ riparian vegetation/ ecosystems/ ecotones/ ecology/ biodiversity/ rangelands / agricultural land/ grazing/ water quality/ environmental management/ grazing systems/ environmental protection/ stream flow/ groundwater/ models/ pollution/ literature reviews
This citation is from AGRICOLA.

1425. **Riparian ecosystem management model: Simulator for ecological processes in riparian zones.**
Altier, Lee S. and United States. Agricultural Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 216 p.: ill.; Series: Conservation research report no. 46. (2002)
Notes: "February 2002"--Cover. Includes bibliographical references.
NAL Call #: A279.9-Ag8-no.-46
Descriptors: Riparian areas---Management/ Riparian ecology---Mathematical models
This citation is from AGRICOLA.

1426. **Riparian ecosystem recovery in arid lands: Strategies and references.**
Briggs, Mark K.
Tucson: University of Arizona Press; xiv, 159 p.: ill. (1996)
NAL Call #: QH104.5.S6B77--1996;
ISBN: 0816516421 (cloth); 0816516448 (paper)
Descriptors: Riparian ecology---Southwest, New/ Riparian ecology---Mexico/ Restoration ecology---Southwest, New/ Restoration ecology---Mexico/ Riparian ecology---Southwest, New---Case studies/ Riparian ecology---Mexico---Case studies/ Restoration ecology---Southwest, New---Case studies/ Restoration ecology---Mexico---Case studies
This citation is from AGRICOLA.

1427. **Riparian ecosystems of semi-arid North America: Diversity and human impacts.**
Patten, D. T.
Wetlands 18 (4): 498-512. (1998)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
This citation is provided courtesy of CAB International/CABI Publishing.

1428. **Riparian Forest Buffer Panel report.**
Chesapeake Bay Program (U.S.); Chesapeake Executive Council; Riparian Forest Buffer Panel; and U.S. Environmental Protection Agency, Region III
Philadelphia, Penn.: U.S. Environmental Protection Agency, Region III; Series: Technical report series 97/167; ii, 362 p.: ill., maps. (1997)
Notes: "March 1997"--Cover. "Printed by the U.S. Environmental Protection Agency for the Chesapeake Bay Program." "EPA 903-R-97-007"--Cover. Includes bibliographical references.
NAL Call #: QH76.5.M3-R56-1997
Descriptors: Riparian forests---Chesapeake Bay---Md and Va/ Water quality management---Chesapeake Bay Watershed---Md and Va/ Natural resources---Chesapeake Bay Watershed---Md and Va/ Chesapeake Bay Watershed---Md and Va
This citation is from AGRICOLA.

1429. **Riparian grazing management that worked: Introduction and winter grazing.**
Masters, L.; Swanson, S.; and Burkhardt, W.
Rangelands 18 (5): 192-195. (1996)
NAL Call #: SF85.A1R32;
ISSN: 0190-0528.
Notes: Subtitle: [Part] I.
This citation is provided courtesy of CAB International/CABI Publishing.

1430. **Riparian landscapes.**
Malanson, G. P.
Cambridge; New York: Cambridge University Press; Series: Cambridge Studies in Ecology; 296 p. (1993)
NAL Call #: QH541.15.L35M35--1993; *ISBN:* 0-521-38431-1
This citation is provided courtesy of CAB International/CABI Publishing.

1431. **Riparian livestock exclosure research in the western United States: A critique and some recommendations.**
Sarr, Daniel A
Environmental Management 30 (4): 516-526. (2002)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: animal (Animalia): aquatic, terrestrial/ Animals/ Humpty Dumpty model/ agenda laden literature reviews/ broken leg model/ critical reviews / ecosystem recovery: mechanisms, scales/ geomorphology/

improved exclosure placement/ design/ long term research programs: development/ meta analyses/ post exclusion dynamics/ pre treatment data: collection/ restoration ecology/ riparian ecosystem ecology: livestock impact susceptibility/ riparian livestock exclosure research: critique, recommendations/ rubber band model/ study popularization/ unifying conceptual framework / vegetation/ weak study designs

Abstract: Over the last three decades, livestock exclosure research has emerged as a preferred method to evaluate the ecology of riparian ecosystems and their susceptibility to livestock impacts. This research has addressed the effects of livestock exclusion on many characteristics of riparian ecosystems, including vegetation, aquatic and terrestrial animals, and geomorphology. This paper reviews, critiques, and provides recommendations for the improvement of riparian livestock exclosure research. Exclosure-based research has left considerable scientific uncertainty due to popularization of relatively few studies, weak study designs, a poor understanding of the scales and mechanisms of ecosystem recovery, and selective, agenda-laden literature reviews advocating for or against public lands livestock grazing. Exclosures are often too small (<50 ha) and improperly placed to accurately measure the responses of aquatic organisms or geomorphic processes to livestock removal. Depending upon the site conditions when and where livestock exclosures are established, postexclusion dynamics may vary considerably. Systems can recover quickly and predictably with livestock removal (the "rubber band" model), fail to recover due to changes in system structure or function (the "Humpty Dumpty" model), or recover slowly and remain more sensitive to livestock impacts than they were before grazing was initiated (the "broken leg" model). Several initial ideas for strengthening the scientific basis for livestock exclosure research are presented: (1) incorporation of meta-analyses and critical reviews; (2) use of restoration ecology as a unifying conceptual framework; (3) development of long-term research programs; (4) improved exclosure placement/design; and (5) a stronger commitment to collection of pre-treatment data.

1432. **Riparian management in forests of the continental Eastern United States.**
Verry, Elon S.; Hornbeck, James W.; and Dolloff, Charles Andrew
Boca Raton, Fla.: Lewis Publishers; xx, 402 p.: ill., maps. (2000)
Notes: Includes bibliographical references (p. 341-391) and index.
NAL Call #: SD144.A112-R56-2000;
ISBN: 1566705010 (alk. paper)
Descriptors: Riparian forests---East---United States---Management/ Riparian areas---East---United States---Management/ Forested wetlands---East---United States---Management
This citation is from AGRICOLA.

1433. **Riparian mesquite forests: A review of their ecology, threats, and recovery potential.**
Stromberg, J. C.
Journal of the Arizona-Nevada Academy of Science 27 (1): 111-124. (1993)
NAL Call #: 500-Ar44;
ISSN: 0193-8509 [JAASDM]
Descriptors: prosopis/ forest ecology/ riparian forests/ endangered species/ forest resources/ literature reviews/ nature conservation/ Arizona
This citation is from AGRICOLA.

1434. **Riparian restoration and streamside erosion control handbook.**
Thompson, Jennifer N.; Green, Don L.; Johnson, LeAnne.; and Tennessee. Dept. of Environment and Conservation.
Nashville, TN: Tennessee Dept. of Environment and Conservation; 74, 32 p.: ill. (1994)
Notes: "November, 1994." Bibliography: p. [7-9] (2nd group).
NAL Call #: QH541.5.R52T46--1994
Descriptors: Riparian ecology---Handbooks, manuals, etc/ Stream conservation---Handbooks, manuals, etc
This citation is from AGRICOLA.

1435. **Riparian Restoration: Current Status and the Reach to the Future.**
Landers, D. H.
Restoration Ecology
5 (4 [supplement]): 113-121. (1997)
NAL Call #: QH541.15.R45R515;
ISSN: 1061-2971.
Notes: Special issue: Riparian Restoration
Descriptors: Site Selection/ Reviews/ Rehabilitation/ Riparian Vegetation/ Interdisciplinary Studies/ Geographical Information Systems/ Baseline Studies/ Environmental restoration/ Riparian environments/ Vegetation patterns/ Rivers/ Habitat improvement/ Environmental protection/ Pollution control/ Planning/ Evaluation process/ Reclamation/ Protective measures and control/ Streamflow and runoff

Abstract: Nine articles in the special issue of Restoration Ecology addressing the subject of site selection for riparian restoration activities were critically examined for this review. The approaches described make significant and original contributions to the field of riparian restoration. All are interdisciplinary to some extent, often combining the fields of hydrology, geomorphology, and biology in the design of restorations. A common component among the articles is that they take a broad view, if not a watershed view, of restoration site selection. The approaches can be generally described as top-down strategic approaches to siting restorations, as opposed to the more methods- and site-driven bottom-up, or tactical, approach. All the articles recognize the importance of developing endpoints related to the ecological function of riparian ecosystems. They succeed in their quest for these indicators of ecological function to varying degrees. The most common indicator used in these papers is riparian vegetation. Several additional elements of scientific investigation, if successfully pursued, could provide vital information and advance our understanding of riparian restoration: developing interdisciplinary approaches more fully; defining endpoints and reference conditions; implementing multiple scale approaches; viewing restorations as experimental ecosystem manipulations; developing a philosophy regarding exotic species; incorporating geographic information systems more often; and integrating science, society, and politics. The foundation provided by the contributions in this issue should provide a strong basis for the rapid advancement of future research in the area of riparian restoration.

1436. **Riparian restoration in the western United States: Overview and perspective.**
Goodwin, C. N.; Hawkins, C. P.; and Kershner, J. L.
Restoration Ecology 5 (4S): 4-14. (1997)
NAL Call #: QH541.15.R45R515;
ISSN: 1061-2971
This citation is provided courtesy of CAB International/CABI Publishing.

1437. **Riparian vegetation diversity along regulated rivers: Contribution of novel and relict habitats.**
Johnson, W Carter
Freshwater Biology 47 (4): 749-759. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: plant (Plantae)/ Plants/ dams/ deltas/ floodplains/ novel ecosystems/ regulated rivers/ relict habitats/ reservoir shorelines/ riparian vegetation/ sedimentation/ spatial heterogeneity/ species diversity/ temporal heterogeneity/ water diversions/ water levels
Abstract: 1. The creation and maintenance of spatial and temporal heterogeneity by rivers flowing through floodplain landscapes has been disrupted worldwide by dams and water diversions. Large reservoirs (novel ecosystems) now separate and isolate remnant floodplains (relict ecosystems). From above, these appear as a string of beads, with beads of different sizes and string connections of varying lengths. 2. Numerous studies have documented or forecast sharp declines in riparian biodiversity in relict ecosystems downstream from dams. Concurrently, novel ecosystems containing species and communities of the former predam ecosystems have arisen along all regulated rivers. These result from the creation of new environments caused by upper reservoir sedimentation, tributary sedimentation and the formation of reservoir shorelines. 3. The contribution of novel habitats to the overall biodiversity of regulated rivers has been poorly studied. Novel ecosystems may become relatively more important in supporting riverine biodiversity if relict ecosystems are not restored to predam levels. The Missouri River of the north-central U.S.A. is used to illustrate existing conditions on a large, regulated river system with a mixture of relict and novel ecosystems.
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1438. **Riparian vegetation effectiveness.**
Castelle, Andrew J.; Johnson, A. W.; and National Council for Air and Stream Improvement.
Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.; 26 p.: ill.; Series: Technical bulletin (National Council for Air and Stream Improvement) no. 799. (2000)
Notes: "February 2000." Includes bibliographical references (p. 20-26).
NAL Call #: TD899.P3-N34-no.-799
Descriptors: Buffer zones---Ecosystem management/ Streambank planting/ Riparian plants/ Grassed waterways/ Best management practices---Pollution prevention
This citation is from AGRICOLA.

1439. **Riparian wetlands and water quality.**
Gilliam, J W
Journal of Environmental Quality 23 (5): 896-900. (1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: nitrate/ phosphorus/ plant (Plantae Unspecified)/ Plantae (Plantae Unspecified)/ plants/ drainage/ farming/ nitrate/ nonpoint source pollution/ phosphorus/ urban activity/ wet soils
Abstract: Because of wet soils adjacent to the strains, riparian buffers are frequently present between farming and urban activities on the uplands and small streams. These riparian areas have been shown to be very valuable for the removal of nonpoint-source pollution from drainage water. Several researchers have measured gt 90% reductions in sediment and nitrate concentrations in water flowing through the riparian areas. The riparian buffers are less effective for P removal but may retain 50% of the surface-water P entering them. I consider riparian buffers to be the most important factor influencing nonpoint-source pollutants entering surface water in many areas of the USA and the most important wetlands for surface water quality protection.
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1440. **Riparian wildlife habitat literature review.**
McComb, William. and Hagar, Joan.
Oregon: Oregon State University, Dept. of Forest Science; 63 p.: maps. (1994)
Notes: Cover title. Includes bibliographical references (p. 25-35).
NAL Call #: QH541.5.R52-M36-1994
Descriptors: Riparian areas---United States/ Riparian animals---United States
This citation is from AGRICOLA.

1441. **Riparian zone, stream, and floodplain issues: A review.**
Bren, L. J.
Journal of Hydrology 150 (2/4): 277-299. (Oct. 1993)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7].
Notes: Special issue: Water Issues in Forests Today / edited by E.M. O'Loughlin and F.X. Dunin. Papers presented at the International Symposium on Forest Hydrology, November 22-26, 1992, Canberra, Australia. Includes references.
Descriptors: riparian forests/ floodplains/ streams/ forest management/ water management/ literature reviews
Abstract: In the last two decades, the effects of forest management on streams, riparian zones, and floodplains have become of much interests. In general, there is agreement that such areas should be maintained in a state approximating naturalness, although it is recognised that definition of this state is usually difficult or impossible. A diversity of management effects has been recognised and, in some cases quantified. For upland catchments, issues particularly relate to direct disturbance of the zone, changes in the flow of woody debris into the stream, or disturbance to the environment by effects generated upstream or downstream. For many areas, a particularly important commercial aspect is the definition of a 'stream', as this can impose many expensive and severe restrictions on management of the land. For large rivers, a common issue is the effect of river management on flooding forests. In each case, the issues are complex, information is difficult to collect, and there are fundamental difficulties in going from anecdotal observation to data. Currently, most information appears to be at a relatively local level, and there is a very inadequate

knowledge base to give a more holistic overview, although the concept of 'cumulative effects', with the effects accumulated over both space and time, has much potential value. There are many opportunities for work in this field.
This citation is from AGRICOLA.

1442. **A Risk Assessment of Emerging Pathogens of Concern in the Land Application of Biosolids.**
Gerba, C. P.; Pepper, I. L.; and Whitehead, L. F.
Water Science and Technology 46 (10): 225-230. (2002)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: IWA Specialised Conference, Acapulco [Mexico], 25-27 Oct 2001; Source: Sludge Management: Regulation, Treatment, Utilisation and Disposal; Editors: Jimenez, B. //Spinosa, L. //Odegaard, H. //Lee, D. J.; *ISBN:* 184339426X
Descriptors: Sludge Disposal/ Land Disposal/ Regulations/ Pathogens/ Disinfection/ Resistance/ Literature Review/ Fate of Pollutants/ Public Health/ Microbiological Studies/ Law/ Risk analysis/ Pathogenic organism/ Reviews/ Public health/ Risk assessment/ risk assessment/ Ultimate disposal of wastes/ Sewage/ Non patents / Soil Pollution: Monitoring, Control & Remediation/ Sources and fate of pollution
Abstract: Since the development of the United States Environmental Projection Agency's 503 biosolids Rule, which includes treatment requirements to reduce the threat of pathogen transmission, many new pathogens have been recognized which could be transmitted by biosolids. A risk analysis was performed to assess which emerging pathogens would be most likely to survive treatments required for Class B biosolids before land application. The literature was reviewed on the resistance of emerging pathogens to temperature and other environmental factors to assess their probability of surviving various biosolids treatment processes. In addition existing information on occurrence in biosolids and dose response models for each pathogen was reviewed. It was concluded that adenoviruses and hepatitis A virus are the most thermally resistant viruses and can survive for prolonged periods in the environment. The protozoan parasites microsporidia and Cyclospora were unlikely to survive the temperatures achieved in anaerobic digestion and do not survive well under low moisture conditions. A risk model was used to assess the risk of infection and illness from enteric viruses after application of class B biosolids.
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1443. **Risk-Based Multiattribute Decision-Making in Property and Watershed Management.**
Prato, T.
Natural Resource Modeling 12 (3): 307-334. (1999);
ISSN: 0890-8575.
Notes: Publisher: The Rocky Mountain Mathematics Consortium
Descriptors: decision making/ Watersheds/ Government policies/ Sustainable development/ Resource management/ United States, Missouri/ Risk/ Watershed Management/ Best Management Practices / Reviews/ Farming/ Agricultural Watersheds/ Resources Management/ River basin management/ Regional planning/ Environmental protection/ Resource conservation/ Management/ Models/ MADM/ best management practices/ sustainable use/ Environmental action/ Watershed protection/ Conservation, wildlife management and recreation/ Modeling, mathematics, computer applications/ Policy and planning/ Techniques of planning
Abstract: Determining best management systems for properties and evaluating their sustainability at the watershed scale are useful and important aspects of integrated watershed management. Multiattribute decision-making (MADM) is very useful for modeling the selection of best management systems for properties in a watershed. This paper reviews four MADM approaches including utility theory, surrogate worth tradeoff, free iterative search and stochastic dominance with respect to a function (SDWF). Emphasis is on determining how the first three methods could be used to determine the best (most preferred) combinations of attributes and associated management systems for a property. An application of the expected utility method with risk neutral preferences is presented in which farmer's preferences for five attributes are used to rank five farming systems for an agricultural watershed in Missouri. A framework is presented for assessing the sustainability of the best management systems for all properties in a watershed and the cost-effectiveness of policies for enhancing sustainable resource management at the watershed scale.
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1444. **A risk management perspective on integrated weed management.**
Gunsolus, J. L. and Buhler, D. D.
Journal of Crop Production 2 (1): 167-187. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler. Includes references.
Descriptors: weed control/ integrated pest management/ risk assessment/ risk reduction/ decision making/ crop yield/ yield losses/ economic analysis/ labor/ management/ time management/ growth rate/ crop growth stage/ plant development/ seedling emergence/ literature reviews
This citation is from AGRICOLA.

1445. **Risk of Nitrate in Groundwater of the United States: A National Perspective.**
Nolan, B. T.; Ruddy, B. C.; Hitt, K. J.; and Helsel, D. R.
Environmental Science and Technology 31 (8): 2229-2236. (1997)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X.
Notes: DOI: 10.1021/es960818d
Descriptors: USA/ Nitrates/ Groundwater Pollution/ Risk/ Data Interpretation/ Mapping/ Regional Analysis/ hazard assessment/ agricultural pollution/ eutrophication/ pollutant persistence/ water supply/ risk assessment/ hazards/ United States/ NAWQA/ USGS/ Sources and fate of pollution/ Behavior and fate characteristics/ Freshwater pollution/ Environment
Abstract: Nitrate contamination of groundwater occurs in predictable patterns, based on findings of the U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) Program. The NAWQA Program was begun in 1991 to describe the quality of the Nation's water resources, using nationally consistent methods. Variables affecting nitrate concentration in

groundwater were grouped as "input" factors (population density and the amount of nitrogen contributed by fertilizer, manure, and atmospheric sources) and "aquifer vulnerability" factors (soil drainage characteristic and the ratio of woodland acres to cropland acres in agricultural areas) and compiled in a national map that shows patterns of risk for nitrate contamination of groundwater. Areas with high nitrogen input, well-drained soils, and low woodland to cropland ratio have the highest potential for contamination of shallow groundwater by nitrate. Groundwater nitrate data collected through 1992 from wells less than 100 ft deep generally verified the risk patterns shown on the national map. Median nitrate concentration was 0.2 mg/L in wells representing the low-risk group, and the maximum contaminant level (MCL) was exceeded in 3% of the wells. In contrast, median nitrate concentration was 4.8 mg/L in wells representing the high-risk group, and the MCL was exceeded in 25% of the wells.

1446. **Risk, reliability, uncertainty and robustness of water resource systems.**
Bogardi, J. J. and Kundzewicz, Z. W.
New York: Cambridge University Press; xv, 220 p. (2002);
ISBN: 0-521-80036-6
This citation is provided courtesy of CAB International/CABI Publishing.

1447. **The risks and benefits of genetically modified crops: A multidisciplinary perspective.**
Peterson, G.; Cunningham, S.; Deutsch, L.; Erickson, J.; Quinlan, A.; Raez-Luna, E.; Tinch, R.; Troell, M.; Woodbury, P.; and Zens, S.
Conservation Ecology 4 (1): U38-U49. (2000)
NAL Call #: QH75.A1C67;
ISSN: 1195-5449
This citation is provided courtesy of CAB International/CABI Publishing.

1448. **Risks associated with the use of chemicals in pond aquaculture.**
Boyd, C. E. and Massaut, L.
Aquacultural Engineering 20 (2): 113-132. (June 1999)
NAL Call #: SH1.A66;
ISSN: 0144-8609 [AQEND6]
Descriptors: aquaculture/ ponds/ risk assessment/ lime/ fertilizers/ eutrophication/ nutrient availability/ solubility/ food safety/ herbicides/ algicides/ probiotics/ disinfectants/ oxidants/ coagulants/ osmoregulation/ chemicals/ degradation/ chemical precipitation/ water pollution/ environmental impact/ literature reviews
This citation is from AGRICOLA.

1449. **Riverbank filtration: Understanding contaminant biogeochemistry and pathogen removal.**
Ray, Chittaranjan.
In: Proceedings of the NATO Advanced Research Workshop on Riverbank Filtration: Understanding Contaminant Biogeochemistry and Pathogen Removal. (Held 5 Sep 2001-8 Sep 2001 at Tihany, Hungary.)
Dordrecht: Kluwer Academic Publishers; xviii, 253 p.: ill., maps; 2002.
Notes: Published in Earth and environmental sciences, v. 14
NAL Call #: TD443-.R58-2002;
ISBN: 1402009542
Descriptors: Water---Purification---Riverbank filtration---Congresses/ Biochemistry---Congresses/ Water---Purification---Microbial removal---Congresses/ Drinking water---Purification---Congresses
This citation is from AGRICOLA.

1450. **Riverine landscape diversity.**
Ward, J. V.; Tockner, K.; Arscott, D. B.; and Claret, C.
Freshwater Biology 47 (4): 517-539. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
This citation is provided courtesy of CAB International/CABI Publishing.

1451. **Riverine landscapes: Biodiversity patterns, disturbance regimes, and aquatic conservation.**
Ward, J V
Biological Conservation 83 (3): 269-278. (1998)
NAL Call #: S900.B5;
ISSN: 0006-3207
Descriptors: aquatic conservation/ bank stabilization/ biodiversity patterns/ channelization/ disturbance regimes/ environmental gradient/ environmental heterogeneity/ flow regulation/ groundwater aquifers/ multiple interactive pathways/ riparian/ floodplain systems/ riverine landscapes/ upstream-downstream linkage
Abstract: The term riverine landscape implies a holistic geomorphic perspective of the extensive interconnected series of biotopes and environmental gradients that, with their biotic communities, constitute fluvial systems. Natural disturbance regimes maintain multiple interactive pathways (connectivity) across the riverine landscape. Disturbance and environmental gradients, acting in concert, result in a positive feedback between connectivity and spatio-temporal heterogeneity that leads to the broadscale patterns and processes responsible for high levels of biodiversity. Anthropogenic impacts such as flow regulation, channelization, and bank stabilization, by (1) disrupting natural disturbance regimes, (2) truncating environmental gradients, and (3) severing interactive pathways, eliminate upstream-downstream linkages and isolate river channels from riparian/floodplain systems and contiguous groundwater aquifers. These alterations interfere with successional trajectories, habitat diversification, migratory pathways and other processes, thereby reducing biodiversity. Ecosystem management is necessary to maintain or restore biodiversity at a landscape scale. To be effective, conservation efforts should be based on a solid conceptual foundation and a holistic understanding of natural river ecosystems. Such background knowledge is necessary to re-establish environmental gradients, to reconnect interactive pathways, and to reconstitute some semblance of the natural dynamics responsible for high levels of biodiversity. The challenge for the future lies in protecting the ecological integrity and biodiversity of aquatic systems in the face of increasing pressures on our freshwater resources. This will require integrating sound scientific principles with management perspectives that recognize floodplains and groundwaters as integral components of rivers and that are based on sustaining, rather than suppressing, environmental heterogeneity.

1452. **Role of agroforestry in sustainable land-use systems.**
Brooks, K. N.; Gregersen, H. M.; and Ffolliott, P. F.
In: Agroforestry and sustainable systems symposium proceedings. Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 199-205; 1995.
Notes: Meeting held August 7-10, 1994, Fort Collins, Colorado. Includes references.
NAL Call #: aSD11.A42-no.261
Descriptors: agroforestry/ sustainability/ land use/ nature conservation/ land management/ watersheds/ erosion/ streams/ literature reviews
This citation is from AGRICOLA.

1453. **The role of biological indicators in a state water quality management process.**
Yoder, Chris O and Rankin, Edward T
Environmental Monitoring and Assessment 51 (1-2): 61-88. (1998)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: biological indicators/ environmental impact/ habitat degradation/ nonpoint source assessment/ pollution control/ sediment contamination/ sewer overflow/ water quality management/ Clean Water Act
Abstract: State water quality agencies are custodians of water quality management programs under the Clean Water Act of which the protection and restoration of biological integrity in surface waters is an integral goal. However, an inappropriate reliance on chemical/physical stressor and exposure data or administrative indicators in place of the direct measurement of ecological response has led to an incomplete foundation for water resource management. As point sources have declined in significance, the consequences of this flawed foundation for dealing with the major limitations to biological integrity (nonpoint sources, habitat degradation) have become more apparent. The use of biocriteria in Ohio, for example, resulted in the identification of 50% more impairment than a water chemistry approach alone and other inconsistencies of a flawed monitoring foundation are illustrated in the national 305(b) report statistics on waters monitored, aquatic life use attainment, and habitat degradation. Biological criteria (biocriteria) incorporates the broader concept of water resource integrity to supplement the roles of chemical and toxicological approaches and reduces the likelihood of making overly optimistic estimates of aquatic life condition. A carefully conceived ambient monitoring approach comprised of biological, chemical, and physical measures ensures all relevant stressors to water resource integrity are identified and that the efficacy of administrative actions can be directly measured with environmental results. New multimetric indices, such as the IBI, ICI, and BIBI represent a significant advancement in aquatic resource characterization that have allowed the inclusion of biological information into many States water quality management programs. Ohio adopted numerical biocriteria in the Ohio water quality standards regulations in May 1990 and, through multiple aquatic life uses that reflect a continuum of biological condition, represents a tiered approach to water resource management. Biocriteria provide the impetus and opportunity to recognize and account for natural, ecological variability in the environment, something which previously was been lacking in state water quality management programs. The upper Great Miami River in Ohio illustrates a case study where bioassessment data documented the efficacy of efforts to permit, fund, and construct municipal treatment systems in restoring aquatic life. In contrast, in the Mahoning River similar administrative actions were inadequate to restore aquatic life in an environment with severe sediment contamination and impacts from combined sewer overflows. A biocriteria-based goal of restoring 75% of aquatic life uses by the year 2000 in Ohio has led to the use of biological data to identify trends and forecast the status and the causes and sources of impairment to Ohio streams, an effort that should affect the strategic focus of our water resource management efforts. A biocriteria-based approach has profoundly influenced strategic planning and priority setting, water quality based permitting, water quality standards, basic monitoring and reporting, nonpoint source assessment, and problem discovery within Ohio EPA.
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1454. **Role of buffer strips in management of waterway pollution: A review.**
Barling, R. D. and Moore, I. D.
Environmental Management 18 (4): 543-558. (1994)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
This citation is provided courtesy of CAB International/CABI Publishing.

1455. **The role of column liquid chromatography-mass spectrometry in environmental trace-level analysis: Determination and identification of pesticides in water.**
Hogenboom, Ariadne C; Niessen, Wilfried M A; and Brinkman, Udo A Th
Journal of Separation Science 24 (5): 331-354. (2001);
ISSN: 1615-9306
Descriptors: pesticides: agrichemical, environmental pollutant, extraction, pesticide, quantitative analysis, river water level, separation, toxin
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1456. **The role of corridors in biodiversity conservation in production forest landscapes: A literature review.**
MacDonald, M. A.
Tasforests 14: 41-52. (2003);
ISSN: 1033-8306
This citation is provided courtesy of CAB International/CABI Publishing.

1457. **The role of earthworms for assessment of sustainability and as bioindicators.**
Paoletti, M. G.
Agriculture, Ecosystems and Environment 74 (1/3): 137-155. (June 1999)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Invertebrate biodiversity as bioindicators of sustainable landscapes / edited by M.G. Paoletti. Includes references.
Descriptors: earthworms/ indicator species/ sustainability/ evaluation/ monitoring/ environmental management/ environmental impact/ habitats/ agricultural land/ urban areas/ industrial sites/ species diversity/ biomass/ taxonomy/ identification/ soil pollution/ pesticides/ heavy metals/ genetic engineering/ crops/ stress/ orchards/ literature reviews/ polluted soils
Abstract: Earthworms, which inhabit soils and litter layers in most landscapes, can offer an important

tool to evaluate different environmental transformations and impacts. Agricultural landscapes, urban and industrialized habitats have some earthworms that represent interesting indicators to monitor different contaminations, to assess different farming practices and different landscape structures and transformations. Species number, abundance and biomass can give easily measurable elements. Ecological guilds can help in comparing different environments. Taxonomy is relatively well known, at least in temperate areas, where species identification is in general easily solved. CD-ROM based programs facilitate rapid identification of collected specimens. The substantial amount of research carried out on these invertebrates has made these soil organisms more promising for further improved and accurate work in assessing sustainability of different environments. In most cases earthworm biomass or abundance can offer a valuable tool to assess different environmental impacts such as tillage operations, soil pollution, different agricultural input, trampling, industrial plant pollution, etc. In rural environments different farming systems can be assessed using earthworm biomass and numbers.
This citation is from AGRICOLA.

1458. **The role of ecology in the development of weed management systems: An outlook.**
Mortensen, D. A.; Bastiaans, L.; and Sattin, M.
Weed Research 40 (1): 49-62. (Feb. 2000)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: weeds/ weed biology/ plant ecology/ weed control/ integrated pest management/ species differences/ life cycle/ habit/ population dynamics/ mortality/ developmental stages/ application rates/ herbicides/ crop weed competition/ phenotypes/ simulation models/ herbicide resistant weeds/ literature reviews/ integrated weed management
This citation is from AGRICOLA.

1459. **The role of fire and soil heating on water repellency in wildland environments: A review.**
DeBano, L. F.
Journal of Hydrology 231/232: 195-206. (2000)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7].
Notes: Special issue: Water repellency is soils / edited by C.J. Ritsema and L.W. Dekker. Proceedings of a workshop held September 2-4, 1998, Wageningen, Netherlands. Includes references.
Descriptors: water repellent soils/ prescribed burning
Abstract: This paper describes the heat transfer mechanisms operating as heat moves downward in the soil along steep temperature gradients during both wildfires and prescribed fires. The transfer of heat downward in the upper part of the soil is enhanced by the vaporization and movement of water and organic compounds. Available information on the changes in the chemistry of vaporized organic compounds is summarized and discussed. An operational theory describing the formation of a highly water repellent soil condition during fire is presented. The relationship between the formation of this fire-related watershed condition and subsequent surface runoff and erosion from wildland ecosystems is explored. Worldwide literature describing fire-induced water repellency is reviewed and summarized.
This citation is from AGRICOLA.

1460. **The role of grazing sheep in sustainable agriculture.**
Ely, D. G.
Sheep Research Journal: 37-51. (1994)
NAL Call #: SF371.R47;
ISSN: 1057-1809.
Notes: Special issue: Role of sheep grazing in natural resource management. Includes references.
Descriptors: sheep/ grazing/ sustainability/ forage/ digestibility/ agricultural production/ maturity stage/ feed conversion/ solar energy/ nitrogen fertilizers/ triticum aestivum/ grazing systems/ profitability/ soil conservation/ literature reviews
This citation is from AGRICOLA.

1461. **The Role of Invertebrates on Leaf Litter Decomposition in Streams: A Review.**
Graca, M. A. S.
International Review of Hydrobiology 86 (4-5): 383-393. (2001);
ISSN: 1434-2944
Descriptors: Streams/ Leaf litter/ Decomposition/ Macrofauna/ Zoobenthos/ Invertebrates/ Riparian Vegetation/ Organic Matter/ Bacteria/ Abrasion/ Leaf Litter/ Aquatic entomology/ Freshwater/ Water and plants
Abstract: Leaves entering low order streams are subject to physical abrasion, microbial degradation and invertebrate fragmentation. Aquatic invertebrates feeding on leaves are known as shredders and their densities tend to be correlated with the spatial and temporal accumulation of organic matter in streams. Shredders discriminate among the variety of leaves normally found in the stream; this discrimination may be related to differences in leaf toughness, plant nutrient content of leaves and the presence of secondary compounds. Shredders also consume leaves preferentially after the establishment of a well-developed microbial community. This preference may be the result of changes in leaf matrix carried out by the microbial community or the presence of fungal hyphae with a higher nutrition value than the leaves themselves. The immediate consequence of invertebrate feeding on leaves is the incorporation of plant material into secondary production and the fragmentation of leaves. The relative importance of fungi and invertebrates in the decomposition process depends upon the density of shredders, which, in turn, may depend on litter accumulation in streams. Therefore, the type of riparian vegetation has the potential to control the diversity and abundance of shredders and changes in riparian vegetation have the potential to affect the assemblages of aquatic invertebrates.

1462. **The role of land/inland water ecotones in fish ecology on the basis of Russian research: A review.**
Dgebuadze, Y. Y.
International journal of ecohydrology and hydrobiology 1 (1-2): 229-237. (2001)
NAL Call #: QH541.15.E19 I58;
ISSN: 1642-3593.
Notes: Special Issue: Catchment Processes Land/Water Ecotones and Fish Communities
Descriptors: Riparian environments/ Fishery management/ Freshwater fish/ Environment management/ Rivers/ Population number/ Agricultural runoff/ Eutrophication/ Pollution effects/ Russia/ Stock assessment and management/ Effects on organisms
Abstract: This review summarises some results of investigation carried out by Russian scientists, concerning the influence of land/inland water ecotones on fish. The main objectives and hypotheses developing in the framework UNESCO MAB working group "Fish and land/inland ecotones" in Russia are: comparison of fish population in salmonid rivers affected or non-affected by lake-rivers ecotones; small scale ecotone studies of model and restored microhabitat of salmonid rivers; comparison of the ecotone patterns and fish abundance in two rivers differing by historical origin of their ichthyofauna; the analysis of the effect of cattle ranching on fish assemblages distribution, dynamics and productivity along a river course in the steppe zone; and the influence of periodically drying up lakes and ecotones on the dynamics of fish populations in the connected river system.
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1463. **The role of parasitoid and predator production in technology transfer of field crop biological control.**
Leppla, N C and King, E C
Entomophaga 41 (3-4): 343-360. (1996)
NAL Call #: 421 EN835M;
ISSN: 0013-8959
Descriptors: insect (Insecta Unspecified)/ Insecta (Insecta Unspecified)/ animals/ arthropods/ insects/ invertebrates/ biobusiness/ biological control/ integrated pest management/ parasitoid production/ pest control method/ pest management/ predator production/ technology transfer
Abstract: The immediate goals for improving natural enemy production are to reduce costs, increase efficacy and provide additional species for pest management. This paper describes expanding markets for natural enemies that are or could be produced commercially, gives operational and experimental examples of parasitoid and predator production for use in field crop biological control, defines some of the obstacles and makes recommendations for producing and using natural enemies. Additionally, it provides recent published guidance for implementing biological control in integrated pest management.
© Thomson

1464. **The Role of Phosphorus in the Eutrophication of Receiving Waters: A Review.**
Correll, D. L.
Journal of Environmental Quality 27 (2): 261-266. (1998)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: Phosphorus/ Bottom Sediments/ Eutrophication/ Receiving Waters/ Primary Productivity/ Dissolved Oxygen/ Nutrients/ Surface Water/ Water Quality/ Water Pollution/ Nutrient concentrations/ Phosphates/ Aquatic environment/ Algal blooms/ Primary production/ Water quality control/ Sources and fate of pollution/ Freshwater pollution/ Characteristics, behavior and fate
Abstract: Phosphorus (P) is an essential element for all life forms. It is a mineral nutrient. Orthophosphate is the only form of P that autotrophs can assimilate. Extracellular enzymes hydrolyze organic forms of P to phosphate. Eutrophication is the overenrichment of receiving waters with mineral nutrients. The results are excessive production of autotrophs, especially algae and cyanobacteria. This high productivity leads to high bacterial populations and high respiration rates, leading to hypoxia or anoxia in poorly mixed bottom waters and at night in surface waters during calm, warm conditions. Low dissolved oxygen causes the loss of aquatic animals and release of many materials normally bound to bottom sediments including various forms of P. This release of P reinforces the eutrophication. Excessive concentrations of P is the most common cause of eutrophication in freshwater lakes, reservoirs, streams, and headwaters of estuarine systems. In the ocean, N becomes the key mineral nutrient controlling primary production. Estuaries and continental shelf waters are a transition zone, where excessive P and N create problems. It is best to measure and regulate total P inputs to whole aquatic ecosystems, but for an easy assay it is best to measure total P concentrations, including particulate P, in surface waters or N/P atomic ratios in phytoplankton.
© Cambridge Scientific Abstracts (CSA)

1465. **Role of plant pathology in integrated pest management.**
Jacobsen, B. J.
Annual Review of Phytopathology 35: 373-391. (1997)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]
Descriptors: plant pathology/ integrated pest management/ plant diseases/ models/ yield losses/ interdisciplinary research/ extension education/ literature reviews/ ecologically based pest management/ biointensive pest management
This citation is from AGRICOLA.

1466. **Role of reference materials in analysis of environmental pollutants.**
Namiesnik, J and Zygmunt, B
Science of the Total Environment 228 (2-3): 243-257. (1999)
NAL Call #: RA565.S365;
ISSN: 0048-9697
Descriptors: air pollution/ environmental pollution analysis: quality assurance, quality controls, reference materials/ sediment pollution/ sludge pollution/ soil pollution/ waste water pollution/ water pollution
Abstract: This paper discusses the importance and use of reference materials for quality assurance and quality control in environmental analysis. The general classification of reference materials and categorisation of those for chemical composition are presented. The most common reference materials for pollutants in air, water, waste water, soil, sediments, sludge and some biological materials and their producers are tabulated. Definitions,

practical recommendations on selection and handling, and application areas of reference materials are also presented.

1467. **The role of science in the preservation of forest biodiversity.**
Simberloff, D.
Forest Ecology and Management 115 (2/3): 101-111. (1999)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

1468. **Role of sediment and internal loading of phosphorus in shallow lakes.**
Sondergaard, M.; Jensen, J. P.; and Jeppesen, E.
Hydrobiologia 506 (1-3): 135-145. (2003)
NAL Call #: 410 H992;
ISSN: 0018-8158.
Notes: Number of References: 108; Dordrecht: Kluwer Academic Publ
Descriptors: Aquatic Sciences/ biomanipulation/ iron/ recovery/ redox/ release mechanisms/ retention/ phosphate release/ hypereutrophic lake/ eutrophic lake/ phytoplankton biomass/ resuspended sediment/ aquatic macrophytes/ inorganic phosphate/ planktivorous fish/ aerobic sediments/ temperate lakes
Abstract: The sediment plays an important role in the overall nutrient dynamics of shallow lakes. In lakes where the external loading has been reduced, internal phosphorus loading may prevent improvements in lake water quality. At high internal loading, particularly summer concentrations rise, and phosphorus retention can be negative during most of the summer. Internal P loading originates from a pool accumulated in the sediment at high external loading, and significant amounts of phosphorus in lake sediments may be bound to redox-sensitive iron compounds or fixed in more or less labile organic forms. These forms are potentially mobile and may eventually be released to the lake water. Many factors are involved in the release of phosphorus. Particularly the redox sensitive mobilization from the anoxic zone a few millimetres or centimetres below the sediment surface and microbial processes are considered important, but the phosphorus release mechanisms are to a certain extent lake specific. The importance of internal phosphorus loading is highly influenced by the biological structure in the pelagic, and lakes shifting from a turbid to a clearwater state as a result of, for example, biomanipulation may have improved retention considerably. However, internal loading may increase again if the turbid state returns. The recovery period following a phosphorus loading reduction depends on the loading history and the accumulation of phosphorus in the sediment, but in some lakes a negative phosphorus retention continues for decades. Phosphorus can be released from sediment depths as low as 20 cm. The internal loading can be reduced significantly by various restoration methods, such as removal of phosphorus-rich surface layers or by the addition of iron or alum to increase the sediment's sorption capacity.

1469. **Role of Selenium Toxicity and Oxidative Stress in Aquatic Birds.**
Hoffman, D. J.
Aquatic Toxicology 57 (1-2): 11-26. (2002);
ISSN: 0166-445X.
Notes: Publisher: Elsevier Science
Descriptors: Reviews/ Water pollution/ Aquatic animals/ Selenium/ Oxidative stress/ Glutathione/ Mortality/ Teratogenesis/ Aquatic birds/ Stress/ Toxicity/ Wildlife/ Pollution effects/ Histopathology/ Bioindicators/ Symptoms/ Liver/ Sexual reproduction/ Agricultural pollution/ Agricultural runoff/ Irrigation water/ Drainage water/ Teratogens/ Toxicity tests/ Water Pollution Effects/ Ecological Effects/ Water birds/ Sublethal Effects/ Metabolism/ Blood/ Pollution (Water)/ Ecology/ Toxicity/ Lethal limits/ Blood/ Pollution indicators/ Anas platyrhynchos/ Recurvirostra americana/ Catoptrophorus semipalmatus/ Chen canagica/ Himantopus mexicanus/ Fulica americana/ Mallard/ American avocet/ Willet/ Emperor goose/ Anser canagicus/ Black necked stilt/ American coot/ glutathione/ Biochemistry/ Toxicology and health/ Effects on organisms/ Pollution Organisms/ Ecology/ Toxicology/ Effects of pollution/ Effects of Pollution
Abstract: Adverse effects of selenium (Se) in wild aquatic birds have been documented as a consequence of pollution of the aquatic environment by subsurface agricultural drainwater and other sources. These effects include mortality, impaired reproduction with teratogenesis, reduced growth, histopathological lesions and alterations in hepatic glutathione metabolism. A review is provided, relating adverse biological effects of Se in aquatic birds to altered glutathione metabolism and oxidative stress. Laboratory studies, mainly with an organic form of Se, selenomethionine, have revealed oxidative stress in different stages of the mallard (Anas platyrhynchos) life cycle. As dietary and tissue concentrations of Se increase, increases in plasma and hepatic GSH peroxidase activities occur, followed by dose-dependent increases in the ratio of hepatic oxidized to reduced glutathione (GSSG:GSH) and ultimately hepatic lipid peroxidation measured as an increase in thiobarbituric acid reactive substances (TBARS). One or more of these oxidative effects were associated with teratogenesis (4.6 ppm wet weight Se in eggs), reduced growth in ducklings (15 ppm Se in liver), diminished immune function (5 ppm Se in liver) and histopathological lesions (29 ppm Se in liver) in adults. Manifestations of Se-related effects on glutathione metabolism were also apparent in field studies in seven species of aquatic birds. Reduced growth and possibly immune function but increased liver:body weight and hepatic GSSG:GSH ratios were apparent in American avocet (Recurvirostra americana) hatchlings from eggs containing 9 ppm Se.

1470. **The role of sheep and sheep products in waste management.**
Glenn, J. S.
Sheep Research Journal: 113-115. (1994)
NAL Call #: SF371.R47;
ISSN: 1057-1809.
Notes: Special issue: Role of sheep grazing in natural resource management. Includes references.
Descriptors: sheep feeding/ crop residues/ agricultural byproducts/ wool/ sorption/ oil spills/ mulches/ sheep manure/ rumen fluid/ rumen microorganisms/ biodegradation/ literature reviews
This citation is from AGRICOLA.

1471. **The role of soil erosion in the movement of pollutants.**
Quinton, J. N. and Rickson, R. J.
In: Soil monitoring: Early detection and surveying of soil contamination and degradation.
Basel: Birkhäuser Verlag, 1993; pp. 141-156
This citation is provided courtesy of CAB International/CABI Publishing.

1472. **The role of soil organic matter in maintaining soil quality in continuous cropping systems.**
Reeves, D. W.
Soil and Tillage Research 43 (1/2): 131-167. (1997)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1473. **The role of spiders as predators of insect pests with particular reference to orchards: A review.**
Bogya, S. and Mols, P. J. M.
Acta Phytopathologica et Entomologica Hungarica 31 (1-2): 83-159. (1996);
ISSN: 0238-1249
Descriptors: predator prey interactions/ pesticides/ biological control/ Araneae/ Insecta/ Agricultural & general applied entomology
Abstract: Spiders are well known predators of insects (including insect pests) but about there role as biological control agents in agroecosystems (particularly in orchards) little is known. In the last decade new information (especially of the behaviour of spiders in different agroecosystems) has become available and this increased expectations about spiders as beneficial organisms. Spiders are a very heterogeneous group of animals with different hunting tactics and therefore, they play a different ecological role. At family level these tactics are rather similar and one species of the group can be used as representative example for ecological studies for the whole family. On the other hand properties and behaviour found in different species of one family can be seen as characteristic for the whole family. A comprehensive review of spiders as natural enemies of pest species of different crops is given offering information about the expected prey spectrum per family. A qualitative evaluation of pest-spider relationships has been carried out for a whole range of agroecosystems and the results are transposed to spider groups inhabiting the orchard ecosystem. The effect of pesticides on spiders, both from laboratory and field experiments is discussed and it has been shown to be the most important factor influencing spider occurrence and abundance in the field. Thus the pest management system (conventional or IPM or ecological) determines to a great extent the role of spiders can play in controlling pest organisms. Only from a few species occurring in different ecosystems quantitative information of their searching and predatory potential is available resulting in functional response relationships to prey density. A list of methods for further quantitative evaluation of spider impact on pest in getting insight in predation processes is presented.

1474. **The role of stability in fine pesticide droplet dispersion in the atmosphere: A review of physical concepts.**
Thistle, H. W.
Transactions of the ASAE 43 (6): 1409-1413. (Nov. 2000-Dec. 2000)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: pesticides/ droplet studies/ meteorological factors
Abstract: The investigation of the role of atmospheric stability in the atmospheric dispersion of pesticide sprays and powders has largely been approached from an empirical standpoint. This article discusses the physical basis underlying the observed results relying on work done by boundary layer meteorologists and air pollution engineers. An examination of the turbulence equation, atmospheric turbulence spectra, and simple applied modeling techniques based on accumulated data all lead to the conclusion that atmospheric stability will influence droplet dispersion through reduced mixing as the atmosphere becomes more stable. The magnitude and interaction of stability with spray application parameters requires further study.
This citation is from AGRICOLA.

1475. **The role of synthetic amino acids in monogastric animal production: Review.**
Han, In K and Lee, J H
Asian Australasian Journal of Animal Sciences 13 (4): 543-560. (2000)
NAL Call #: SF55.A78A7;
ISSN: 1011-2367
Descriptors: immunoproteins: synthesis/ nitrogen/ protein: dietary/ synthetic amino acids: dietary supplementation/ threonine/ poultry (Aves)/ swine (Suidae): piglet/ Animals/ Artiodactyls/ Birds/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ amino acid nutrition/ environmental manure pollutants/ growth performance/ immunocompetency/ monogastric animal production/ nutrient excretion
Abstract: The present paper gives a general overview on amino acid nutrition mainly focused on the concept of ideal protein and amino acid requirements in swine and poultry. Also, the nutritional, economic and environmental roles of synthetic amino acids are presented. A special emphasis has been given to the protein sparing effect by the supplementation of synthetic amino acids into diet and to the effect of this supplementation on growth performance and reduction of environmental pollutants in swine and poultry manure. It is concluded that the supplementation of limited amounts of synthetic amino acids (0.1 to 0.3%) to diets for swine and poultry could spare 2 to 3 percentage units of dietary protein and substantially reduce nutrient excretion, especially nitrogen. Immunocompetency as affected by amino acid nutrition is also introduced and the importance of threonine for the synthesis of immunoproteins in colostrum and milk to maintain piglets' health and intestinal integrity has been emphasized. Finally, some speculation on the future of global amino acids market is presented in conclusion.

1476. **The role of traditional and novel toxicity test methods in assessing stormwater and sediment contamination.**
Burton, G Allen Jr; Pitt, Robert; and Clark, Shirley
Critical Reviews in Environmental Science and Technology 30 (4): 413-447. (2000)

NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: suspended solids: pollutant, toxin/ UV light/ biological responses/ carcinogenicity/ ecotoxicology/ elutriate exposure [extract exposure]/ endocrine disruption/ fluctuating stressors/ indigenous communities/ lethality/ mutagenicity/ physicochemical conditions/ pore water [interstitial water]/ sediment contamination/ stormwater contamination / subcellular responses/ temperature/ teratogenicity/ water column toxicity
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1477. **The role of trees in sustainable agriculture: An overview.**
Prinsley, R. T.
Forestry Sciences 43: 87-115. (1993)
NAL Call #: SD1.F627;
ISSN: 0924-5480.
Notes: In the series analytic: The role of trees in sustainable agriculture / edited by R. T. Prinsley. Papers presented at a conference held Oct 1991, Albury, Victoria, Australia. Includes references.
Descriptors: agroforestry/ sustainability/ shelterbelts/ rehabilitation/ erosion control/ wind/ Australia
This citation is from AGRICOLA.

1478. **The role of turfgrasses in environmental protection and their benefits to humans.**
Beard, J. B. and Green, R. L.
Journal of Environmental Quality 23 (3): 452-460.
(May 1994-June 1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Descriptors: lawns and turf/ environmental protection/ erosion/ erosion control/ soil stabilization/ groundwater recharge/ water quality/ literature reviews
Abstract: Turfgrasses have been utilized by humans to enhance their environment for more than 10 centuries. The complexity and comprehensiveness of these environmental benefits that improve our quality-of-life are just now being quantitatively documented through research. Turfgrass benefits may be divided into (i) functional, (ii) recreational, and (iii) aesthetic components. Specific functional benefits include: excellent soil erosion control and dust stabilization thereby protecting a vital soil resource; improved recharge and quality protection of groundwater, plus flood control: enhanced entrapment and biodegradation of synthetic organic compounds; soil improvement that includes CO2 conversion; accelerated restoration of disturbed soils; substantial urban heat dissipation-temperature moderation; reduced noise, glare and visual pollution problems; decreased noxious pests and allergy-related pollens; safety in vehicle operation on roadsides and engine longevity on airfields; lowered fire hazard via open, green turfed firebreaks; and improved security of sensitive installations provided by high visibility zones. The recreational benefits include a low-cost surface for outdoor sport and leisure activity enhanced physical health of participants, and a unique low-cost cushion against personal impact injuries. The aesthetic benefits include enhanced beauty and attractiveness; a complimentary relationship to the total landscape ecosystem of flowers, shrubs and trees; improved mental health with a positive therapeutic impact, social harmony and stability; improved work productivity; and an overall better quality-of-life, especially in densely populated urban areas.
This citation is from AGRICOLA.

1479. **The roles of spent mushroom substrate for the mitigation of coal mine drainage.**
Stark, Lloyd R and
Williams, Frederick M
Compost Science and Utilization 2 (4): 84-94. (1994)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: iron/ manganese/ carbon/ nitrogen/ sulfate/ Basidiomycetes (Fungi Unspecified)/ fungi/ microorganisms/ nonvascular plants/ plants/ acidity/ iron/ limestone dissolution/ manganese/ nitrogen/ organic carbon/ pH/ sulfate reduction/ water quality
Abstract: Spent mushroom substrate (SMS) has been used widely in coal mining regions of the USA as the primary substrate in constructed wetlands for the treatment of coal mine drainage. Such mine drainage is usually acidic and contains high concentrations of dissolved Fe and, less commonly, Mn. In laboratory and mesocosm studies, SMS has emerged as one of the substrates for mine water treatment, owing to its high organic carbon and limestone content. Processes that are responsible in waterlogged SMS for the successful treatment of acidity and Fe include limestone dissolution, sulfate reduction, and Fe oxidation. Provided the pH of the mine water does not fall below 3.0, SMS can be used in the mitigation plan. However, neither Mn nor dissolved ferric Fe appears to be treatable using reducing SMS wetlands. Care must be taken to create reducing conditions in the SMS wetlands, since if the SMS volume is too low, oxidizing conditions will obtain throughout the profile of the SMS, and eventually the SMS will fail to treat the water. Since after a few years much of the nonrefractive organic carbon in SMS will have been decomposed and metabolized, carbon supplementation can significantly extend the life of the SMS treatment wetland and improve water treatment. Several species of plants thrive in SMS under mine water conditions, but none improve water quality over the short term in excess of the treatment provided by SMS. Nitrogen leakage from SMS wetlands is not problematic after several weeks of operation.
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1480. **Rolled erosion control systems for hillslope surface protection: A critical review, synthesis and analysis of available data.**
Sutherland, R. A.
Land Degradation and Development 9 (6): 465-486. (Nov. 1998-Dec. 1998)
NAL Call #: S622.L26 S622.L26;
ISSN: 1085-3278 [LDDEF6].
Notes: Subtitle: I. Background and formative years.
Descriptors: erosion control/ upland areas/ data analysis/ literature reviews/ vegetation/ ground cover/ United States
This citation is from AGRICOLA.

1481. **Root aeration in wetland trees and its ecophysiological significance.**
Grosse, W.; Buchel, H. B.; and Lattermann, S.
In: Coastally restricted forests; Series: Biological resources management series.
New York: Oxford University Press, 1998; pp. 293-305.
ISBN: 0195075676
NAL Call #: QK115.C63-1998
Descriptors: forest trees/ roots/ flooding/ stress factors/ stress response/ wetlands/ forest ecology/

species diversity/ coastal areas/ literature reviews
This citation is from AGRICOLA.

1482. **Root zone solute dynamics under drip irrigation: A review.**
Mmolawa, K. and Or, D.
Plant and Soil 222 (1/2): 163-190. (2000)
NAL Call #: 450 P696;
ISSN: 0032-079X
This citation is provided courtesy of CAB International/CABI Publishing.

1483. **Rootzone processes and the efficient use of irrigation water.**
Clothier, Brent E and
Green, Steven R
Agricultural Water Management 25 (1): 1-12. (1994)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: kiwifruit (Actinidiaceae)/ angiosperms/ dicots/ plants/ spermatophytes/ vascular plants/ horticulture/ hydraulic conductivity/ infiltration/ macropores/ plant water uptake
Abstract: The need for more-efficient agricultural use of irrigation water arises out of increased competition for water resources, and the greater pressure on irrigation practices to be environmentally friendly. In this review for the 25th Jubilee volume of Agricultural Water Management we focus on three rootzone processes that determine water-use efficiency in irrigation. Firstly, we discuss the role of macropores in preferentially-transporting irrigation water to depth during infiltration under both sprinkler and flood systems. It is suggested that more-uniform entry of irrigation water into the rootzone will result either by matching the sprinkler rate to the soil's matrix hydraulic conductivity, or by modifying the soil-surface's macroporosity prior to flood irrigation. Secondly, the environmentally-deleterious leaching of chemicals by irrigation is shown to be reduced if the applied fertilizer is first washed into dry soil by a small amount of water. This first pulse of water is drawn by capillarity into the soil's microporosity, and it carries with it the dissolved fertilizer which becomes resident there. These nutrients are then available for plant uptake, yet less prone to subsequent leaching by heavy rains. Meanwhile, initially-resident solutes in the dry soil, such as salts, will be more-effectively displaced by the infiltrating irrigation water. Finally, our time domain reflectometry (TDR) observations of the changing soil water content in the rootzone of a kiwifruit vine, and our direct measurements of sap flow within individual roots, both reveal that plants can rapidly change their spatial pattern of water uptake in response to the application of irrigation water. The prime uptake role of near-surface roots is highlighted. Consideration of all three of these rootzone processes reinforces the claim that more-efficient and environmentally-sustainable water management will arise through higher-frequency applications of smaller amounts of irrigation.
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1484. **Ruminant methane emission measurements and estimates: From gut to globe.**
Clark, H.
Proceedings of the New Zealand Society of Animal Production 62: 206-210. (2002);
ISSN: 0370-2731
This citation is provided courtesy of CAB International/CABI Publishing.

1485. **Ruminant nutrition from an environmental perspective: Factors affecting whole-farm nutrient balance.**
Horn, H. H. van; Newton, G. L.; and Kunkle, W. E.
Journal of Animal Science 74 (12): 3082-3102. (1996)
NAL Call #: 49 J82;
ISSN: 0021-8812
This citation is provided courtesy of CAB International/CABI Publishing.

1486. **Safeguarding the welfare of livestock grazing on nature conservation sites.**
Grayson, F. W.
Animal Welfare 12 (4): 685-688. (2003);
ISSN: 0962-7286
This citation is provided courtesy of CAB International/CABI Publishing.

1487. **Salinisation: A major threat to water resources in the arid and semi-arid regions of the world.**
Williams, W D
Lakes and Reservoirs: Research and Management 4 (3-4): 85-91. (1999);
ISSN: 1320-5331
Descriptors: human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ agricultural wastewater discharge/ annual mean rainfall/ aquatic ecosystems/ arid regions/ biodiversity/ catchments/ dryland salinity/ ecological productivity/ economic impact/ environmental impact/ freshwaters/ global threat/ groundwaters/ human pressure/ irrigation/ natural salt lakes/ resource management/ river/ salinization: secondary/ semi arid regions/ social impact/ vegetation clearance/ water resources/ wetlands
Abstract: Semi-arid and arid regions (i.e. drylands with annual mean rainfall between 25 and 500 mm) cover approximately one-third of the world's land area and are inhabited by almost 400 million people. Because they are a resource in short supply, waters in drylands are under increasing human pressures, and many are threatened by rising salinities (salinisation) in particular. Rising salinities result from several causes. The salinities of many large natural salt lakes in drylands are rising as water is diverted from their inflows for irrigation and other uses. The excessive clearance of natural, deep-rooted vegetation from catchments and the discharge of saline agricultural wastewater causes the salinity of many freshwater lakes, wetlands and rivers to rise. The salinisation of some fresh waters is caused by rising saline groundwaters. And in some regions, increasing climatic aridity may be a cause of salinisation. Whatever the cause, salinisation has significant economic, social and environmental impacts. They are usually deleterious and often irreparable. Decreased biodiversity, changes in the natural character of aquatic ecosystems, and lower productivity are frequent ecological effects. In some dryland countries, salinisation is viewed as the single most important threat to water resources. However, the extent and importance of salinisation as a global threat has been greatly underestimated. Recognition of this is the first step in any attempt to manage it effectively. The aims of the present paper, therefore, are three-fold. First, it aims to define the problem and indicate its extent; second, it aims to outline the causes and effects of salinisation; third, it aims to highlight the social, economic and environmental costs and comment on management responses. An overarching aim is to draw attention to the importance of

salinisation as a phenomenon of global significance to waters in drylands.

1488. **Salinity and its effect on growth, yield and some physiological processes of crop plants.**
El Saidi, M. T.
In: Strategies for improving salt tolerance in higher plants/ Jaiwal, P. K.; Singh, R. P.; and Gulati, A.
Enfield, N.H.: Science Pub., 1997; pp. 111-127.
ISBN: 1886106975
NAL Call #: QK753.S3S77-1997
Descriptors: gossypium hirsutum/ oryza sativa/ beta vulgaris/ brassica napus/ salinity/ hordeum vulgare/ growth/ crop yield/ plant physiology/ saline soils/ reclamation/ irrigation water/ vesicular arbuscular mycorrhizas/ soil fertility/ phosphorus/ trace elements/ nutrient availability/ root systems/ roots/ rhizobium/ azotobacter/ tolerance/ heat tolerance/ drought resistance/ nitrogen content/ drainage/ soil amendments/ fertilizers/ plant growth regulators/ irrigation/ literature reviews
This citation is from AGRICOLA.

1489. **Salmon recovery in the Pacific Northwest: A summary of agricultural and other economic effects.**
Aillery, Marcel P. and United States. Dept. of Agriculture. Economic Research Service.
Washington, D.C.: U.S. Dept. of Agriculture, Economic Research Service; 10 p.: ill., map. (1994)
Notes: Caption title. "July 1994." Includes bibliographical references (p. 9).
NAL Call #: 1--Ag84Ab-no.699
Descriptors: Salmon fisheries---Columbia River---Watershed/ Rare fishes---Columbia River---Watershed/ Wildlife conservation---Columbia River---Watershed
This citation is from AGRICOLA.

1490. **Salt tolerance and crop potential of halophytes.**
Glenn, E. P.; Brown, J. J.; and Blumwald, E.
Critical Reviews in Plant Sciences 18 (2): 227-255. (1999)
NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3]
Descriptors: halophytes/ salicornia/ salt tolerance/ crops/ evolution/ osmosis/ vacuoles/ sodium chloride/ solutes/ cytoplasm/ ion transport/ sodium/ chloride/ tonoplast/ pyrophosphatases/ adenosinetriphosphatase/ irrigation/ water/ sea water/ hydrogen ions/ glycophytes/ field experimentation/ crop yield/ leaching/ water use efficiency/ forage/ seeds/ feeds/ leaves/ sap/ maximum yield/ literature reviews/ saline water/ salicornia bigelovii
This citation is from AGRICOLA.

1491. **Satellite eco-hydrology: A review.**
Meijerink, A. M. J.
Tropical Ecology 43 (1): 91-106. (2002);
ISSN: 0564-3295
This citation is provided courtesy of CAB International/CABI Publishing.

1492. **Satellite remote sensing for forestry planning: A review.**
Holmgren, P. and Thuresson, T.
Scandinavian Journal of Forest Research 13 (1): 90-110. (1998)
NAL Call #: SD1.S34;
ISSN: 0282-7581
This citation is provided courtesy of CAB International/CABI Publishing.

1493. **Satellite Remote Sensing of Wetlands.**
Ozesmi, SL and Bauer, ME
Wetlands Ecology and Management 10 (5): 381-402. (2002)
NAL Call #: QH541.5.M3 W472;
ISSN: 0923-4861
Descriptors: Conservation/ Remote sensing/ Wetlands/ Satellites/ Classification/ Literature reviews/ Environmental monitoring/ Baseline studies/ Nature conservation/ Land use/ Satellite sensing/ Ecosystem management/ Long term changes/ Short term changes/ Environmental protection/ Classification systems/ Surveying and remote sensing/ Wildlife management and recreation/ Habitat community studies/ Wetlands
Abstract: To conserve and manage wetland resources, it is important to inventory and monitor wetlands and their adjacent uplands. Satellite remote sensing has several advantages for monitoring wetland resources, especially for large geographic areas. This review summarizes the literature on satellite remote sensing of wetlands, including what classification techniques were most successful in identifying wetlands and separating them from other land cover types. All types of wetlands have been studied with satellite remote sensing. Landsat MSS, Landsat TM, and SPOT are the major satellite systems that have been used to study wetlands; other systems are NOAA AVHRR, IRS-1B LISS-II and radar systems, including JERS-1, ERS-1 and RADARSAT. Early work with satellite imagery used visual interpretation for classification. The most commonly used computer classification method to map wetlands is unsupervised classification or clustering. Maximum likelihood is the most common supervised classification method. Wetland classification is difficult because of spectral confusion with other landcover classes and among different types of wetlands. However, multi-temporal data usually improves the classification of wetlands, as does ancillary data such as soil data, elevation or topography data. Classified satellite imagery and maps derived from aerial photography have been compared with the conclusion that they offer different but complimentary information. Change detection studies have taken advantage of the repeat coverage and archival data available with satellite remote sensing. Detailed wetland maps can be updated using satellite imagery. Given the spatial resolution of satellite remote sensing systems, fuzzy classification, subpixel classification, spectral mixture analysis, and mixtures estimation may provide more detailed information on wetlands. A layered, hybrid or rule-based approach may give better results than more traditional methods. The combination of radar and optical data provide the most promise for improving wetland classification.

1494. **Scale-dependent dispersal and distribution patterns of spiders in agricultural systems: A review.**
Samu, F.; Sunderland, K. D.; and Szinetár, C.
Journal of Arachnology 27 (1): 325-332. (1999)
NAL Call #: QL451.J6;
ISSN: 0161-8202
This citation is provided courtesy of CAB International/CABI Publishing.

1495. **Scale Issues in Hydrological Modelling: A Review.**
Bloeschl, G. and Sivapalan, M.
Hydrological Processes 9 (3-4): 251-290. (1995)
NAL Call #: GB651.H93;
ISSN: 0885-6087.
Notes: Conference: Workshop on Scale Issues in Hydrological/Environmental Modelling, Robertson, NSW (Australia), 30 Nov-2 Dec 1993; Source: Scale Issues in Hydrological/Environmental Modelling., 1995
Descriptors: hydrologic models/ dimensional analysis/ catchment basins/ variability/ research needs/ reviews/ parametric hydrology/ streams/ drainage patterns/ mathematical models/ hydrology/ catchment area/ river basins/ scale issues/ Dynamics of lakes and rivers
Abstract: A framework is provided for scaling and scale issues in hydrology. The first section gives some basic definitions. This is important as researchers do not seem to have agreed on the meaning of concepts such as scale or upscaling. 'Process scale', 'observation scale' and 'modelling (working) scale' require different definitions. The second section discusses heterogeneity and variability in catchments and touches on the implications of randomness and organization for scaling. The third section addresses the linkages across scales from a modelling point of view. It is argued that upscaling typically consists of two steps: distributing and aggregating. Conversely, downscaling involves disaggregation and singling out. Different approaches are discussed for linking state variables, parameters, inputs and conceptualizations across scales. The fourth section addresses the linkages across scales from a more holistic perspective dealing with dimensional analysis and similarity concepts. The main difference to the modelling point of view is that dimensional analysis and similarity concepts deal with complex processes in a much simpler fashion. Examples of dimensional analysis, similarity analysis and functional normalization in catchment hydrology are given. This section also briefly discusses fractals, which are a popular tool for quantifying variability across scales. The fifth section focuses on one particular aspect of this holistic view, discussing stream network analysis. The paper concludes with identifying key issues and gives some directions for future research.
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1496. **Science in agroforestry.**
Sanchez, P A
Agroforestry Systems 30 (1-2): 5-55. (1995)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
Descriptors: Faidherbia albida (Leguminosae)/ angiosperms/ dicots/ plants/ spermatophytes/ vascular plants/ competition/ complexity/ crop yield/ intercropping/ profitability/ sustainability
Abstract: Agroforestry research is being transformed from a collection of largely descriptive studies into more scientific approaches, based on process-oriented research. The development of agroforestry as a science should be based on four key features: competition, complexity, profitability and sustainability. Managing the competition between trees and crops for light, water and nutrients to the farmers' benefit is the biophysical determinant of successful agroforestry systems. Simultaneous agroforestry systems are more susceptible to competition than sequential ones. A tree-crop interaction equation helps quantify competition vs. complementary effects on fertility. Alley cropping, a simultaneous agroforestry system, has limited applicability because the competition factor usually exceeds the beneficial fertility effects. The Faidherbia albida parkland, another simultaneous system, is almost always beneficial since the reverse phenology of F. albida minimizes competition while enhancing the fertility effect. Sequential systems such as relay intercropping and improved fallows also minimize competition but the processes responsible for crop yield increases are largely unquantified. New methodologies for reliably measuring complex below-ground interactions are being developed. Socioeconomic and ecological complexity are typical of agroforestry systems. Participatory, analytical and multidisciplinary characterization at different spatial scales is the required first step in effective agroforestry research. Diversity of products and services should be manipulated in a way that puts money in farmers' pockets. Domestication of indigenous trees with high-value products enhances profitability, particularly those that can be marketed as ingredients of several finished products. Policy research interventions are often necessary to help farmers during the initial years before trees become productive and exert their positive ecological functions. Profitable agroforestry systems are potentially sustainable, controlling erosion, enhancing biodiversity and conserving carbon, provided nutrient offtake is balanced by nutrient returns via litter and the strategic use of fertilizers, particularly phosphorus. A list of research gaps indicates where hard data are needed to provide a predictive understanding of the competition, complexity, profitability and sustainability aspects of agroforestry.
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1497. **Scientific basis for estimating air emissions from animal feeding operations.**
National Research Council. Committee on Air Emissions from Animal Feeding Operations
Washington DC: National Academies Press; 122 p. (2002)
Notes: Title: Interim report;
ISBN: 0-309-08461-X
http://www.nap.edu/books/030908461X/html/
Descriptors: emissions/ animal feeding/ testing/ pollution control/ odor control

1498. **Scoping analysis and public involvement: Summary for the proposed standards for rangeland health and guidelines for livestock grazing.**
United States. Bureau of Land Management. New Mexico State Office.
Santa Fe, N.M.: U.S. Dept. of the Interior, Bureau of Land Management, New Mexico State Office; 69 p. (1996)
Notes: Cover title. Shipping list no.: 97-0020-P. "September 1996." Chiefly tables. SUDOCS: I 53.2:SCO 6.
NAL Call #: SF85.35.N6S36--1996
Descriptors: Range management---New Mexico---Planning/ Livestock---New Mexico---Management/ Grazing districts---New Mexico---Planning---Citizen participation
This citation is from AGRICOLA.

1499. **The secret life of compost: A "how-to" & "why" guide to composting: Lawn, garden, feedlot, or farm.**
Beck, Malcolm
Metairie, La.: Acres U.S.A.; x, 150 p.: ill. (1997)
NAL Call #: S661-.B42-1997;
ISBN: 0911311521 (trade paper); 091131153X (hardcover)
Descriptors: Compost
This citation is from AGRICOLA.

1500. **Section 319 National Monitoring Program: An Overview.**
Osmond, D. L.; Line, D. E.; Spooner, J.; North Carolina State University Water Quality Group; and U. S. Environmental Protection Agency.
North Carolina State University, 1997 (text/html)
NAL Call #: TD223 S44 1997
http://h2osparc.wq.ncsu.edu/319glossy/index.html
Descriptors: nonpoint source pollution/ environmental monitoring/ governmental programs and projects/ watershed management/ water quality/ land management/ best management practices/ pollution control/ case studies/ United States/ Section 319 National Monitoring Program/ BMPs
This citation is from AGRICOLA.

1501. **Section 319 National Monitoring Program Projects: 2000 Summary Report.**
Lombardo, L. A.; Grabow, G. L.; Tweedy, K. L.; Line, D. E.; Osmond, D. L.; Spooner, J.; North Carolina State University Water Quality Group; and U. S. Environmental Protection Agency.
North Carolina State University, 2000 (text/html)
http://h2osparc.wq.ncsu.edu/2000rept319/
Descriptors: nonpoint source pollution/ environmental monitoring/ governmental programs and projects/ watershed management/ water quality/ land management/ best management practices/ agricultural land/ case studies/ United States/ Section 319 National Monitoring Program/ BMPs

1502. **Section 319 National Monitoring Program Projects: 2001 Summary Report.**
Lombardo, L. A.; Grabow, G. L.; Line, D. E.; Osmond, D. L.; Spooner, J.; North Carolina State University Water Quality Group; and U. S. Environmental Protection Agency.
North Carolina State University, 2001 (text/html)
http://h2osparc.wq.ncsu.edu/319/2001rept/index.htm
Descriptors: nonpoint source pollution/ environmental monitoring/ governmental programs and projects/ watershed management/ water quality/ land management/ best management practices/ agricultural land/ case studies/ United States/ Section 319 National Monitoring Program/ BMPs

1503. **Section 319 Nonpoint Source National Monitoring Program: Successes and Recommendations.**
Lombardo, L. A.; Grabow, G. L.; Spooner, J.; Line, D. E.; Osmond, D. L.; Jennings, G. D.; North Carolina State University Water Quality Group; and U. S. Environmental Protection Agency.
North Carolina State University, 2000 (application/pdf)
http://www5.bae.ncsu.edu/programs/extension/wqg/section319/NMP%20Lessons%20Learned%2011_00.pdf
Descriptors: nonpoint source pollution/ environmental monitoring/ governmental programs and projects/ watershed management/ water quality/ land management/ best management practices/ pollution control/ case studies/ United States/ Section 319 National Monitoring Program/ BMPs

1504. **Section 319 Nonpoint Source Success Stories.**
U. S. Environmental Protection Agency [Also available as: EPA 841-S-94-004], 1994 (text/html)
NAL Call #: TD223 S43 1998
http://www.epa.gov/owow/nps/Success319/
Descriptors: Clean Water Act/ laws and regulations/ nonpoint source pollution/ runoff/ water pollution/ water quality/ watershed management/ best management practices/ environmental protection/ governmental programs and projects/ United States/ BMPs
Abstract: Demonstrates the successful implementation of the Section 319 Clean Water Act Nonpoint Source program. Provides examples of successful solutions to a variety of water quality problems caused by nonpoint source pollution.
This citation is from AGRICOLA.

1505. **Section 319 Success Stories: Highlights of State and Tribal Nonpoint Source Programs.**
U. S. Environmental Protection Agency [Also available as: EPA 841-R-97-001], 1997.
Notes: Subtitle: Volume II (text/html)
http://www.epa.gov/owow/NPS/Section319II/
Descriptors: Clean Water Act/ laws and regulations/ nonpoint source pollution/ runoff/ water pollution/ water quality/ watershed management/ best management practices/ environmental protection/ governmental programs and projects/ United States/ BMPs
Abstract: Gives examples of success stories that have come with the maturation of state nonpoint source programs.

1506. **Section 319 Success Stories: Volume III.**
U. S. Environmental Protection Agency, Office of Water.
U. S. Environmental Protection Agency [Also available as: EPA-841-S-01-001], 2002 (application/pdf; text/html)
http://www.epa.gov/owow/nps/Section319III/pdf/319_all.pdf
Descriptors: Clean Water Act/ laws and regulations/ nonpoint source pollution/ runoff/ water pollution/ water quality/ watershed management/ best management practices/ environmental protection/ governmental programs and projects/ United States/ BMPs
Abstract: Success Stories: Volume III contains approximately two new stories per state, highlighting some of the additional successes achieved since the 1997 publication. These stories demonstrate better-defined water quality improvements, as well as growing partnerships and funding sources, as state 319 programs expand and states learn increasingly more from past 319 demonstration projects. Collectively, they represent only a fraction of the section 319 project successes.

1507. **Sediment quality criteria in use around the world.**
Burton, G Allen Jr
Limnology 3 (2): 65-75. (2002);
ISSN: 1439-8621
Descriptors: acid volatile sulfides/ organic carbon/ organism

(Organisms): bioindicator/ aquatic ecosystems/ benchmarks/ bioaccumulation/ ecological risk/ ecotoxicology/ laboratory toxicity/ sediment contamination/ sediment quality guidelines [SQGs]: criteria/ temporal variability

Abstract: There have been numerous sediment quality guidelines (SQGs) developed during the past 20 years to assist regulators in dealing with contaminated sediments. Unfortunately, most of these have been developed in North America. Traditionally, sediment contamination was determined by assessing the bulk chemical concentrations of individual compounds and often comparing them with background or reference values. Since the 1980s, SQGs have attempted to incorporate biological effects in their derivation approach. These approaches can be categorized as empirical, frequency-based approaches to establish the relationship between sediment contamination and toxic response, and theoretically based approaches that attempt to account for differences in bioavailability through equilibrium partitioning (EqP) (i.e., using organic carbon or acid volatile sulfides). Some of these guidelines have been adopted by various regulatory agencies in several countries and are being used as cleanup goals in remediation activities and to identify priority polluted sites. The original SQGs, which compared bulk chemical concentrations to a reference or to background, provided little insight into the ecosystem impact of sediment contaminants. Therefore, SQGs for individual chemicals were developed that relied on field sediment chemistry paired with field or laboratory-based biological effects data. Although some SQGs have been found to be relatively good predictors of significant site contamination, they also have several limitations. False positive and false negative predictions are frequently in the 20% to 30% range for many chemicals and higher for others. The guidelines are chemical specific and do not establish causality where chemical mixtures occur. Equilibrium-based guidelines do not consider sediment ingestion as an exposure route. The guidelines do not consider spatial and temporal variability, and they may not apply in dynamic or larger-grained sediments. Finally, sediment chemistry and bioavailability are easily altered by sampling and subsequent manipulation processes, and therefore, measured SQGs may not reflect in situ conditions. All the assessment tools provide useful information, but some (such as SQGs, laboratory toxicity and bioaccumulation, and benthic indices) are prone to misinterpretation without the availability of specific in situ exposure and effects data. SQGs should be used only in a "screening" manner or in a "weight-of-evidence" approach. Aquatic ecosystems (including sediments) must be assessed in a "holistic" manner in which multiple components are assessed (e.g., habitat, hydrodynamics, resident biota, toxicity, and physicochemistry, including SQGs) by using integrated approaches.

1508. **Sediment quality values (SQVs) and ecological risk assessment (ERA).**
Chapman, Peter M and Mann, Gary S
Marine Pollution Bulletin 38 (5): 339-344. (1999)
NAL Call #: GC1000.M3;
ISSN: 0025-326X
Descriptors: contaminants: bioavailability/ dredging/ ecological risk assessment/ environmental contamination/ sediment quality

Abstract: A wide variety of sediment quality values (SQVs) have been promulgated. Ecological risk assessment (ERA) provides a framework for objectively and systematically evaluating the risks posed by environmental contamination to ecological resources. SQV application to ERA should be restricted to the initial problem formulation stage where they can be used either alone (i.e., in jurisdictions with accepted SQVs) or in a weight-of-evidence approach (i.e., multiple SQV types; in jurisdictions without accepted SQVs) to screen out contaminants posing negligible risks to ecological receptors.

1509. **Sediment transport, aqueous bedform stability and morphodynamics under unidirectional current: A brief overview.**
Mazumder, R.
Journal of African Earth Sciences 36 (1-2): 1-14. (Jan.-Feb. 2003);
ISSN: 0899-5362.
Notes: Number of References: 132
Descriptors: Earth Sciences/ bedform stability/ morphodynamics/ turbulence/ sediment transport/ boundary layer/ stage plane beds/ turbulent boundary layers/ current ripples/ equilibrium morphology/ subaqueous dunes/ fine sand/ heterogeneous sediment/ stratification types/ fluvial sandstone/ flume experiments

Abstract: Extensive research on the stability and morphodynamics of aqueous bedforms over the past four decades reveals the existance of seven bedform states (ripples, lower stage plane beds, pebble clusters, bedload sheets, dunes, upper stage plane beds and antidunes). Their stability and morphology is a function of mean flow velocity/non-dimensional bed shear stress and sediment-size. These bedform states are distinguishable from one other by their morphology, dimension, and sediment transport rate. Each bedform state is characterized by distinct physical process(es), and transitional bedform states (washed-out-ripples and dunes) are consequences of their temporal, spatial and dimensional variabilities. The physical processes associated with various aqueous bedform states and transitional bedforms are discussed in this paper, in order to gain insights into their stability and morphodynamics in different sediment-sizes.

1510. **Seed Banks and Seed Population Dynamics of Halophytes.**
Ungar, I. A.
Wetlands Ecology and Management 9 (6): 499-510. (2001)
NAL Call #: QH541.5.M3 W472;
ISSN: 0923-4861.
Notes: Special Issue: Halophytes - a Resource for the future; DOI: 10.1023/A:1012236829474
Descriptors: Seed banks/ Population dynamics/ Halophytes/ Gradients/ Salinity effects/ Seeds/ Aquatic plants/ Environmental protection/ Nature conservation/ Salinity tolerance/ Literature reviews/ Geographical distribution/ Wetlands/ Salt Marshes/ Zones/ Plant Populations/ Spatial Distribution/ Temporal Distribution/ Salt Tolerance/ Reviews/ Plants general/ Population dynamics/ Viruses, Bacteria, Protists, Fungi and Plants/ Water and plants

Abstract: In this review I will describe the importance of seed banks and the population dynamics of seeds on the distribution of species in saline habitats. The main questions being examined in this review include: 1. Does the seed bank represent the flora of the entire salinity gradient or is it restricted to the species in each zonal community? 2. Is the size and species composition of the persistent seed bank regulated by the degree of salt stress in habitats along an environmental gradient? 3. Does the population dynamics of seeds influence the temporal and spatial distribution of plant species in saline habitats? Seed banks may be transient or persistent depending upon the physiological responses of species and the soil environment in which the seeds are found. The formation of zonal communities in salt marsh environments is affected by changes in soil salinity and flooding along an elevational gradient. Population dynamics of seeds have been found to determine the spatial and temporal distribution of species along salinity gradients. The flora and relative density of species of zonal communities are significantly dependent upon the stress tolerance of species at different stages of development and the presence of transient or persistent seed banks. The occurrence of a seed bank is related to the salinity tolerance of species at the germination stage of development, a seeds ability to tolerate hypersaline conditions and flooding, and whether or not species are able to maintain a persistent seed bank until hypersaline conditions are alleviated.

1511. **Seed banks: Memory in soil.**
Cavers, P. B.
Canadian Journal of Soil Science 75 (1): 11-13. (1995)
NAL Call #: 56.8 C162;
ISSN: 0008-4271
This citation is provided courtesy of CAB International/CABI Publishing.

1512. **Seeking the root of insect resistance to transgenic plants.**
Tabashnik, B. E.
Proceedings of the National Academy of Sciences 94 (8): 3488-3490. (Apr. 1997);
ISSN: 0027-8424
Descriptors: reviews/ transgenic plants/ Bacillus thuringiensis/ pest resistance/ insecticides/ toxins/ Plants/ Pathology
Abstract: It is humbling and instructive that the most exquisitely specific group of insecticides known originates not from a laboratory, but instead from the common soil bacterium Bacillus thuringiensis (Bt). Insecticidal crystal proteins produced by Bt kill insects by binding to and disrupting their midgut membranes. Each of the numerous strains of Bt produces a characteristic set of crystal proteins. Each of these toxins is lethal to certain insects, yet does little or no harm to most other organisms, including people, wildlife, and even other insects. Bt was first formally described from Thuringia, Germany, in 1911 and has been available in commercial formulations for insect control since the 1930s; yet until recently, it remained a minor component of pest management. Three factors set the stage for the emerging importance of Bt: evolution of resistance to insecticides in more than 500 species of insects and mites, rising concerns about environmental hazards of conventional insecticides, and breakthroughs in biotechnology. Genetic engineering has created transgenic varieties of many crops that express Bt toxins; such cultivars of transgenic corn, cotton, and potatoes were grown on a large scale in the United States for the first time during 1996. Transgenic plants armed with Bt toxins are defended against some of the most notorious pests, which reduces the need for insecticidal sprays. Because Bt is not toxic to arthropod natural enemies, opportunities for biological control are enhanced and the secondary pest outbreaks often caused by conventional insecticides are avoided. Thus, this new technology could yield enormous benefits for food production and environmental quality worldwide. Will the advent of Bt-expressing transgenic plants herald a new era of environmentally benign insect control? Or will the pests quickly adapt?

1513. **Seepage from earthern animal waste ponds and lagoons: An overview of research results and state regulations.**
Parker, D. B.; Schulte, D. D.; and Eisenhauer, D. E.
Transactions of the ASAE 42 (2): 485-493. (1999)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: animal wastes/ seepage/ infiltration/ ponds/ lagoons/ regulations/ water quality/ pollution control
Abstract: Wastewater seepage from earthen animal waste lagoons and storage ponds can contaminate groundwater with nutrients and pathogens. For almost 30 years, the subject has been the focus of laboratory and field research projects designed to (1) measure if and how much earthen ponds and lagoons leak, (2) determine how different soil types affect seepage rates, and (3) evaluate the magnitudes and mechanisms of sealing from animal waste. In this article we present a research review performed to determine how researchers have attempted to answer these questions and how well they have been answered. We discuss weaknesses in the body of knowledge and present further research and educational needs. We also performed a review of 14 state regulations to assess and compare how different states govern seepage from ponds and lagoons. Six states regulate the maximum allowable seepage rate from ponds and lagoons (values ranging from 0.042 to 0.63 cm/day) while another six states regulate the maximum hydraulic conductivity of earthen liners (values ranging from 0.086 to 0.0086 cm/day). The two remaining states regulate neither. The results of this research and regulatory, review demonstrate that there is still much to be learned about seepage from animal waste ponds and lagoons. We suggest that a risk-based approach to regulating seepage may be appropriate in the future.
This citation is from AGRICOLA.

1514. **Selected procedures for the monitoring of polar pesticides and related microcontaminants in aquatic samples.**
Brouwer, E R; Kofman, S; and Brinkman, U A T
Journal of Chromatography A 703 (1-2): 167-190. (1995)

NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: analytical method/ surface water/ tap water/ water pollution
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1515. **Selecting and testing indicators of forest health.**
Lewis, T. E.; Cassell, D. L.; Cline, S. P.; Alexander, S. A.; Stolte, K. W.; and Smith, W. D.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems = Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City, Mexico.) Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 140-156; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: forest health/ biological indicators/ monitoring/ environmental assessment/ forest ecology/ ecosystems/ government/ cooperation/ quality controls/ organizations/ sustainability/ forest management/ social values/ wildlife/ habitats/ productivity/ environmental management/ spatial distribution/ environmental impact/ quantitative techniques/ literature reviews
This citation is from AGRICOLA.

1516. **Selecting indicator species to monitor ecological integrity: A review.**
Carignan, V. and Villard, M. A.
Environmental Monitoring and Assessment 78 (1): 45-61. (2002)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: Environment management/ Bioindicators/ Conservation/ Environmental monitoring/ Biological diversity/ Pollution monitoring/ Indicator species/ Pollution indicators/ Test organisms/ Marine organisms/ Estuarine organisms/ Animal physiology/ Life history/ Population structure/ Population dynamics/ Analytical techniques/ Ecosystem management/ Water quality control/ Pollution control/ Water pollution/ Sediment pollution/ Aquatic environment/ Reviews/ Environmental action/ Methods and instruments/ Instruments/ Methods/ Pollution monitoring and detection
Abstract: We review critical issues that must be considered when selecting indicator species for a monitoring program that aims to maintain or restore ecological integrity. First, we examine the pros and cons of different management approaches on which a conservation program can be based and conclude that ecosystem management is most appropriate. We then identify potential indicators of ecological integrity at various levels of the ecosystem, with a particular emphasis on the species level. We conclude that, although the use of indicator species remains contentious, it can be useful if (1) many species representing various taxa and life histories are included in the monitoring program, (2) their selection is primarily based on a sound quantitative database from the focal region, and (3) caution is applied when interpreting their population trends to distinguish actual signals from variations that may be unrelated to the deterioration of ecological integrity. Finally, we present and discuss different methods that have been used to select indicator species.
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1517. **Selenium speciation in soils and plants.**
Fox, P. M.; LeDuc, D. L.; Hussein, H.; Lin, Z. Q.; and Terry, N.
In: Biogeochemistry of environmentally important trace elements/ Cai, Y. and Braids, O. C., 2002; pp. 339-354.
ISBN: 0-8412-3805-7
This citation is provided courtesy of CAB International/CABI Publishing.

1518. **Separation of manure solids from simulated flushed manures by screening or sedimentation.**
Powers, W. J.; Montoya, R. E.; Van Horn, H. H.; Nordstedt, R. A.; and Bucklin, R. A.
Applied Engineering in Agriculture 11 (3): 431-436. (May 1995)
NAL Call #: S671.A66;
ISSN: 0883-8542
Descriptors: cows/ cattle manure/ solid wastes/ cattle slurry/ separation/ sieving/ sedimentation/ nitrogen/ phosphorus/ simulation/ literature reviews/ United States
Abstract: Feces and urine were collected separately from individual cows fed corn silage-based (50% of dry matter) diets which were supplemented with distillers dried grains plus solubles or soybean meal to be 14 or 18% crude protein (CP). Fecal samples from 30 cows were screened using wet sieving and vibrating screens (nested in series); sizes were 3.35, 2.00, 1.40, 1.00, and 0.50 mm. Effluent passing the screens contained 60.2% of total solids (TS), 86.3% of nitrogen (N), and 94.3% of phosphorus (P). Solids caught on the five screens (largest to smallest) accounted for the following percentages of materials: 14.6, 9.4, 2.8, 4.3, 8.6% of TS; 5.7, 3.1, 0.8, 1.3, 2.8% of N; 2.2, 1.2, 0.3, 0.6, 1.5% of P. In another study, a 100 g composite sample of urine and feces from each of 44 cows, mixed in proportion to the amount excreted, was diluted to 1 L with water and allowed to settle for 1 h in a graduated cylinder. Supernatant and sediment were separated by decanting. Supernatants were analyzed for N content, sediments for TS content, and these amounts were subtracted from analyzed contents of samples to obtain reciprocal fractions. Overall, the sediment contained 66% of TS and 45% of N. Estimates of sediment amount made at 5, 10, 20, 40, and 60 min by recording best-defined line between supernatant and sediment suggested sedimentation was 89% completed by 5 min. In a second sedimentation study, simulated manure flushwaters (0.5, 1.0, and 1.5% TS) were treated with additives as follows: (1) 0.75 g of $CaCO_3$ plus 0.50 mL $Fe_2(SO_4)_3$ solution/L, (2) 0.75 g of CaO plus 0.50 mL $Fe_2(SO_4)_3$ solution/L, (3) 0.50 mL $Fe_2(SO_4)_3$ solution/L plus five drops of a commercial polymer, and (4) control (no additives). Precipitates with $CaCO_3$ and CaO treatments contained 92% of the TS, 69% of the N, and 31% of the total potassium (K); the CaO treatment precipitated appreciably more P (93% of total) than other treatments; and treatment with $Fe_2(SO_4)_3$ plus polymer precipitated the least TS and N. These data indicated a potential to remove more manure solids and N from flushed manure by sedimentation than by screening.
This citation is from AGRICOLA.

1519. **Sequestration of carbon and changes in soil quality under conservation tillage on light-textured soils in Australia: A review.**
Chan, K. Y.; Heenan, D. P.; and So, H. B.
Australian Journal of Experimental Agriculture 43 (4): 325-334. (2003)
NAL Call #: 23-Au792;
ISSN: 0816-1089
This citation is provided courtesy of CAB International/CABI Publishing.

1520. **Sheep grazing and riparian and watershed management.**
Glimp, H. A. and Swanson, S. R.
Sheep Research Journal Special issue: 65-71. (1994)
NAL Call #: SF371.R47
This citation is provided courtesy of CAB International/CABI Publishing.

1521. **Sheep grazing as a range improvement tool.**
Havstad, K. M.
Sheep Research Journal: 72-78. (1994)
NAL Call #: SF371.R47;
ISSN: 1057-1809.
Notes: Special issue: Role of sheep grazing in natural resource management. Includes references.
Descriptors: sheep/ range management/ grazing intensity/ grazing effects/ herbivores/ plant succession/ controlled grazing/ literature reviews
This citation is from AGRICOLA.

1522. **Significance and application of microbial toxicity tests in assessing ecotoxicological risks of contaminants in soil and sediment.**
Beelen, P. van and Doelman, P.
Chemosphere 34 (3): 455-499. (Feb. 1997)
NAL Call #: TD172.C54;
ISSN: 0045-6535 [CMSHAF]
Descriptors: polluted soils/ sediment/ pollutants/ toxicity/ tests/ bioassays/ contaminants/ soil flora/ soil enzymes/ biological activity in soil/ respiration/ mineralization/ microbial degradation/ nitrogen/ carbon/ microbial activities/ literature reviews
This citation is from AGRICOLA.

1523. **Simulation of pesticide persistence in the field on the basis of laboratory data: A review.**
Beulke, S.; Dubus, I. G.; Brown, C. D.; and Gottesburen, B.
Journal of Environmental Quality 29 (5): 1371-1379. (Sept. 2000-Oct. 2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Descriptors: pesticides/ persistence/ degradation/ soil/ simulation models/ environmental fate/ model evaluation
Abstract: Simulations of pesticide fate in soils are often based on persistence models developed nearly 30 years ago. These models predict dissipation in the field on a daily basis by correcting laboratory degradation half-lives for actual soil temperature and moisture content. They have been extensively applied, but to date no attempt has been made to evaluate existing studies in a consistent, quantitative way. This paper reviews 178 studies comparing pesticide soil residues measured in the field with those simulated by persistence models. The simulated percentage of initial pesticide concentration at the time of 50% measured loss was taken as a common criterion for model performance. The models showed an overall tendency to overestimate persistence. Simulated values ranged from 12 to 96% of initial pesticide concentrations with a median of 60%. Simulated soil residues overestimated the target value (50% of initial) by more than a factor of 1.25 in 44% of the cases. An underestimation by more than a factor of 1.25 was found in only 17% of the experiments. Discrepancies between simulated and observed data are attributed to difficulties in characterizing pesticide behavior under outdoor conditions using laboratory studies. These arise because of differences in soil conditions between the laboratory and the field and the spatial and temporal variability of degradation. Other possible causes include losses in the field by processes other than degradation, deviations of degradation from first-order kinetics, discrepancies between simulated and actual soil temperature and moisture content, and the lack of soil-specific degradation parameters. Implications for modeling of pesticide behavior within regulatory risk assessments are discussed.
This citation is from AGRICOLA.

1524. **Simulation of snowmelt erosion using the EROSION 3D model.**
Weigert, Astrid; Wenk, Gerald; Ollesch, Gregor; and Fritz, Heiko
Journal of Plant Nutrition and Soil Science 166 (1): 128-130. (2003)
NAL Call #: 384 Z343A;
ISSN: 1436-8730
Descriptors: snowmelt erosion/ soil properties: water content
© Thomson

1525. **Simulation of subsurface flow constructed wetlands: Results and further research needs.**
Langergraber, G.
Water Science and Technology 48 (5): 157-166. (2003)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: 16 references.
Publisher: I W a Publishing
Descriptors: Environment/ Ecology/ CW2D/ modelling/ multi component reactive transport/ numerical simulation/ research need/ subsurface flow constructed wetlands
Abstract: Simulation of constructed wetlands has two main tasks: to obtain a better understanding of the processes in constructed wetlands, and to check and optimise existing design criteria. This paper shows simulation results for two indoor pilot-scale constructed wetlands for wastewater and surface water treatment respectively. The results presented and discussed are mainly focussed on the hydraulic behaviour of the constructed wetland systems. In addition results of reactive transport simulations with CW2D are shown. The multi-component reactive transport model CW2D (Constructed Wetlands 2 Dimensional) was developed to model transport and reactions of the main constituents of wastewater (organic matter, nitrogen, and phosphorus) in subsurface flow constructed wetlands. For the pilot-scale constructed wetlands a calibration of the flow model was possible and therefore the results of the reactive transport simulations with CW2D fit the measured data well. The further research needs regarding the simulation of subsurface flow constructed wetlands are discussed.
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1526. **Site selection of animal operations using air quality criteria.**
Jacobson, L. D.; Wood, S. L.; Schmidt, D. R.; Heber, A. J.; Bicudo, J. R.; and Moon, R. D.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1527. **Slope stabilization and erosion control: A bioengineering approach.**
Morgan, R. P. C. and Rickson, R. J.; 288 p. (1994); *ISBN:* 0-419-15630-5
This citation is provided courtesy of CAB International/CABI Publishing.

1528. **Sludge Treatment, Utilization, and Disposal.**
Bowen, P. T.; Jackson, M. K.; Corbitt, R. A.; and Gonce, N.
Water Environment Research 65 (6): 360-368. (1993)
NAL Call #: TD419.R47
Descriptors: Literature review/ Reviews/ Sludge disposal/ Sludge treatment/ Sludge utilization/ Wastewater disposal/ Wastewater treatment/ Chemical treatment/ Composting/ Incineration/ Land disposal/ Ocean dumping/ Recycling/ Sludge drying/ Sludge stabilization/ Sludge thickening/ Wastewater treatment processes/ Ultimate disposal of wastes
Abstract: Comprehensive reviews of sludge management have been published. Sludge loading facilities, and agricultural use of sludge is described in the United states, and internationally, the incineration, dewatering and agricultural utilization and disposal of sludge has been investigated. The microbiological and organic properties of sludges have been extensively reviewed and the metals content of sludge and analytical procedures for determining the properties of sludges have been investigated. Many methods are available for the dewatering, thickening, and drying of sludge. These methods fall under the broad categories of presses, centrifuges, and pressure filters. A decision-making process for choosing the appropriate dewatering technology has been described. Sludge stabilization methods that are reviewed include composting and chemical treatments. Ultimate disposal methods for sludge may involve, incineration, ocean/river dumping, land application, recycling, and agricultural uses. Dewatering technologies for alum and polymer sludges, metal finishing slurries, and for pulp and paper mill sludges have also been investigated. (Geiger-PTT)
© Cambridge Scientific Abstracts (CSA)

1529. **Slurry application technology: A review of methods.**
Frick R
In: FAT - Berichte, 441; Tanikon, Switzerland: Der Forschungsanstalt, 1994. 12 p.
Notes: Also published in French as Rapports FAT No. 441
This citation is provided courtesy of CAB International/CABI Publishing.

1530. **Small-scale spatial and temporal variance in the concentration of heavy metals in aquatic sediments: A review and some new concepts.**
Birch, G. F.; Taylor, S. E.; and Matthai, C.
Environmental Pollution 113 (3): 357-372. (2001)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491 [ENPOEK]
Descriptors: heavy metals/ sediment/ aquatic environment/ spatial variation/ temporal variation
This citation is from AGRICOLA.

1531. **A sociological analysis of site-specific management.**
Nowak P; Pierce FJ; and Sadler EJ
In: The state of site specific management for agriculture, 1997; pp. 397-422.
Notes: 24 ref
This citation is provided courtesy of CAB International/CABI Publishing.

1532. **Software for pest-management science: Computer models and databases from the United States Department of Agriculture - Agricultural Research Service.**
Wauchope, R. D.; Ahuja, L. R.; Arnold, J. G.; Bingner, R.; Lowrance, R.; Genuchten, M. T. van; and Adams, L. D.
Pest Management Science 59 (6-7): 691-698. (June 2003-July 2003)
NAL Call #: SB951 .P47;
ISSN: 1526-498X.
Notes: Number of References: 51
Descriptors: Entomology/ Pest Control/ simulation model/ database/ pesticide transport/ pesticide fate/ non point pollution/ risk assessment/ runoff/ leaching/ erosion/ riparian buffer/ watershed/ simulation/ transport/ water/ pesticides/ parameters/ systems/ scale
Abstract: We present an overview of USDA Agricultural Research Service (ARS) computer models and databases related to pest-management science, emphasizing current developments in environmental risk assessment and management simulation models. The ARS has a unique national interdisciplinary team of researchers in surface and sub-surface hydrology, soil and plant science, systems analysis and pesticide science, who have networked to develop empirical and mechanistic computer models describing the behavior of pests, pest responses to controls and the environmental impact of pest-control methods. Historically, much of this work has been in support of production agriculture and in support of the conservation programs of our 'action agency' sister, the Natural Resources Conservation Service (formerly the Soil Conservation Service). Because we are a public agency, our software/database products are generally offered without cost, unless they are developed in cooperation with a private-sector cooperator. Because ARS, is a basic and applied research organization, with development of new science as our highest priority, these products tend to be offered on an 'as-is' basis with limited user support except for cooperating R&D relationship with other scientists. However, rapid changes in the technology for information analysis and communication continually challenge our way of doing business.
© Thomson ISI

1533. **Soil aggregate stability: A review.**
Amezketa, E.
Journal of Sustainable Agriculture 14 (2/3): 83-151. (1999)
NAL Call #: S494.5.S86S8;
ISSN: 1044-0046 [JSAGEB]
Descriptors: aggregates/ soil structure/ sustainability/ soil formation/ stability/ quantitative analysis/

erodibility/ erosion/ measurement/ techniques/ sampling/ estimation/ crusts/ soil chemistry/ age of soil/ soil amendments/ cropping systems/ crops/ literature reviews/ sample processing
Abstract: Soil aggregate stability is a crucial soil property affecting soil sustainability and crop production. A broad outline of the processes and agents of aggregate formation and aggregate stabilization are presented and discussed in this review. Aggregate stability is difficult to quantify and interpret. The aim of aggregate stability tests is to give a reliable description and ranking of the behavior of soils under the effect of water, wind and management. Numerous methods have been used to determine aggregate stability with varying success. The different methodologies complicate the comparison among aggregate stability data. It is also difficult to obtain a consistent correlation between aggregate stability and other important soil properties such as soil erodibility or crusting potential. This paper reviews the different methods of measurement of soil aggregate stability used in the literature, paying attention to the conditions of sample collection in the field and sample preparation and treatments in the laboratory. A unified methodological framework including the most interesting aspects of existing methods is suggested. The possibility of using aggregate stability data as an estimation of soil erodibility is also discussed.
This citation is from AGRICOLA.

1534. **Soil and crop responses to soil tillage systems: A Polish perspective.**
Malicki, Leszek; Nowicki, Janusz; and Szwejkowski, Zbigniew
Soil and Tillage Research 43 (1-2): 65-80. (1997)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: erosion
Abstract: An analysis of the literature of the subject shows that soil tillage only has a short-term direct influence on soil properties and it exerts its influence on cropping, first of all indirectly, through its effects on yield forming factors. Consequently, on well cultivated soils in flat areas and in the conditions of rational crop rotation, fertilization and plant protection, it is possible to simplify tillage significantly without adverse economical or ecological results. The limitation of tillage, up to direct sowing, will be indispensable in erosion areas. However, the presence of defective soils and some meteorological conditions require conventional plough tillage.

1535. **Soil and water quality: An agenda for agriculture.**
National Research Council. Committee on Long-Range Soil and Water Conservation Policy
Washington DC: National Academies Press; 542 p. (1993);
ISBN: 0-309-04933-4
http://www.nap.edu/openbook/0309045347/html/
Descriptors: agriculture/ soil erosion/ soil degradation/ water quality/ soil management

1536. **Soil biochemical properties as indices of performance and sustainability of effluent irrigation systems in New Zealand: A review.**
Speir, T W
Journal of the Royal Society of New Zealand 32 (4): 535-553. (2002);
ISSN: 0303-6758
Descriptors: nutrients/ plant (Plantae)/ Plants/ biochemical properties/ denitrification/ enzyme activities/ industrial effluents/ land management/ methodological limitations/ microbial biomass/ plant growth/ sewage effluents/ soil heaths/ treatment sustainability/ water supply
Abstract: In New Zealand, there have been a number of investigations of the effects on soil biochemical properties of land application of industrial and sewage effluents. In recent years, the rationale for determining these properties has been to ascertain if they have a potential role as early warning indicators of adverse effects of effluent irrigation on treatment sustainability and/or soil health. In this review, I summarise the findings from these studies and attempt to establish whether the data do support this role. Assessment of biochemical effects of the application of effluents to land under crops, forest, or scrub is complicated by previous land management and by site characteristics. Consequently, only investigations of effluent application onto pastoral soils have allowed an assessment of the potential value of soil biochemical properties as early-warning indicators of adverse effects. Generally, these studies have shown that effluent application has had a beneficial effect on soil properties and plant growth and this is reflected by enhanced soil biochemical activities. Where an adverse effect did occur in response to a drastic change of effluent amount and composition, soil biochemical properties were markedly reduced. However, soil chemical properties and aggregate stability were unaffected. This suggests, therefore, that there could be a role for biochemical properties as indices of performance and sustainability of land-based effluent irrigation systems. However, with most studies showing that most effluent application is beneficial, such a role may be limited to situations where the effluent is to be applied at an amount, or has a composition that has not been previously tested. The main conclusion from this review is that when irrigation schemes have been running for a number of years and are functioning well, soil biochemical properties reflect the soil health enhancements provided by the water and nutrients added. Such enhancements are generally manifested slowly and, therefore, monitoring is required over a longer duration than has occurred in several of the studies examined. Adverse effects attributable to effluent irrigation are more difficult to recognise and interpret unless a drastic change has occurred, due mainly to methodological limitations and our lack of understanding of the true meaning of what we are measuring or its relevance to soil functioning. Until our understanding improves markedly, a predictive role for these properties as an early warning of adverse effects of effluent irrigation will remain elusive.

1537. **Soil biology: Effects on soil quality.**
Hatfield, Jerry L. and Stewart, B. A.
Boca Raton: Lewis Publishers; 169 p.: ill.; Series: Advances in soil science (Boca Raton, Fla.). (1994)
NAL Call #: QH84.8.S6315--1994;
ISBN: 0873719271
Descriptors: Soil biology/ Soils---Quality
This citation is from AGRICOLA.

1538. **Soil Biology Primer.**
Ingham, E. R.; Moldenke, A. R.; and Edwards, C. A.
Ankeny, Iowa: Soil and Water Conservation Society. (2000)
Notes: Revised edition
Descriptors: soil/ agricultural land/ soil quality/ air quality/ water quality/ soil microorganisms

1539. **Soil carbon sequestration for improved land management.**
Food and Agriculture Organization; World Soil Resources Reports No.96, 2001. xi, 57 p.
Notes:
ISSN: 0532-0488
This citation is provided courtesy of CAB International/CABI Publishing.

1540. **Soil community composition and ecosystem processes: Comparing agricultural ecosystems with natural ecosystems.**
Neher, D A
Agroforestry Systems 45 (1-3): 159-185. (1999)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366
Descriptors: nitrogen/ pesticide/ plant (Plantae)/ soil organism (Organisms)/ Plants/ agroforestry/ decomposition/ ecosystem processes/ fertilizer/ mineralization/ nutrition/ phenology/ plant productivity/ soil community composition/ water
Abstract: Soil organisms play principal roles in several ecosystem functions, i.e. promoting plant productivity, enhancing water relations, regulating nutrient mineralisation, permitting decomposition, and acting as an environmental buffer. Agricultural soils would more closely resemble soils of natural ecosystems if management practices would reduce or eliminate cultivation, heavy machinery, and general biocides; incorporate perennial crops and organic material; and synchronise nutrient release and water availability with plant demand. In order to achieve these goals, research must be completed to develop methods for successful application of organic materials and associated micro-organisms, synchronisation of management practices with crop and soil biota phenology, and improve our knowledge of the mechanisms linking species to ecosystem processes.
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1541. **Soil degradation by erosion.**
Lal, R.
Land Degradation and Development 12 (6): 519-539. (2001)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

1542. **Soil detachment in the physically based soil erosion process: A review.**
Owoputi, L. O. and Stolte, W. J.
Transactions of the ASAE 38 (4): 1099-1110. (July 1995-Aug. 1995)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: interrill erosion/ rill erosion/ soil movement/ equations/ erodibility/ rain/ literature reviews
Abstract: This article presents a broad review of the physical process of soil erosion, but with the main focus on the approaches, forms of equations, and techniques commonly adopted to quantify the rate of soil detachment in an erosion event. While presenting some of the commonly used equations, the emphasis is placed on the physical significance of the associated parameters and the general weaknesses of the equations. The two main parameters of the existing equations, namely the critical condition for erosion and soil erodibility, are evaluated in this article with respect to the factors affecting them. In addition, the impacts of flow and moisture variations in the soil that are commonly neglected while defining soil erosion components and parameters are also discussed. The conclusion of this article is that there is a need to derive a more fundamental equation for predicting the soil detachment rate. As a step in that direction, a conceptual clarification of the mechanism of soil detachment, is presented. Some fundamental concepts that may be useful in deriving a more physically and engineering-based soil detachment equation are also introduced.
This citation is from AGRICOLA.

1543. **Soil ecosystem properties, microbial diversity, and ecosystem assessments.**
Tate, R. L. III and Rogers, B. F.
In: Ecological significance of the interactions among clay minerals, organic matter and soil biota: 3rd Symposium on Soil Mineral-Organic Matter-Microorganism Interactions and Ecosystem Health. (Held 22 May 2000-26 May 2000 at Naples-Capri, Italy.) Violante, A.; Huang, P. M.; Bollag, J. M.; and Gianfreda, L. (eds.); pp. 79-93; 2002.
ISBN: 0-444-51039-7
This citation is provided courtesy of CAB International/CABI Publishing.

1544. **Soil erosion and conservation in the United States: An overview.**
Magleby, Richard S. and United States. Dept. of Agriculture. Economic Research Service.
Washington, DC: U.S. Dept. of Agriculture, Economic Research Service; iii, 28, 1 p.: ill., maps; Series: Agriculture information bulletin no. 718. (1995)
Notes: "An Economic Research Service report." Cover title. "October 1995"--P. [i]. Includes bibliographical references (p. 27-[29]).
NAL Call #: 1--Ag84Ab-no.718
Descriptors: Soil erosion---United States/ Soil conservation---United States
This citation is from AGRICOLA.

1545. **Soil erosion and productivity: A brief review.**
Ponzi, D.
Desertification Control Bulletin (22): 36-44. (1993)
NAL Call #: GB611.D47;
ISSN: 0379-2455
Descriptors: erosion/ soil degradation/ land productivity/ relationships/ cost analysis/ losses
This citation is from AGRICOLA.

1546. **Soil erosion and soil problems.**
Higgitt, D.
Progress in Physical Geography 17 (4): 461-472. (1993);
ISSN: 0309-1333
This citation is provided courtesy of CAB International/CABI Publishing.

1547. **Soil erosion at multiple scales: Principles and methods for assessing causes and impacts.**
Penning de Vries, F. W. T.; Agus, F.; and Kerr, J.; xii, 390 p. (1998);
ISBN: 0-85199-290-0
This citation is provided courtesy of CAB International/CABI Publishing.

1548. **Soil erosion by water: Problems and prospects for research.**
Boardman, J.
In: Advances in hillslope processes/ Anderson, M. G. and Brooks, S. M.; Vol. 1.
Chichester, UK: John Wiley & Sons, 1996; pp. 489-505.
ISBN: 0-471-96774-2
This citation is provided courtesy of CAB International/CABI Publishing.

1549. **Soil erosion impact on agronomic productivity and environment quality.**
Lal, R.
Critical Reviews in Plant Sciences 17 (4): 319-464. (1998)
NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3]
Descriptors: erosion/ crop production/ pollution/ water pollution/ air quality/ dust/ emission/ water reservoirs/ silt/ geological sedimentation/ soil fertility/ soil depth/ roots/ growth/ horizons/ runoff/ watersheds/ topsoil/ economic analysis/ soil water content/ surveys/ soil management/ sustainability/ soil formation/ desertification/ nitrogen fertilizers/ application rates/ crop yield/ soil organic matter/ clay fraction/ mathematical models/ literature reviews/ losses from soil
This citation is from AGRICOLA.

1550. **Soil Erosion Research for the 21st Century: Symposium.**
American Society of Agricultural Engineers
St. Joseph, Mich.: American Society of Agricultural Engineers, 2001.
Notes: Conference held 3-5 January 2001 at Honolulu, Hawaii; Co-sponsors: American Society of Agronomy (ASA), Chinese Soil and Water Conservation Society (CSWCS) Taiwan, Council of Agriculture (COA) Taiwan, European Society for Soil Conservation (ESSC), International Erosion Control Association (IECA), International Union of Soil Sciences (IUSS), Soil Science Society of America (SSSA), Soil and Water Conservation Society (SWCS), USDA-Agricultural Research Service (ARS), USDA-Cooperative State Research, Education, and Extension Service (CSREES), USDA-Forest Service (FS), USDA-Natural Resources Conservation Service (NRCS), and World Association of Soil and Water Conservation (WASWC)
http://horizon.nserl.purdue.edu/~flanagan/erosymp/statement.htm
Descriptors: soil erosion/ sedimentation/ agricultural research
Abstract: This consensus document was developed by participants of the symposium "Soil Erosion Research for the 21st Century," sponsored by the American Society of Agricultural Engineers (ASAE) and thirteen other professional societies and agencies. Participants comprised 210 soil erosion researchers and field practitioners from 30 countries, who gathered with the specific purpose of reviewing current scientific understanding of soil erosion and sedimentation and setting research directions and goals for the next two decades.

1551. **Soil fertility and fertilizers: An introduction to nutrient management.**
Havlin, John.
Upper Saddle River, N.J.: Prentice Hall; x, 499 p.: ill. (some col.), maps. (1999)
Notes: 6th ed.; Includes bibliographical references and index.
NAL Call #: S633-.S715-1999;
ISBN: 0136268064
Descriptors: Fertilizers/ Soil fertility/ Crops---Nutrition
This citation is from AGRICOLA.

1552. **Soil fertility management and insect pests: Harmonizing soil and plant health in agroecosystems.**
Altieri, Miguel A and Nicholls, Clara I
Soil and Tillage Research 72 (2): 203-211. (2003)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: inorganic fertilizers: excessive use/ nitrogen: nutrient/ nutrient: plant tissue levels / insect (Insecta): herbivore, pest/ Animals/ Arthropods/ Insects/ Invertebrates/ active soil biology/ agroecosystems/ crop nutrition/ nutrient imbalances/ organic fertilizers/ organic matter/ soil biological properties/ soil chemical properties/ soil fertility/ soil fertility management/ soil physical properties/ soil plant health harmonization
Abstract: Cultural methods such as crop fertilization can affect susceptibility of plants to insect pests by altering plant tissue nutrient levels. Research shows that the ability of a crop plant to resist or tolerate insect pests and diseases is tied to optimal physical, chemical and mainly biological properties of soils. Soils with high organic matter and active soil biology generally exhibit good soil fertility. Crops grown in such soils generally exhibit lower abundance of several insect herbivores, reductions that may be attributed to a lower nitrogen content in organically farmed crops. On the other hand, farming practices, such as excessive use of inorganic fertilizers, can cause nutrient imbalances and lower pest resistance. More studies comparing pest populations on plants treated with synthetic versus organic fertilizers are needed. Understanding the underlying effects of why organic fertilization appears to improve plant health may lead us to new and better integrated pest management and integrated soil fertility management designs.
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1553. **Soil health and sustainability.**
Doran, J. W.; Sarrantonio, M.; and Liebig, M. A.
Advances in Agronomy *56: 1-54.* (1996)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: soil/ quality/ sustainability/ assessment/ soil resources/ resource management/ environmental protection/ farming systems/ literature reviews
This citation is from AGRICOLA.

1554. **Soil health and sustainability: Managing the biotic component of soil quality.**
Doran, John W and Zeiss, Michael R
Applied Soil Ecology 15 (1): 3-11. (2000)
NAL Call #: QH541.5.S6A67
Descriptors: anthropogenic impact/ biotic component management/ ecosystem management/ land use/ soil health/ soil quality/ sustainability/ sustainable management system
Abstract: Soil health is the capacity of soil to function as a vital living system, within ecosystem and land-use boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health. Anthropogenic reductions in soil health, and of individual components of soil quality, are a pressing ecological concern. A conference entitled 'Soil Health: Managing the Biological Component of Soil Quality' was held was held in the USA in November 1998 to help increase awareness of the importance and

utility of soil organisms as indicators of soil quality and determinants of soil health. To evaluate sustainability of agricultural practices, assessment of soil health using various indicators of soil quality is needed. Soil organism and biotic parameters (e.g. abundance, diversity, food web structure, or community stability) meet most of the five criteria for useful indicators of soil quality. Soil organisms respond sensitively to land management practices and climate. They are well correlated with beneficial soil and ecosystem functions including water storage, decomposition and nutrient cycling, detoxification of toxicants, and suppression of noxious and pathogenic organisms. Soil organisms also illustrate the chain of cause and effect that links land management decisions to ultimate productivity and health of plants and animals. Indicators must be comprehensible and useful to land managers, who are the ultimate stewards of soil quality and soil health. Visible organisms such as earthworms, insects, and molds have historically met this criterion. Finally, indicators must be easy and inexpensive to measure, but the need for knowledge of taxonomy complicates the measurement of soil organisms. Several farmer-participatory programs for managing soil quality and health have incorporated abiotic and simple biotic indicators. The challenge for the future is to develop sustainable management systems which are the vanguard of soil health; soil quality indicators are merely a means towards this end.
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1555. **Soil invertebrates as bioindicators of human disturbance.**
Paoletti, M. G. and Bressan, M.
Critical Reviews in Plant Sciences 15 (1): 21-26. (1996)
NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3]
Descriptors: soil fauna/ soil invertebrates/ biological indicators/ checklists/ soil pollution/ ecosystems/ heavy metals/ sulfur/ pesticide residues/ herbicide residues/ dosage effects/ disturbed soils/ literature reviews
This citation is from AGRICOLA.

1556. **Soil microbial biomass: What do the numbers really mean.**
Dalal, R. C.
Australian Journal of Experimental Agriculture 38 (7): 649-665. (1998)
NAL Call #: 23-Au792;
ISSN: 0816-1089.
Notes: Special issue: Moving towards precision with soil and plant analysis. Proceedings of the Second National Conference and Workshops of the Australian Soil and Plant Analysis Council, November 23-26, 1997, Launceston, Tasmania. Includes references.
Descriptors: soil organic matter/ soil flora/ soil fauna/ carbon/ nitrogen/ phosphorus/ sulfur/ mineralization/ biological activity in soil/ techniques/ literature reviews/ nutrient sink/ soil quality/ soil health/ pesticide degradation
This citation is from AGRICOLA.

1557. **Soil organic matter and management of plant-parasitic nematodes.**
Widmer, T. L.; Mitkowski, N. A.; and Abawi, G. S.
Journal of Nematology 34 (4): 289-295. (Dec. 2002)
NAL Call #: QL391.N4J62;
ISSN: 0022-300X [JONEB5].
Notes: Symposium paper presented at the 39th Annual Meeting of the Society of Nematologists, June 24-28, 2000, Quebec City, Quebec, Canada. Includes references.
Descriptors: nematoda/ plant parasitic nematodes/ nematode control/ cultural control/ hosts of plant pests/ crops/ rotations/ cover crops/ green manures/ soil organic matter/ organic amendments/ soil management/ literature reviews
Abstract: Organic matter and its replenishment has become a major component of soil health management programs. Many of the soil's physical, chemical, and biological properties are a function of organic matter content and quality. Adding organic matter to soil influences diverse and important biological activities. The diversity and number of free-living and plant-parasitic nematodes are altered by rotational crops, cover crops, green manures, and other sources of organic matter. Soil management programs should include the use of the proper organic materials to improve soil chemical, physical, and biological parameters and to suppress plant-parasitic nematodes and soilborne pathogens. It is critical to monitor the effects of organic matter additions on activities of major and minor plant-parasitic nematodes in the production system. This paper presents a general review of information in the literature on the effects of crop rotation, cover crops, and green manures on nematodes and their damage to economic crops.
This citation is from AGRICOLA.

1558. **Soil organic matter and nitrogen management in dryland cropping systems.**
Payne, R. A.
Adelaide, SA: Primary Industries, South Australia; 2 v.: ill.; Series: Technical report (Dept. of Primary Industries) no. 211-212. (1993)
Notes: "August 1993." "AGDEX 536." Includes bibliographical references; Contents note: pt. 1. Soil organic matter sustainability -- pt. 2. Nitrogen requirements for dryland cereal crops.
NAL Call #: S478.A86T4--no.211-212; *ISBN:* 0730821439 (set); 0730821145 (pt.1); 0730821234 (pt.2)
This citation is from AGRICOLA.

1559. **Soil organic matter is essential to solving soil and environmental problems.**
Wallace, Arthur
Communications in Soil Science and Plant Analysis 25 (1-2): 15-28. (1994)
NAL Call #: S590.C63;
ISSN: 0010-3624
Descriptors: agriculture/ erosion/ mineralization/ physical properties/ resource management/ water holding capacity
Abstract: Fifty per cent, more or less, of the soil organic matter from farm lands has been lost. The remainder is perhaps more resistant to loss and therefore is stable but that which has been lost was perhaps the most important half--it resisted erosion, it made soils permeable, it increased water-holding capacity and it produced healthy crops. The 50 per cent that has been lost is via two major mechanisms. One is loss per unit weight of soil by decomposition (mineralization) induced by cultivation, and the other is loss by erosion--loss by wash away and blow away of the surface soil which contains the most soil organic matter. Both mineralization and erosion are downhill processes. If they are not in equilibrium with reverse processes, the land cannot be sustainable. If agriculture is to be sustainable, we have to look at soil organic matter,

first and foremost, as a means for maintaining stable-tillable soil. Mining of soil for nutrients and letting soil organic matter levels decrease can never result in sustainable agriculture. The role of soil organic matter as a source of nitrogen and other nutrients is less important than that of providing excellent physical and biological properties of soil. Use of water-soluble polymer soil conditioners can help.

1560. **Soil phosphorus management and water quality: A UK perspective.**
Edwards, A C and Withers, P J A
Soil Use and Management
14 (supplement): 124-130. (1998)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: phosphorus: availability, fertilizer, nutrient, pollution potential/ agriculture/ soil management/ water quality
Abstract: An increasing proportion of P reaching surface waters appears to be derived from agricultural land; apportioning the relative contribution to particular farming systems is not straightforward. The majority of farms in the UK operate on the basis of an annual agricultural P surplus, the size of which varies across different farm types. Particularly high values (>20 kg ha-1) are commonly associated with intensive-livestock production and the lower values (< 10 kg P ha-1) with arable farms. The geographical divide between the predominance of arable cropping in the east and livestock enterprises in the west of the UK should result in an uneven pattern to the distribution of annual P surplus. The expected cumulative effects of this surplus should be a noticeable increase in total and extractable soil P concentrations, but this is not readily apparent. While evidence from experimental plots suggests a relationship between the concentration of available soil P and that present in drainage waters, extrapolating this information so that it can be useful at the scale of a whole catchment is difficult. The loss of P from agricultural land is controlled by factors which are independent of the size of the annual P surplus. The pattern of P cycling, together with the dominant loss pathways, differ greatly between livestock and arable farming systems. Proportioning the contributions that either increased soil erosion arising from changing agricultural practices or the cumulative effect of a P surplus have had upon P loss is a necessary prerequisite to effective management.

1561. **Soil phosphorus saturation degree: Review of some indices and their suitability for P management in Quebec, Canada.**
Beauchemin, S. and Simard, R. R.
Canadian Journal of Soil Science
79 (4): 615-625. (Nov. 1999)
NAL Call #: 56.8-C162;
ISSN: 0008-4271 [CJSSAR]
Descriptors: soil chemistry/ phosphorus/ base saturation/ indexes/ solubility/ relationships/ sorption isotherms/ water pollution/ pollution control/ management/ Quebec/ phosphorus sorption capacity/ nutrient management
This citation is from AGRICOLA.

1562. **Soil physics, pesticides, & pathogens.**
U.S. Department of Agriculture, George E. Brown Jr. Salinity Laboratory Soil Physics and Pesticide Research Unit
Riverside, CA: George E. Brown Jr. Salinity Laboratory, Soil Physics and Pesticide Research Unit. (2002)
Notes: Title from web page. Description based on content viewed April 30, 2002.
NAL Call #: aS595-.G46-2002
http://www.ussl.ars.usda.gov/physics.htm
Descriptors: George E Brown, Jr. Salinity Laboratory, Soil Physics and Pesticide Research Unit/ Soils, Salts in---Research---United States/ Groundwater---Quality---Research---United States/ Computer simulation/ Crops and water---Research---United States/ Pesticides---Environmental aspects---Research---United States
Abstract: The mission of the Soil Physics and Pesticide Research Unit is to develop methods for evaluating, predicting, and managing the movement of water, salts and agricultural chemicals in the root and vadose zones of salt-affected soils and to develop tools for assessing new soil-water-crop management schemes to make effective use of limited resources where salinity and/or pesticides are a concern.
This citation is from AGRICOLA.

1563. **Soil, plant and atmospheric conditions as they relate to ammonia volatilization.**
Sharpe, R. R. and Harper, L. A.
Fertilizer Research 42 (1/3): 149-153. (1995)
NAL Call #: S631.F422;
ISSN: 0167-1731 [FRESDF].
Notes: Special issue: Nitrogen economy in tropical soils / edited by N. Ahmad. Includes references.
Descriptors: ammonia/ volatilization/ nitrogen/ losses from soil/ nitrogen cycle/ transport processes/ determination/ atmosphere/ concentration/ measurement/ analytical methods/ evaluation/ accuracy/ micrometeorology/ environmental factors/ stable isotopes/ nitrogen fertilizers/ urea/ manures/ animal wastes/ crops/ adsorption/ efflux/ reviews/ nitrogen balance method/ enclosure method/ micrometeorological method
Abstract: Gaseous ammonia (NH3) transport is an important pathway in the terrestrial N cycle. In the atmosphere NH3 neutralizes airborne acids and is a major factor determining air quality and acid rain deposition patterns. Redeposition of atmospheric NH3 plays an important role in the N balance of natural ecosystems and has been implicated in forest decline, plant species change and eutrophication of surface water. Much of the N in soil-plant animal systems can be lost to the atmosphere, particularly with surface applied livestock waste, or urea and anhydrous ammonia fertilizers. Plants can have a significant impact on NH3 transport because they can both absorb and desorb atmospheric NH3. Under conditions of low soil N or high atmospheric NH3 concentrations, plants absorb NH3. Under conditions of high soil N or low atmospheric NH3 concentrations, plants volatilize NH3. This article discusses methods for evaluating NH3 transport in the filed, the rate of NH3 volatilized from fertilizer application, and the effects of plants on net NH3 transport.
This citation is from AGRICOLA.

1564. **Soil-plant nitrogen dynamics: What concepts are required.**
Stockdale, E. A.; Gaunt, J. L.; and Vos, J.
European Journal of Agronomy
7 (1/3): 145-159. (Sept. 1997)
NAL Call #: SB13.E97;
ISSN: 1161-0301.

Notes: Special issue: Perspectives for Agronomy--Adopting Ecological Principles and Managing Resource Use / edited by M.K. Van Ittersum and S.C. Van de Geijn. Proceedings of a conference held July 7-11, 1996, Veldhoven-Wageningen, The Netherlands. Includes references.
Descriptors: nitrogen cycle/ plants/ soil fertility/ simulation models/ agricultural research/ crop management/ nitrogen/ nutrition physiology/ efficiency/ fertilizers/ guidelines/ application rates/ losses/ literature reviews
This citation is from AGRICOLA.

1565. **The soil quality concept: A tool for evaluating sustainability.**
Karlen, D. L. and Andrews, S. S.
In: Soil stresses, quality and care: Proceedings from NJF seminar 310 [DIAS Report: Plant Production, No. 38]. Elmholt, Susanne (eds.)
Tjele, Denmark: Danish Institute of Agricultural Sciences, Research Centre Foulum; pp. 15-26; 2000.
Notes: Conference held: 10-12 April 2000
NAL Call #: SB187.D4 D54 nr. 38
This citation is provided courtesy of CAB International/CABI Publishing.

1566. **Soil quality field tools: Experiences of USDA-NRCS Soil Quality Institute.**
Ditzler, C. A. and Tugel, A. J.
Agronomy Journal 94 (1): 33-38. (2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962
This citation is provided courtesy of CAB International/CABI Publishing.

1567. **Soil resilience: A fundamental component of soil quality.**
Seybold, C. A.; Herrick, J. E.; and Brejda, J. J.
Soil Science 164 (4): 224-234. (Apr. 1999)
NAL Call #: 56.8-So3;
ISSN: 0038-075X [SOSCAK]
Descriptors: soil/ soil resources/ sustainability/ literature reviews/ terminology
This citation is from AGRICOLA.

1568. **Soil solution and other soil analyses as indicators of nutrient supply: A review.**
Smethurst, P. J.
Forest Ecology and Management 138 (1-3): 397-411. (2000)
NAL Call #: SD1.F73;
ISSN: 0378-1127.
Notes: Publisher: Elsevier Science
Descriptors: Reviews/ Soil nutrients/ Nutrient availability/ Soil chemistry/ Forest management/ Eucalyptus/ Management
Abstract: This review examines the potential for using soil solution as a tool for managing soil fertility. A review of the current use of other types of soil analyses indicates that, while their use in some cases is justified, there are substantial limitations to the development of reliable and widely applicable calibrations. Factors that govern concentrations of nutrients in soil solution and the methods for measuring them are reviewed in relation to their use in nutrient management of forest plantations and agricultural crops. Topics include a discussion of (i) nutrient supply and uptake mechanisms; (ii) solution culture studies which define critical concentrations in solution; (iii) methods of sampling solution from soils and (iv) estimation of concentrations that can be maintained at root surfaces in soil. By inference, nutrient supply would not limit plant growth if concentrations at most root surfaces (e.g. young roots in surface soil) were maintained at or above concentrations needed to maintain high rates of growth in solution culture, i.e. critical concentrations. Several aspects of this method have been validated for N and P in Eucalyptus nitens plantations. For example, when concentrations of ammonium (the preferred N source for E. nitens) in the field fell below the critical level of 50 mu M, plantations of E. nitens responded to applications of N-fertilizer. This method was also useful for predicting P deficiency in corn (Zea mays), Eucalyptus globulus and E. nitens grown in soils of widely different P-supply characteristics. The convergence of concepts based on the principles of soil nutrient supply and uptake, which link soil and solution culture studies, is likely to provide a unifying approach for diagnosing nutrient-supply limitations to plant growth and a practical tool for nutrient management in forest plantations.
© Cambridge Scientific Abstracts (CSA)

1569. **Soil tillage: A review.**
Sturny, W. G.
Revue Suisse d'Agriculture 25 (3): 154-168. (1993);
ISSN: 0375-1325
This citation is provided courtesy of CAB International/CABI Publishing.

1570. **Soil translocation by tillage tools.**
Sharifat, K.; Kushwaha, R. L.; and Reed, W. B.
In: 1994 International Summer Meeting sponsored by the American Society of Agricultural Engineers. (Held 19 Jun 1994-22 Jun 1994 at Kansas City, Missouri.)
St. Joseph, Mich.: American Society of Agricultural Engineers; 17 p.; 1994.
Notes: Paper numbers: 94-1039/94-1074;
ISSN: 0149-9890
NAL Call #: 290.9-Am32P
Descriptors: tillage/ erosion/ soil movement/ soil water/ soil compaction/ simulation/ literature reviews
This citation is from AGRICOLA.

1571. **Soils, land use and sustainable agriculture: A review.**
Miller, F. P. and Wali, M. K.
Canadian Journal of Soil Science 75 (4): 413-422. (Nov. 1995)
NAL Call #: 56.8-C162;
ISSN: 0008-4271 [CJSSAR]
Descriptors: agricultural land/ land use/ sustainability/ soil/ quality/ land management/ food security/ soil quality/ sustainable development
This citation is from AGRICOLA.

1572. **Solid-liquid separation of animal manure for odor control and nutrient management.**
Zhang, R. H. and Westerman, P. W.
Applied Engineering in Agriculture 13 (5): 657-664. (Sept. 1997)
NAL Call #: S671.A66;
ISSN: 0883-8542
Descriptors: animal manures/ liquid manures/ solid wastes/ separation/ techniques/ odor abatement/ nutrients/ management/ waste utilization/ waste treatment/ separators/ design/ operation/ performance/ economic analysis/ literature reviews/ manure management systems
Abstract: Solid-liquid separation can be an effective manure treatment method for producing nutrient-rich organic solids for multiple uses and potentially reducing the odor generation rate and nutrient contents

in liquid manure storage and treatment units. This article discusses the characteristics of animal manure relevant to solid-liquid separation for odor control and nutrient management, reviews the basic concepts used in different separation processes, and presents the design and operational principles and performance data of several major types of separation equipment as compiled from an extensive literature review. Such information is very useful for agricultural and sanitary engineers and animal producers to select solid-liquid separation equipment for animal enterprises. The needs for further research and development in the area of solid-liquid separation are identified.
This citation is from AGRICOLA.

1573. **Solid-phase extraction of quaternary ammonium herbicides.**
Pico, Y; Font, G; Molto, J C; and Manes, J
Journal of Chromatography A 885 (1-2): 251-271. (2000)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: quaternary ammonium herbicides/ plant materials/ soil/ water
Abstract: This paper highlights recent advances in the solid-phase extraction (SPE) of quaternary ammonium herbicides in water, soil, plant and biological samples. After a brief introduction summarizing the properties of quaternary ammonium herbicides and the difficulties involved in measuring them, attention is paid primarily to solid supports used for isolation and concentration, pre-treatments required for the different matrices, and eluents applied for quantitative desorption of these analytes. The determination techniques used after SPE and applications of the proposed SPE methodology are also briefly discussed.
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1574. **Solid-phase sample preparation and stability of pesticides in water using Empore disks.**
Barcelo, D; Chiron, S; Lacorte, S; Martinez, E; Salau, J S; and Hennion, M C
Trends in Analytical Chemistry 13 (9): 352-361. (1994)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: analytical method/ gas chromatography/ mass spectrometry
© Thomson

1575. **Solving Algae Problems: French Expertise and World-Wide Applications.**
Mouchet, P. and Bonnelye, V.
Aqua: Journal of Water Services Research and Technology 47 (3): 125-141. (1998)
NAL Call #: TD201.A72;
ISSN: 0003-7214
Descriptors: France/ Reviews/ Algae/ Eutrophication/ Activated Carbon/ Technology/ Optimization/ Algal blooms/ Plant control/ Water treatment/ Toxicology/ Ozonation/ Filtration/ Sedimentation/ Algae/ Sources and fate of pollution/ Species interactions: pests and control/ Fungi
Abstract: This paper reviews the various methods available for removing planktonic microalgae (microstraining, direct filtration, sedimentation, flotation, polishing using ozonation and granular activated carbon [O sub(3) + GAC], membrane filtration), and discusses their comparative effectiveness, optimisation and limitations. Also described are the treatments considered most effective in the removal of odorous and/or toxic metabolites. In each case French technology and its world-wide applications are compared to those documented in the literature. The article concludes with recommendations on the most appropriate processes for treating eutrophic waters.
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1576. **Some agrometeorological aspects of pest and disease management for the 21st century.**
Strand, J. F.
Agricultural and Forest Meteorology 103 (1/2): 73-82. (June 2000)
NAL Call #: 340.8-AG8;
ISSN: 0168-1923.
Notes: Special issue: Agrometeorology in the 21st century: Needs and perspectives / edited by M.V.K. Sivakumar, C.J. Stigter, and D. Rijks. Paper presented at an international workshop held February 15-17, 1999, Accra, Ghana. Includes references.
Descriptors: agriculture/ plant pests/ plant diseases/ pest control/ disease control/ agricultural meteorology/ simulation models/ cropping systems/ pest management/ weeds/ crop weed competition/ transgenic plants/ genetic resistance/ biological control agents/ cultural control/ information needs/ agricultural chemicals/ weather data/ weather forecasting/ climatic factors/ climatic change/ risk assessment/ literature reviews
This citation is from AGRICOLA.

1577. **Some contributions to integrated crop management in Europe.**
Hewson, R. T. and Sagenmueller, A.
Pest Management Science 56 (11): 954-956. (Nov. 2000)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: Integrated control/ Agricultural practices/ Europe/ Insecta/ Agricultural & general applied entomology
Abstract: This paper reports the successful outcome of case studies using integrated crop management (ICM) with a view to attaining sustainable, safe and economic practices for European farmers and growers. Examples are the adoption of 6-m conservation headlands to allow the use of selective herbicides for the control of problem weeds, whilst leaving non-competitive species as a habitat and food source for diverse fauna; a computerised warning system for the control of Phytophthora infestans in the Netherlands, enabling fewer fungicide applications; a computer model (Colibri) which allows French farmers and advisers to forecast development of Sitobion avenae populations in order to predict optimal dates for treatment and recommendations for achieving control of Myzus persicae in peaches grown in Italy which results in least harm to beneficial insects. Lower inputs have often resulted in more cost-effective programmes accompanied by less environmental impact, while support for farmers and growers by well-trained staff has proved to be an important factor contributing to successful outcome of the various projects.
© Cambridge Scientific Abstracts (CSA)

1578. **Sorption and binding of organic compounds in soils and their relation to bioavailability.**
Novak, J. M.; Jayachandran, K.; Moorman, T. B.; and Weber, J. B.
In: Bioremediation science and applications/ Skipper, H. D. and

Turco, R. F.; Series: SSSA special publication 43.
Madison, Wis.: Soil Science Society of America, 1995; pp. 13-31
NAL Call #: S590.S62-no.43
Descriptors: polluted soils/ pesticide residues/ contamination/ pesticides/ adsorption/ desorption/ binding/ binding sites/ bioavailability/ microbial flora/ microbial degradation/ bioremediation/ transformation/ detoxification/ soil pollution/ pollution control/ literature reviews
This citation is from AGRICOLA.

1579. **Sources and Impacts of Irrigation Drainwater Contaminants in Arid Wetlands.**
Lemly, A. D.; Finger, S. E.; and Nelson, M. K.
Environmental Toxicology and Chemistry 12 (12): 2265-2279. (1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: wetlands / arid environments/ contaminants/ agriculture / irrigation/ drainage/ reviews/ agricultural wastes/ agricultural runoff/ water supply/ ecological effects/ environmental effects/ toxicity/ pollutants/ regulations/ Western/ Wetlands/ Environmental impact/ Sources and fate of pollution/ Freshwater pollution/ United States
Abstract: Arid wetlands are being contaminated by subsurface agricultural irrigation drainage throughout the western United States. Historic freshwater inflows have been diverted for agricultural and municipal use, and remaining freshwater supplies are not sufficient to maintain the integrity of these important natural areas once they are degraded by irrigation drainwater. Waterfowl populations are threatened in the Pacific and Central Flyways; migratory birds have been poisoned by drainwater contaminants on at least six national wildlife refuges. Subsurface irrigation drainage is the most widespread and biologically important source of contaminants to wetlands in arid regions of the country. The case history of poisoning at Kesterson National Wildlife Refuge in California and studies at other locations by the U.S. Department of the Interior provide detailed information on the toxicity of drainwater contaminants to fish and wildlife. Biogeochemical conditions favorable for the production of toxic drainage are found throughout the western states. Two actions seem necessary to prevent further drainage-related degradation of arid wetlands. First is a reduction in the amount of contaminants reaching these wetlands, possibly involving regulatory intervention through the National Pollutant Discharge Elimination System permit process. Second, a better balance must be achieved in the way fresh water is allocated between agriculture and wildlife. Federally subsidized water has supported agriculture at the expense of wetlands for nearly 100 years in the western United States. This trend must be reversed if arid wetlands and their fish and wildlife populations are to survive.
© Cambridge Scientific Abstracts (CSA)

1580. **Sources of Methyl Mercury to Freshwater Ecosystems: A Review.**
Rudd, J. W. M.
Water, Air and Soil Pollution 80 (1-4): 697-713. (1995)
NAL Call #: TD172.W36;
ISSN: 0049-6979.
Notes: Conference: Third International Conference on Mercury as a Global Pollutant, Whistler, BC (Canada), 10-14 Jul 1994; Editors: Porcella, D. // Huckabee, J. // Wheatley, B.
Descriptors: methyl mercury/ freshwater environments/ lakes/ wetlands/ pollutant deposition/ aquatic environment/ literature reviews/ inland water environment/ pollution dispersion/ air pollution/ water pollution/ methylmercury/ water pollution sources/ ecosystems/ analytical methods/ literature review/ Freshwater pollution/ Behavior and fate characteristics/ Sources and fate of pollution
Abstract: The recent development of sensitive analytical techniques for the determination of MeHg concentrations in water has resulted in a rapid advancement in our understanding of MeHg production and transport in lake and reservoir systems. Results from three recent whole-ecosystem studies have shown that there are three important sources of MeHg to aquatic systems - precipitation, runoff from wetlands, and inlake methylation. Data from these three studies are used to construct a simple model that illustrates how the relative importance of these sources can vary with rates of atmospheric deposition of MeHg, lake type, percentage of wetlands in the terrestrial catchment and the percentage of water surface area that covers flooded terrain.
© Cambridge Scientific Abstracts (CSA)

1581. **Sources of Nutrient Pollution to Coastal Waters in the United States: Implications for Achieving Coastal Water Quality Goals.**
Howarth, R. W.; Sharpley, A.; and Walker, D.
Estuaries 25 (4b): 656-676. (2002)
NAL Call #: GC96.E79;
ISSN: 0160-8347.
Notes: Special issue: Nutrient Over-enrichment in Coastal Waters: Global Patterns of Cause and Effect
Descriptors: Nutrients (mineral)/ Nitrogen/ Phosphorus/ River basins/ River discharge/ Brackishwater pollution/ Eutrophication/ Anoxic conditions/ Oxygen depletion/ Coastal waters/ Pollution effects/ Wastewater treatment/ Sewage/ Agricultural runoff/ Pollution control/ Pollution sources/ Water pollution/ Inland water environment/ Reviews/ United States/ Estuaries / Water Pollution Sources/ Nutrients/ Wastewater Disposal/ Nonpoint Pollution Sources/ Air Pollution/ Spatial Distribution/ Temporal Distribution/ Water Pollution Control/ Pollution (Water)/ Pollution (Nonpoint sources)/ Runoff (Agricultural)/ Pollution (Air)/ Distribution (Mathematical)/ Time dependent/ Nutrient concentrations/ Sewage treatment plants/ Marine pollution/ United States/ United States, Mississippi River/ ASW, USA, Gulf Coast/ Pollution Environment/ Behavior and fate characteristics/ Pollution studies general/ Sources and fate of pollution/ Water Quality/ Marine Pollution/ Water Pollution: Monitoring, Control & Remediation
Abstract: Some 60% of coastal rivers and bays in the U.S. have been moderately to severely degraded by nutrient pollution. Both nitrogen (N) and phosphorus (P) contribute to the problem, although for most coastal systems N additions cause more damage. Globally, human activity has increased the flux of N and P from land to the oceans by 2-fold and 3-fold, respectively. For N, much of this increase has occurred over the past 40 years, with the increase varying by region. Human activity has increased the flux of N in the Mississippi River basin by 4-fold, in the rivers of the north-eastern U.S. by 8-fold, and in the rivers draining to the North Sea by more than 10-fold. The sources of

nutrients to the coast vary. For some estuaries, sewage treatment plants are the largest single input; for most systems nonpoint sources of nutrients are now of relatively greater importance, both because of improved point source treatment and control (particularly for P) and because of increases in the total magnitude of nonpoint sources (particularly for N) over the past three decades. For P, agricultural activities dominate nonpoint source fluxes. Agriculture is also the major source of N in many systems, including the flux of N down the Mississippi River, which has contributed to the large hypoxic zone in the Gulf of Mexico. For both P and N, agriculture contributes to nonpoint source pollution both through losses at the field scale, as soils erode away and fertilizer is leached to surface and ground waters, and from losses from animal feedlot operations. In the U.S. N from animal wastes that leaks directly to surface waters or is volatilized to the atmosphere as ammonia may be the single largest source of N that moves from agricultural operations into coastal waters. In some regions, including the northeastern U.S., atmospheric deposition of oxidized N from fossil-fuel combustion is the major flux from nonpoint sources. This atmospheric component of the N flux into estuaries has often been under-estimated, particularly with respect to deposition onto the terrestrial landscape with subsequent export downstream. Because the relative importance of these nutrient sources varies among regions and sites, so too must appropriate and effective mitigation strategies. The regional nature and variability of nutrient sources require that nutrient management efforts address large geographic areas.

1582. **Sources of nutrients in the nation's watersheds.**
Smith, Richard A. and
Alexander, Richard B.
Reston, Va.: U.S. Geological Survey. (2000)
NAL Call #: TD428.8 .S65 2000
http://water.usgs.gov/nawqa/sparrow/nut%5Fsources/nut%5Fsources.htm
Descriptors: Nonpoint source pollution---United States/ Fertilizers---Environmental aspects---United States/ Water---Pollution---United States/ Agricultural pollution---Environmental aspects---United States/ Eutrophication---United States/ Watershed management---United States
Abstract: SPARROW and Nutrient Sources; Also available at: http://water.usgs.gov/nawqa/sparrow/nut%5Fsources/Nutrients%5FSPARROW%5Fpaper.pdf
This citation is from AGRICOLA.

1583. **Southern forested wetlands: Ecology and management.**
Messina, M. G. and
Conner, William H.
Boca Raton, Fla.: Lewis Publishers; 616 p.: ill., maps. (1998)
Notes: Includes bibliographical references (p. 493-582) and index.
NAL Call #: SD410.9.S68--1998;
ISBN: 1566702283 (alk. paper)
Descriptors: Wetland forestry/ Forested wetlands---Management/ Wetlands---Management/ Wetland ecology/ Forest ecology
This citation is from AGRICOLA.

1584. **Spatial patterns and fragmentation: Indicators for conserving biodiversity in forest landscapes.**
Loyn, R. H. and McAlpine, C.
In: Criteria and indicators for sustainable forest management: Papers presented at a IUFRO/CIFOR/FAO conference, Sustainable forest management: Fostering stakeholder input to advance development of scientifically based indicators. (Held Aug 1998 at Melbourne, Australia.) Raison, R. J.; Brown, A. G.; and Flinn, D. W. (eds.) Wallingford, UK: CAB International; pp. 391-422; 2001.
ISBN: 0-85199-392-3
This citation is provided courtesy of CAB International/CABI Publishing.

1585. **Spatial Variability of Microbial Processes in Soil: A Review.**
Parkin, T. B.
Journal of Environmental Quality 22 (3): 409-417. (1993)
NAL Call #: QH540.J6 [JEVQAA]
Descriptors: Agricultural chemicals/ Fate of pollutants/ Path of pollutants/ Soil bacteria/ Soil environment/ Water pollution control/ Cropland/ Farm management/ Fertilizers/ Leaching/ Pesticides/ Spatial variation/ Statistical analysis/ Sources and fate of pollution/ Water quality control/ Water in soils
Abstract: Microbial transformations of fertilizers and pesticides in the surface soil have a direct impact on the mass of the agrochemical that is susceptible to leaching losses. The greatest potential for controlling leaching losses of agrochemicals is through the management of these compounds in the surface soil. A variety of strategies have been employed to maximize the residence time of applied chemical in the surface soil, including: timing of application, formulation (e.g., slow-release fertilizers and encapsulated pesticides), and the use of compounds that modify microbial activity in soil (e.g., nitrification inhibitors). Although these strategies have met with some success, more precise quantification of the microbial transformations of agrochemicals is required to aid the development of improved management strategies. The high spatial variability exhibited by many microbial processes, in many cases, precludes precise quantification. A greater understanding of the factors contributing to the variability of microbial processes allows for improved estimation, as well as for the assessment of key driving variables controlling microbial processes in soil. The discussion focuses on the scale at which variability is expressed (microscale, plot scale, landscape scale, and regional scale), and the soil and environmental variables that serve to control variability at each scale. The study of variability provides a mathematical or statistical framework that is useful in elucidating both the interactions involved in controlling soil processes as well as estimating the magnitude of a given microbial process in soils. (Author's abstract) 35 097797000

1586. **Species guides for wetland plantings in the southeast United States.**
Everett, H. Wayne and South National Technical Center (U.S.).
Fort Worth, TX: USDA, Soil Conservation Service, South National Technical Center; 1 v. (various pagings): maps. (1994)
Notes: 1st ed.; Cover title. "April 1994." Includes bibliographical references.

NAL Call #: aQK125.S64--1994
Descriptors: Wetland plants Southern states/ Wetland planting---Southern States
This citation is from AGRICOLA.

1587. **Spiders in decomposition food webs of agroecosystems: Theory and evidence.**
Wise, D. H.; Snyder, W. E.; Tuntibunpakul, P.; and Halaj, J.
Journal of Arachnology 27 (1): 363-370. (1999)
NAL Call #: QL451.J6;
ISSN: 0161-8202
This citation is provided courtesy of CAB International/CABI Publishing.

1588. **Spiking hydrophobic organic compounds into soil and sediment: A review and critique of adopted procedures. [Erratum: Feb 2001, v. 20 (2), p. 458.].**
Northcott, G. L. and Jones, K. C.
Environmental Toxicology and Chemistry 19 (10): 2418-2430. (Oct. 2000)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268 [ETOCDK]
Descriptors: organic compounds/ soil/ sediment/ analytical methods/ soil spiking procedures
Abstract: Studies on the fate and effects of organic pollutants in soil and sediment are often carried out under laboratory conditions and often require the study compound to be introduced, or spiked, into the test substrate. The procedures adopted to spike relatively large amounts of hydrophobic organic compounds into soil and sediment can introduce interferences into experiments that have the potential to dominate the process(es) under investigation. This review identifies and discusses key factors of spiking procedures that can introduce significant interferences to experiments. These include soil or sediment drying and rewetting, effects of carrier solvents, and the homogeneity of spike distribution. The persistence of solvents, and therefore their contribution to soil and sediment organic carbon, is discussed with reference to potential effects on the partitioning behavior of spiked compounds. We have summarized the spiking procedures used in 64 published articles and have evaluated the information supplied by authors. From this analysis, we conclude that, in general, authors should report more detailed information regarding the procedural aspects of compound spiking. We conclude that standard operating procedures need to be validated and recommended for spiking organic compounds into soil and sediment by recommended organizations. As an aid to this process, we recommend a number of practices to observe when spiking organic compounds into soil and sediment.
This citation is from AGRICOLA.

1589. **Status and trends of wetlands in the conterminous United States 1986 to 1997.**
Dahl, Thomas E. and U.S. Fish and Wildlife Service.
Washington, D.C.: U.S. Dept. of the Interior, Fish and Wildlife Service; 82 p.: ill. (some col.), col. maps. (2000)
Notes: "December 2000"--P. 4 of cover. Includes bibliographical references (p. 70-72).
NAL Call #: QH541.5.M3-D33-2000
Descriptors: Wetlands---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

1590. **The status of IPM... Past, present and future.**
Polk, D.
Pennsylvania Fruit News 79 (4): 19-23. (1999);
ISSN: 0031-451X
This citation is provided courtesy of CAB International/CABI Publishing.

1591. **Stomatal control by chemical signalling and the exploitation of this mechanism to increase water use efficiency in agriculture.**
Davies, W. J.; Wilkinson, S.; and Loveys, B.
New Phytologist 153 (3): 449-460. (Mar. 2002)
NAL Call #: 450-N42;
ISSN: 0028-646X [NEPHAV].
Notes: Special issue: Stomata / edited by P. Ayres. Includes references.
Descriptors: plants/ water use efficiency/ stomatal movement/ plant breeding/ biochemical pathways/ shoots/ abscisic acid/ xylem/ pH/ sap/ translocation/ temperature/ irrigation/ plant water relations/ literature reviews
This citation is from AGRICOLA.

1592. **Storing carbon in agricultural soils to help mitigate global warming.**
Rosenberg, Norman J.
Ames, Iowa: Council for Agricultural Science and Technology, 2000. 8 p.
http://www.cast-science.org/cast-science.lh/pdf/glo2_ip.pdf
Descriptors: soil conservation/ global warming/ pollution control/ carbon sequestration/ agriculture
This citation is from AGRICOLA.

1593. **Strategies for chromatographic analysis of pesticide residues in water.**
Balinova, Anna
Journal of Chromatography A 754 (1-2): 125-135. (1996)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: analytical method/ coupled column liquid chromatography/ gas chromatography/ high performance liquid chromatography/ high performance thin layer chromatography/ HPLC/ liquid-liquid extraction/ methodology/ pesticide residues/ pesticides/ pollution/ purification method/ sample preparation method/ solid phase extraction/ solid phase microextraction/ supercritical fluid extraction/ water
Abstract: A review is presented of the modern techniques and approaches in methods for pesticide residue analysis in water matrices. The state of the art of the individual steps (extraction, clean-up, separation, identification, quantitation) of the chromatographic methods is reviewed with emphasis laid on emerging techniques which have gained popularity. The new approaches are discussed with respect to their relevancy to the requirements for increasing the sensitivity of detection and reliability of identification and quantitation at low levels of concentrations, arising from the European Community Drinking Water Directive.
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1594. **Strategies to reduce environmental pollution from animal manure: Nutritional management option: Review.**
Paik, I K
Asian Australasian Journal of Animal Sciences 12 (4): 657-666. (1999)
NAL Call #: SF55.A78A7;
ISSN: 1011-2367
Descriptors: animal (Animalia)/ Animals/ manure environmental pollution/ nutritional management
Abstract: The first option in manure management is developing an environmentally sound nutritional

management. This includes proper feeding programs and feeds which will result in less excreted nutrients that need to be managed. Critical components that should be controlled are N, P and minerals that are used at supranutritional levels. Amino acid supplementation and protein restriction reduce N excretion in the monogastric animals. Supplementation with enzymes, such as carbohydrases, phytase and proteases, can be used to reduce excretion of nutrients and feces by improving digestibility of specific nutrients. Growth promoting agents, such as antibiotics, beta-agonists and somatotropin, increase the ability of animals to utilize nutrients, especially dietary protein, which results in reduced excretion of N. Some microminerals, such as Cu and Zn, are supplemented at supranutritional level. Metal-amino acid chelates, metal-proteinates and metal-polysaccharide complexes can be used at a much lower level than inorganic forms of metals without compromising performance of animals. Deodorases can be used to avoid air pollution from animal manure. Nutritional management increases costs to implement. It is necessary to assess the economics in order to find an acceptable compromise between the increased costs and the benefits to the environment and production as well.

1595. **Strategies to reduce environmental pollution from animal manure: Principles and nutritional management: A review.**
Paik IK; Blair R; and Jacob J
Asian Australasian Journal of Animal Sciences 9 (6): 615-635; 94 ref. (1996)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

1596. **Straw chopper systems for manure pipelines: Final report.**
Boyden, Alan.; Prairie Agricultural Machinery Institute (Canada); and Saskatchewan, Agriculture Development Fund
Regina, Saskatchewan, Canada: Agriculture Development Fund; various pagings: ill. (2000)
Notes: "ADF #9700326." "March 2000." "Prepared by: PAMI"--Cover. Includes bibliographical references (p. 1, 4th group).; Contents note: Efficient injection for sustainable nutrient management of manure / Alan Boyden ... [et al.] -- Development of a hog manure pipeline control system / Alan Boyden ... [et al.].
NAL Call #: TD930.2-.S77-2000
Descriptors: Manure handling---Equipment and supplies
This citation is from AGRICOLA.

1597. **Stream and riparian management for freshwater turtles.**
Bodie, J.
Journal of environmental management 62 (4): 443-455. (2001)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797.
Notes: Publisher: Academic Press
Descriptors: Riparian environments/ Environment management/ Streams/ Conservation/ Nests/ Migration/ Freshwater organisms/ Wildlife/ Habitat/ Nature conservation/ Migrations/ Aquatic reptiles/ Ecosystem management/ Feeding/ Nesting/ Overwintering/ River basin management/ Water Resources Management/ Ecological Effects/ Literature Review/ Ecosystems/ Riparian Land/ Turtles/ Habitats/ Research Priorities/ Environmental Policy/ Testudines/ Reptilia/ United States/ Turtles/ Reptiles/ Tortoises / Terrapins/ Reptiles/ Environmental action/ Conservation, wildlife management and recreation/ Ecological impact of water development
Abstract: The regulation and management of stream ecosystems worldwide have led to irreversible loss of wildlife species. Due to recent scrutiny of water policy and dam feasibility, there is an urgent need for fundamental research on the biotic integrity of streams and riparian zones. Although riverine turtles rely on stream and riparian zones to complete their life cycle, are vital producers and consumers, and are declining worldwide, they have received relatively little attention. I review the literature on the impacts of contemporary stream management on freshwater turtles. Specifically, I summarize and discuss 10 distinct practices that produce five potential biological repercussions. I then focus on the often-overlooked use of riparian zones by freshwater turtles, calculate a biologically determined riparian width, and offer recommendations for ecosystem management. Migration data were summarized on 10 species from eight US states and four countries. A riparian zone encompassing the majority of freshwater turtle migrations would need to span 150 m from the stream edge. Freshwater turtles primarily chose high, open, sandy habitats to nest. Nests in North America contained eggs and hatchlings during April through September and often through the winter. In addition, freshwater turtles utilized diverse riparian habitats for feeding, nesting, and overwintering. Additional documentation of stream and riparian habitat use by turtles is needed. Copyright 2001 Academic Press

1598. **Stream corridor restoration: Principles, processes, and practices.**
Federal Interagency Stream Restoration Working Group.
USDA, Natural Resources Conservation Service, 1998.
Notes: Cooperative effort among fifteen Federal agencies and partners to produce a common reference on stream corridor restoration./ Cover title./ Shipping list no.: 99-0011-S./ "National engineering handbook (NEH), part 653"--Transmittal sheet./ "October 1998."/ "August 26, 1998"--Transmittal sheet./ Includes bibliographical references and index.
http://www.usda.gov/stream_restoration/newgra.html

1599. **Stream Restoration: A Natural Channel Design Handbook.**
Doll, B. A.; Grabow, G. L.; Hall, K. R.; Halley, J.; Harman, W. A.; Jennings, G. D.; Wise, D. E.; North Carolina Stream Restoration Institute; and North Carolina Sea Grant.
North Carolina State University, 2003 (application/pdf)
http://www.bae.ncsu.edu/programs/extension/wqg/sri/stream_rest_guidebook/sr_guidebook.pdf
Descriptors: riverbank protection/ land management/ stream channels/ ecological restoration/ stream restoration/ natural channel design

1600. **A stream visual assessment protocol (SVAP) for riparian landowners.**
Bjorkland, R.; Pringle, C. M.; and Newton, B.
Environmental Monitoring and Assessment 68 (2): 99-125. (May 2001)

NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: Streams/ Riparian environments/ Environmental surveys/ Environmental monitoring/ United States/ Land/ Streams (in natural channels)/ River management/ Natural resources/ Water resources/ Conservation/ Agriculture/ Nature conservation/ Monitoring methods/ Water pollution measurements/ Riparian Land/ Land Tenure/ Monitoring/ Methodology/ Visual inspection/ Rivers/ Environment management/ United States/ landowners/ stream visual assessment protocol/ Methodology general/ Water Resources and Supplies/ Freshwater pollution/ Streamflow and runoff/ Protective measures and control/ Water Pollution: Monitoring, Control & Remediation
Abstract: A user-friendly Stream Visual Assessment Protocol (SVAP) was recently developed in a joint effort by the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture and the University of Georgia. SVAP was designed to be an introductory screening-level assessment method for people unfamiliar with stream assessments. It was designed for use by NRCS field staff who work with agricultural landowners. NRCS is in a key position to influence conservation practices since the organization works with private stakeholders, maintaining more than 2000 field offices throughout the U.S. with a central office in each state. The SVAP measures a maximum of 15 elements and is based on visual inspection of the physical and biological characteristics of instream and riparian environments. Each element is assigned a numerical score relative to reference conditions and an overall score for the stream reach is calculated. A qualitative description of the stream reach is made based on overall numerical score. While SVAP is not intended to replace more robust stream assessment protocols, it provides quick and reliable information for use in NRCS farm assistance programs. It is also an educational tool through which landowners can learn about conservation of aquatic resources. An abridged copy of SVAP is attached as an appendix to this article and the complete document can be found on the web at www.ncg.nrcs.usda.gov/tech_notes.html.

1601. **Strengths and limitations of immunoassays for effective and efficient use for pesticide analysis in water samples: A review.**
Hennion, Marie Claire and
Barcelo, Damia
Analytica Chimica Acta 362 (1): 3-34. (1998)
NAL Call #: 381 An1;
ISSN: 0003-2670
Descriptors: pesticide: analysis/ quality assurance/ water samples
Abstract: Immunoassay techniques provide a simple, powerful and inexpensive method for pesticide analysis. However, the acceptance of immunoassays is dependent on the demonstration of quality and validity compared to more traditional techniques. In this review, primarily, the knowledge and the fundamentals of immunoassay methods are given in order to make good use of immunoassays, especially of ELISA tests. Special attention is given to a better understanding of the high selectivity and sensitivity which is attained for some immunoassays and not for others. It is also explained why some immunoassays are a quantitative method whereas others can only be used as a screening method. The cross-reactivity process, the effect of the sample matrix and the data interpretation are illustrated by numerous examples from the literature. Other formats, especially flow-injection immunoassays, dipstick immunoassay and liposome-amplified immunoassays are presented. Quality assurance and guidelines for validation and use are given.

1602. **Strip tillage for "no-till" row crop production.**
Morrison, J. E. Jr.
Applied Engineering in Agriculture 18 (3): 277-284. (2002)
NAL Call #: S671.A66;
ISSN: 0883-8542

1603. **The strobilurin fungicides.**
Bartlett, Dave W; Clough, John M; Godwin, Jeremy R; Hall, Alison A; Hamer, Mick; and
Parr Dobrzanski, Bob
Pest Management Science 58 (7): 649-662. (2002)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: azoxystrobin: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ famoxadone: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ fenamidone: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ kresoxim methyl: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ metominostrobin: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ picoxystrobin: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ pyraclostrobin: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis/ trifloxystrobin: environmental safety, fungicide, mode of action, risk, strobilurin, synthesis
Abstract: Strobilurins are one of the most important classes of agricultural fungicide. Their invention was inspired by a group of fungicidally active natural products. The outstanding benefits they deliver are currently being utilised in a wide range of crops throughout the world. First launched in 1996, the strobilurins now include the world's biggest selling fungicide, azoxystrobin. By 2002 there will be six strobilurin active ingredients commercially available for agricultural use. This review describes in detail the properties of these active ingredients - their synthesis, biochemical mode of action, biokinetics, fungicidal activity, yield and quality benefits, resistance risk and human and environmental safety. It also describes the clear technical differences that exist between these active ingredients, particularly in the areas of fungicidal activity and biokinetics.

1604. **Stubble height as a tool for management of riparian areas.**
Clary, W. P. and Leininger, W. C.
Journal of Range Management 53 (6): 562-573. (2000)
NAL Call #: 60.18 J82;
ISSN: 0022-409X
This citation is provided courtesy of CAB International/CABI Publishing.

1605. **Study design for monitoring wetlands.**
Parker, Amanda K.; United States. Environmental Protection Agency. Health and Ecological Criteria Division; United States. Environmental Protection Agency. Wetlands Division; and United States. Environmental Protection Agency. Office of Water.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Original title: Study design for monitoring wetlands (#4).
Title from web page. "March 2002." "Prepared jointly by The U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)." "EPA 822-R-02-015." Description based on content viewed March 31, 2003. Includes bibliographical references.
NAL Call #: QH90.57.B5-P37-2002
http://www.epa.gov/waterscience/criteria/wetlands/4StudyDesign.pdf
Descriptors: Wetland management---United States/ Water quality management---United States/ Pollution---United States---Measurement/ Environmental sampling---United States
This citation is from AGRICOLA.

1606. **Subirrigation and controlled drainage.**
Belcher, H. W. and D'Itri, Frank M.
Boca Raton, Fla.: Lewis Publishers; xii, 482 p.: ill. (1995)
NAL Call #: S619.S92S83--1995;
ISBN: 1566701392 (acid-free paper)
Descriptors: Subirrigation---Congresses/ Drainage---Congresses
This citation is from AGRICOLA.

1607. **Substratum-Associated Microbiota.**
Tuchman, N. C. and Peterson, C. G.
Water Environment Research 67 (4): 702-713. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ substrates/ microbiological studies/ bacteria/ algae/ metabolism/ enzymes/ microbiological analysis/ surface films/ sediment analysis/ meiobenthos/ enzymatic activity/ biofilms/ Network design/ Ecological techniques and apparatus/ Methods and instruments
© Cambridge Scientific Abstracts (CSA)

1608. **Subsurface drip irrigation: A review.**
Camp, C. R.
Transactions of the ASAE 41 (5): 1353-1367. (Sept. 1998-Oct. 1998)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: trickle irrigation/ subsurface irrigation/ literature reviews
Abstract: A comprehensive review of published information on subsurface drip irrigation was performed to determine the state of the art on the subject. Subsurface drip irrigation has been a part of drip irrigation development in the USA since its beginning about 1960, but interest has escalated since the early 1980s. Yield response for over 30 crops indicated that crop yield for subsurface drip was greater than or equal to that for other irrigation methods, including surface drip, and required less water in most cases. Lateral depths ranged from 0.02 to 0.70 m and lateral spacings ranged from 0.25 to 5.0 m. Several irrigation scheduling techniques, management strategies, crop water requirements, and water use efficiencies were discussed. Injection of nutrients, pesticides, and other chemicals to modify water and soil conditions is an important component of subsurface drip irrigation. Some mathematical models that simulate water movement in subsurface drip systems were included. Uniformity measurements and methods, a limited assessment of root intrusion into emitters, and estimates of overall system longevity were also discussed. Sufficient information exists to provide general guidance with regard to design, installation, and management of subsurface drip irrigation systems. A significant body of information is available to assist in determining relative advantages and disadvantages of this technology in comparison with other irrigation types. Subsurface drip provides a more efficient delivery system if water and nutrient applications are managed properly. Waste water application, especially for turf and landscape plants, offers great potential. Profitability and economic aspects have not been determined conclusively and will depend greatly on local conditions and constraints, especially availability and cost of water.
This citation is from AGRICOLA.

1609. **Subsurface Drip Irrigation of Row Crops: A Review of 15 Years of Research at the Water Management Research Laboratory.**
Ayars, J. E.; Phene, C. J.; Hutmacher, R. B.; Davis, K. R.; Schoneman, R. A.; Vail, S. S.; and Mead, R. M.
Agricultural Water Management 42 (1): 1-27. (1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: Drip Irrigation/ Subsurface Irrigation/ Agriculture/ Literature Review/ Water Management/ Fertilizers/ Water Table/ Groundwater/ Research Priorities/ Conservation in agricultural use
Abstract: Use of subsurface drip irrigation (SDI) has progressed from being a novelty employed by researchers to an accepted method of irrigation of both perennial and annual crops. This paper reviews the SDI research conducted by scientists at the Water Management Research Laboratory over a period of 15 years. Data are presented for irrigation and fertilization management on tomato, cotton, sweet corn, alfalfa, and cantaloupe for both plot and field applications. Results from these studies demonstrated significant yield and water use efficiency increases in all crops. Use of high frequency irrigation resulted in reduced deep percolation and increased use of water from shallow ground water when crops were grown in high water table areas. Uniformity studies demonstrated that after 9 years of operation SDI uniformity was as good as at the time of installation if management procedures were followed to prevent root intrusion.
© Cambridge Scientific Abstracts (CSA)

1610. **Subsurface flow constructed wetlands for wastewater treatment: A technology assessment.**
Reed, Sherwood C.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Water; 1 v. (various pagings): ill. (1993)
Notes: "Mr. Sherwood C. Reed ... was the principal author and editor of this document"--P. i. "July 1993." "EPA 832/R-93-008." "PB94-107893"--Cover. Includes bibliographical references.
NAL Call #: TD756.5.R44--1993
Descriptors: Constructed wetlands
This citation is from AGRICOLA.

1611. **Summary of national standards and guidelines for pesticides in water, bed sediment, and aquatic organisms and their application to water-quality assessments.**
Nowell, Lisa H.; Resek, Elizabeth A.; Geological Survey (U.S.); and United States. Environmental Protection Agency.
Sacramento, Calif.: U.S. Geological Survey; vi, 115 p.: ill.; Series: U.S. Geological Survey open-file report 94-44. (1994)
Notes: Open-File Report 94-44; Spine title: National standards and guidelines for pesticides in water, bed sediment, and aquatic organisms. Includes bibliographical references (p. 48-51).
NAL Call #: SB970.4.U6N69--1994
Descriptors: Pesticides---Government policy---United States/ Pesticides---Law and legislation---United States/ Pesticides---Environmental aspects---United States/ Water---United States---Pesticide content
This citation is from AGRICOLA.

1612. **Summary of research and development needs for monitoring forest and rangeland ecosystems.**
Powell, D. S.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems = Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City, Mexico.) Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 295-296; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: forests/ rangelands/ ecosystems/ environmental assessment/ monitoring/ information needs/ research / cooperation/ spatial variation/ temporal variation/ sampling/ quality controls/ information/ government organizations
This citation is from AGRICOLA.

1613. **Supercritical fluid extraction as a useful method for pesticides determination.**
Camel, V
Analusis 26 (6): M99-M111. (1998)
NAL Call #: QD71.A52;
ISSN: 0365-4877
Descriptors: benzoic acid pesticides: determination, extraction, pollutant/ organochlorine pesticides: determination, pollutant, extraction/ organophosphorus pesticides: determination, pollutant, extraction/ organotin pesticides: determination, extraction, pollutant/ pesticides: determination, pollutant, extraction/ phenoxyacetic acid pesticides: determination, extraction, pollutant/ substituted urea pesticides: determination, pollutant, extraction/ thiolcarbamate pesticides: determination, extraction, pollutant/ triazine pesticides: determination, extraction, pollutant/ triazole pesticides: determination, pollutant, extraction / animal tissue/ food/ plant tissues/ sediments/ soils/ water
Abstract: Supercritical fluid extraction (SFE) has faced a growing interest in the past few years, due to its numerous advantages over classical liquid solvent extractions (mainly rapidity, selectivity, low solvent volumes required). In particular, applications of this technique have been reported for the determination of pesticides in complex matrices, such as soils and sediments, water samples (after a solid-phase extraction), plant materials, animal tissues, and food items. In fact, SFE of pesticides represents quite a challenge due to the wide range of polarity encountered and the variety of matrices that may contain those residues. Consequently, extraction parameters need to be carefully chosen. So, this paper details the main strategies possible for efficient extractions of pesticides from several matrices.
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1614. **Supercritical fluid extraction for the analysis of pesticide residues in miscellaneous samples.**
Motohashi, Noboru; Nagashima, Hideo; and Parkanyi, Cyril
Journal of Biochemical and Biophysical Methods 43 (1-3): 313-328. (2000);
ISSN: 0165-022X
Descriptors: pesticide residues: analysis, extraction, food contaminant/ biological tissues/ fruits/ soils/ vegetables
Abstract: Supercritical fluid extraction (SFE) procedures for pesticide residue analysis are reviewed and discussed. A variety of applications were classified, on matrices such as fruits, vegetables, soils, biological tissues, and other materials. Emphasis is placed on analysis of samples with a high water content containing polar pesticides, with particular attention paid to the multiresidue analyses.
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1615. **Surface Flow Constructed Wetlands: Overview.**
Kadlec, R. H.
Water Science and Technology 32 (3): 1-12. (1995)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Monograph: 0-08-042878-9; Conference: 4. Int. Conf. on Wetlands Systems for Water Pollution Control [Selected Proceedings], Ghangzhou (People's Rep. China), 6-10 Nov 1994; Source: Wetland Systems for Water Pollution Control 1994. Selected Proceedings for the 4th International Conference on Wetland Systems for Water Pollution Control Held in Guangzhou, China 6-10 November, 1994., 1995, Pp. 1-12, Water Science and Technology [Water Sci. Technol.], Vol. 32, No. 3
Descriptors: wetlands / hydrology/ fluid flow/ marshes/ wastewater treatment/ nutrients (mineral)/ surface runoff/ artificial wetlands/ water quality control/ design criteria/ Dynamics of lakes and rivers/ Mechanical and natural changes/ Wastewater treatment processes/ Freshwater pollution
Abstract: Several hundreds of marshes have now been built primarily for the purposes of water quality improvement. This paper reviews statistics on the types and numbers and character of these low-tech water treatment wetlands. The

operational processes are discussed, including sedimentation, plant uptake, sorption, nutrient cycling, and chemical and microbial conversion. Performance has been good for reduction of suspended solids, biological oxygen demand, phosphorus, nitrogen, metals and some anthropogenic chemicals. Design procedures are evaluated, showing that the overly simplistic techniques used in the infancy of the technology may now be replaced by rational procedures based on the large and rapidly growing information base for constructed surface flow treatment wetlands. Ancillary wildlife and human use is an important part of this type of wetland, and should be acknowledged in design. Capital costs are low, but the principal financial advantage is the extremely low base cost of operation.

1616. **Survey of livestock influences on stream and riparian ecosystems in the western United States.**
Belsky, A. J.; Matzke, A.; and Uselman, S.
Journal of Soil and Water Conservation 54 (1): 419-431. (1999)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

1617. **Survival of pathogenic microorganisms and parasites in excreta, manure and sewage sludge: A review.**
Strauch D
Medycyna Weterynaryjna 49 (3): 117-121; 66 ref. (1993).
Notes: Subtitle: Part II
This citation is provided courtesy of CAB International/CABI Publishing.

1618. **Suspended clay's effect on lake and reservoir limnology.**
Lind, Owen T
Archiv fuer Hydrobiologie Supplement 139 (3): 327-360. (2003)
Descriptors: ions/ polar organic molecules/ toxic materials: food chain entry, sedimentation, suspended clay adsorption/ algae (Algae): filterable/ animal (Animalia): filter feeders/ bacteria (Bacteria): filterable/ fish (Pisces)/ macrophyte (Plantae): production/ plankton (Organisms): production/ zooplankton (Animalia)/ Algae/ Animals/ Bacteria/ Chordates/ Eubacteria/ Fish/ Microorganisms/ Nonhuman Vertebrates/ Nonvascular Plants/ Organisms/ Plants/ Vertebrates/ adsorbed organic material: concentrated bacterial substrate source/ benthic production/ clay crystals: physical layered structure/ clays: chemical properties, physical properties/ grazer assimilation/ lake limnology: suspended clay impacts/ light attenuation/ limnological system properties/ mixing depth/ reservoir limnology: suspended clay impacts/ sediment resuspension/ stratification/ suspended clay/ thermal regimes/ trophic state/ water chemistry
Abstract: Many reservoirs and some lakes have significant quantities of suspended clay that is primarily derived from the watershed, but subsequently from sediment resuspension. Both the physical and chemical properties of clays affect other limnological system properties. The physical layered structure of the different clay crystals presents greatly different surfaces for adsorption of ions and polar organic molecules. Adsorption of nutrients acts as either a sink or a source relative to biotic use depending upon water chemistry and trophic state. Toxic materials may be adsorbed to suspended clay and then either be directed into the food chain or removed from the system by sedimentation. Suspended clay lessens autotrophy. It competes with autotrophs for nutrients and is the principal cause of light attenuation in many waters. Thus it significantly governs plankton, benthic and macrophyte production. Clay in suspension may either facilitate or inhibit filter feeding animals. Adsorbed organic material provides a concentrated source of bacterial substrate as well as food for zooplankton and small fishes. But, high concentrations can dilute the concentration of filterable cells (algae, bacteria) and lessen grazer assimilation. Suspended clay is significant in determining community structure. Light attenuation governs the relative abundance of sight-feeding predators and their prey and thus is significant in structuring aquatic communities. In addition to light attenuation, suspended clay affects thermal regimes, and consequently mixing depth and time of stratification which in turn can affect the quantity of resuspended clay.

1619. **Sustainability, conservation tillage and weeds in Canada.**
Derksen, D A; Blackshaw, R E; and Boyetchko, S M
Canadian Journal of Plant Science 76 (4): 651-659. (1996)
NAL Call #: 450-C16;
ISSN: 0008-4220
Descriptors: bacteria (Bacteria General Unspecified)/ crop (Angiospermae)/ fungi (Fungi Unspecified)/ fungus (Fungi Unspecified)/ insect (Insecta Unspecified)/ plant (Plantae Unspecified)/ rhizobacteria (Bacteria General Unspecified)/ weeds (Tracheophyta)/ Insecta (Insecta Unspecified)/ Plantae (Plantae Unspecified)/ angiosperms/ animals/ arthropods/ bacteria/ eubacteria/ fungi/ insects/ invertebrates/ microorganisms/ nonvascular plants/ plants/ spermatophytes/ vascular plants/ agriculture/ biobusiness/ biological control/ biological control agent/ conservation tillage/ crop residue/ herbicide/ integrated management systems/ pest/ pest management/ soil science/ sustainability
Abstract: The sustainability of conservation tillage is dependent on the extent of changes in weed community composition, the usage of herbicides, and the development of integrated weed management (IWM) strategies, including biological weed control. The objective of this paper is to review research on conservation tillage and weed management in light of these factors. Recent Canadian research has found that changes in weed communities due to the adoption of conservation tillage are not necessarily those expected and were not consistent by species, location, or year. Changes reflected the use of different selection pressures, such as different crop rotations and herbicides, within the studies to a greater extent than weed life cycle groupings. Therefore, research that determines the reasons for change or the lack of change in weed communities is required to provide the scientific basis for the development of IWM strategies. Documented herbicide usage in conservation tillage varies from less than to more than conventional-tillage systems. Potential to reduce herbicide usage in conservation-tillage systems exists. Furthermore, the herbicides used in western Canada are different from those causing ground water contamination in the United States,

are less volatile, and are used at lower rates. The presence of surface crop residues in conservation tillage may provide a unique environment for classical and inundative biological control agents. Some insects, fungi, and bacteria have the potential to survive to a greater extent in undisturbed plant residues. Residue management and conservation tillage systems are evolving in Canada. Research must keep pace by providing weed management strategies that enhance the sustainability of these systems.
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1620. **Sustainability in agriculture: An evaluation of principal goal-oriented concepts to close the gap between theory and practice.**
Wiren Lehr, S. von.
Agriculture, Ecosystems and Environment 84 (2): 115-129. (Apr. 2001)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agriculture/ sustainability/ guidelines/ land management/ crop management/ evaluation/ indicators/ agricultural production/ environmental protection/ ecology/ literature reviews
Abstract: The objective of concepts to assess and implement sustainability in agriculture is to consolidate the complex and diverse principles of the theoretical paradigm and to transform them into recommendations for agricultural practice. Since only goal-oriented concepts show a high adaptation to different conditions and target groups, their fundamental strategy was highlighted and their suitability for successful operationalisation was worked out. Seven goal-oriented concepts, representing the main current methods of sustainability assessment, were evaluated regarding potential and drawbacks for a successful transfer of the theoretical paradigm into practice. A principal strategy of goal-oriented concepts has been identified in all concepts: goal definition, indicator selection, evaluation based on indicator sets and final formulation of management advice. In most of the seven reviewed concepts, the protection of the agricultural production system itself is postulated as a major aim. Consequently, indicator sets mainly consist of production-oriented indicators and eco-balancing predominantly represents the methodological framework. Six of the seven selected concepts base sustainability assessment on an evaluation strategy with estimated threshold values or margins of tolerance. Three main drawbacks of goal-oriented concepts have been identified that restrict to transfer the theoretical sustainability paradigm into agricultural practice: (1) the lack of systemic and transferable indicators which characterise agricultural and other eco-systems regarding all dimensions of sustainability; (2) the deficit of an adequate evaluation of agro-ecosystems; and (3) the lack of principal guidelines for the. formulation of management advice for practical application. Goal-oriented concepts based on models for agronomy and management show a high potential to overcome these drawbacks and therefore represent a promising tool to bridge the gap between theory and practice of sustainability in agriculture.
This citation is from AGRICOLA.

1621. **Sustainability of irrigation: An overview of salinity problems and control strategies.**
Rhoades, J. D. and Salinity Laboratory (U.S.)., 1997.
Notes: Caption title. Paper presented at the 1997 annual conference, footprints of humanity: reflections on fifty years of water resource developments, held in Lethbridge, Alberta, June 3-6, 1997. Includes bibliographical references.
NAL Call #: aS613.R56-1997
http://www.ussl.ars.usda.gov/pdfpubl/p1506.pdf
Descriptors: Irrigation Management/ Soils, Salts in/ Irrigation water/ Soils, Irrigated
This citation is from AGRICOLA.

1622. **Sustainability of soil use.**
Buol, S. W.
Annual Review of Ecology and Systematics 26: 25-44. (1995)
NAL Call #: QH540.A55;
ISSN: 0066-4162 [ARECBC]
Descriptors: sustainability/ agricultural land/ crop production/ soil fertility/ soil exhaustion/ ecosystems/ soil degradation/ erosion/ reviews/ agroecosystems
This citation is from AGRICOLA.

1623. **Sustainable agriculture systems.**
Hatfield, Jerry L. and Karlen, D. L.
Boca Raton: Lewis Publishers; 316 p.: ill. (1994)
NAL Call #: S494.5.S86S86--1994;
ISBN: 1566700493 (acid-free paper)
Descriptors: Sustainable agriculture/ Agricultural systems/ Agricultural ecology
This citation is from AGRICOLA.

1624. **Sustained productivity in intensively managed forest plantations.**
Fox, T. R.
Forest Ecology and Management 138 (1/3): 187-202. (2000)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

1625. **Sustaining biological diversity in early successional communities: The challenge of managing unpopular habitats.**
Askins, Robert A
Wildlife Society Bulletin 29 (2): 407-412. (2001)
NAL Call #: SK357.A1W5;
ISSN: 0091-7648
Descriptors: beauty perceptions/ biological diversity: sustenance/ conservation priorities/ early successional communities/ forest clearing/ habitat destruction/ habitat disturbance/ regional variation/ shrubland declines/ unpopular habitat management/ wetlands protection
© Thomson

1626. **Swine manure odor control using pit additives: A review.**
Zhu Jun; Bundy DS; Li XiWei; Rashid N; Zhu J; and Li XW.
In: Livestock Environment V: Proceedings of the Fifth International Symposium. (Held 29 May 1997-31 May 1997 at Bloomington, Minnesota.) Bottcher RW and Hoff SJ (eds.); Vol. 2.
St. Joseph, Mich.: American Society of Agricultural Engineers; pp. 295-302; 1997.
This citation is provided courtesy of CAB International/CABI Publishing.

1627. **A synthesis of carbon sequestration, carbon emissions, and net carbon flux in agriculture: Comparing tillage practices in the United States.**
West, T. O. and Marland, G.
Agriculture, Ecosystems and Environment 91 (1/3): 217-232. (Sept. 2002)
NAL Call #: S601 .A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: agriculture/ tillage/ carbon/ emission/ carbon cycle/ deforestation/ fuel consumption/ farm management/ pesticides/ irrigation/ farm machinery/ estimation/ estimates/ no-tillage/ soil organic matter/ conservation/ carbon dioxide/ literature reviews/ United States
Abstract: The atmospheric CO2 concentration is increasing, due primarily to fossil-fuel combustion and deforestation. Sequestering atmospheric C in agricultural soils is being advocated as a possibility to partially offset fossil-fuel emissions. Sequestering C in agriculture requires a change in management practices, i.e. efficient use of pesticides, irrigation, and farm machinery. The C emissions associated with a change in practices have not traditionally been incorporated comprehensively into C sequestration analyses. A full C cycle analysis has been completed for agricultural inputs, resulting in estimates of net C flux for three crop types across three tillage intensities. The full C cycle analysis includes estimates of energy use and C emissions for primary fuels, electricity, fertilizers, lime, pesticides, irrigation, seed production, and farm machinery. Total C emissions values were used in conjunction with C sequestration estimates to model net C flux to the atmosphere over time. Based on US average crop inputs, no-till emitted less CO2 from agricultural operations than did conventional tillage, with 137 and 168 kg C ha(-1) per year, respectively. Changing from conventional tillage to no-till is therefore estimated to both enhance C sequestration and decrease CO2 emissions. While the enhanced C sequestration will continue for a finite time, the reduction in net CO2 flux to the atmosphere, caused by the reduced fossil-fuel use, can continue indefinitely, as long as the alternative practice is continued. Estimates of net C flux, which are based on US average inputs, will vary across crop type and different climate regimes. The C coefficients calculated for agricultural inputs can be used to estimate C emissions and net C flux on a site-specific basis.
This citation is from AGRICOLA.

1628. **A systems engineering approach for utilizing animal manure.**
Karlen, D. L.; Russel, J. R.; and Mallarino, A. P.
In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A., 1998; pp. 283-315
NAL Call #: S655.A57 1998
This citation is provided courtesy of CAB International/CABI Publishing.

1629. **Technical and commercial aspects of biocontrol products.**
Powell, K. A. and Jutsum, A. R.
Pesticide Science 37 (4): 315-321. (1993)
NAL Call #: SB951.P47;
ISSN: 0031-613X [PSSCBG].
Notes: Paper presented at the meeting, "Biological Control: Use of Living Organisms in the Management of Invertebrate Pests, Pathogens and Weeds," October 19-20, 1992, London, England. Includes references.
Descriptors: biological control agents/ microbial pesticides/ world markets/ applications/ regulations/ pest control/ industry/ literature reviews
Abstract: The global agrochemical market in 1991 was $26800 million, yet biological products were reported to account for only $120 million of sales per annum-less than 0.5% of the total. The majority of these sales are attributed to bio-insecticides of which Bacillus thuringiensis accounts for over 90%, but B. thuringiensis could be described as a biologically produced insecticide, rather than a true biocontrol agent. Biological products have technical limitations, including extreme specificity, sensitivity to environmental factors and problems with robustness of the formulations, but ironically, it is these limitations which also give biological control an image of environmental acceptability. Nonetheless, some of the limitations will be overcome and sales will increase, but primarily in niche situations such as the control of soil-borne diseases and the control of insect pests showing resistance to agrochemicals. In order for significant inroads to be made into such niche markets it is imperative that progress with biological products is not impaired by over-regulation, and a rational approach by all regulatory bodies is required. Overall, though, agrochemicals are likely to continue to be the major method of crop protection for the foreseeable future, and the biological control field now needs clear, well-defined goals if current successful niche products can be the basis for future success rather than a limited experiment in alternative technology.
This citation is from AGRICOLA.

1630. **Techniques for restoration of disturbed coastal wetlands of the Great Lakes.**
Wilcox, D. A. and Whillans, T. H.
Wetlands 19 (4): 835-857. (1999)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212.
Notes: Conference: Temperate Wetlands Restoration Workshop, Barrie, ON (Canada), 27 Nov-1 Dec 1995; Publisher: Society of Wetlands Scientists
Descriptors: North America/ Wetlands/ Degradation/ Environmental Quality/ Land Reclamation/ Land Management/ Hydrology/ Water Control/ Environmental restoration/ Methodology/ Coastal environments/ North America, Great Lakes/ Restoration/ Sedimentation/ Community composition/ Water levels/ Pollution control/ Sediment pollution/ Decomposition/ Environmental quality standards/ Land restoration/ North America, Great Lakes/ North America/ land restoration/ Watershed protection/ Reclamation/ Protective measures and control/ Water Resources and Supplies
Abstract: A long history of human-induced degradation of Great Lakes wetlands has made restoration a necessity, but the practice of wetland restoration is relatively new, especially in large lake systems. Therefore, we compiled tested methods and developed additional potential methods based on scientific understanding of Great Lakes wetland ecosystems to provide an overview of approaches for restoration. We addressed this challenge by focusing on four general fields of science: hydrology, sedimentology, chemistry, and biology. Hydrologic remediation methods include restoring hydrologic connections between diked and hydrologically altered wetlands and the lakes, restoring water tables

lowered by ditching, and restoring natural variation in lake levels of regulated lakes Superior and Ontario. Sedimentological remediation methods include management of sediment input from uplands, removal or proper management of dams on tributary rivers, and restoration of protective barrier beaches and sand spits. Chemical remediation methods include reducing or eliminating inputs of contaminants from point and non-point sources, natural sediment remediation by biodegradation and chemical degradation, and active sediment remediation by removal or by in situ treatment. Biological remediation methods include control of non-target organisms, enhancing populations of target organisms, and enhancing habitat for target organisms. Some of these methods were used in three major restoration projects (Metzger Marsh on Lake Erie and Cootes Paradise and Oshawa Second Marsh on Lake Ontario), which are described as case studies to show practical applications of wetland restoration in the Great Lakes. Successful restoration techniques that do not require continued manipulation must be founded in the basic tenets of ecology and should mimic natural processes. Success is demonstrated by the sustain -ability, productivity, nutrient-retention ability, invasibility, and biotic interactions within a restored wetland.

1631. **Techniques for simultaneous quantification of wind and water erosion in semiarid zones.**
Visser, S. M. and Sterk, G.
In: Soil erosion research for the 21st century: Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough, J. C. and Flanagan, D. C. (eds.)
St Joseph, Mo.: American Society of Agricultural Engineers; pp. 544-547; 2001. *ISBN:* 1-892769-16-6
This citation is provided courtesy of CAB International/CABI Publishing.

1632. **Technologies and management practices for more efficient manure handling: A committee report.**
Mellano, Valerie J.; Meyer, Deanne Morse.; University of California, Davis. Animal Agricultural Research Center; and University of California, Davis. Agricultural Issues Center.
Davis, Calif.: UCD Animal Agriculture Research Center: UC Agricultural Issues Center; iv, 48 p. (1996)
Notes: Includes bibliographical references (p. 43-46).
NAL Call #: S655-.T43-1996
Descriptors: Manure handling/ Manures---Management/ Agricultural wastes---Management/ Farm manure ---Management
This citation is from AGRICOLA.

1633. **Temperate freshwater wetlands: Types, status, and threats.**
Brinson, M. M. and Malvarez, A. I.
Environmental Conservation 29 (2): 115-133. (June 2002)
NAL Call #: QH540.E55;
ISSN: 0376-8929
Descriptors: Wetlands / Land Use/ Environmental Protection/ Environmental Quality/ Eutrophication/ Water Quality/ Drainage/ Resources Management/ Ecosystem analysis/ Temperate environments/ Environmental degradation/ General/ Management/ Wetlands
Abstract: This review examines the status of temperate-zone freshwater wetlands and makes projections of how changes over the 2025 time horizon might affect their biodiversity. The six geographic regions addressed are temperate areas of North America, South America, northern Europe, northern Mediterranean, temperate Russia, Mongolia, north-east China, Korea and Japan, and southern Australia and New Zealand. Information from the recent technical literature, general accounts in books, and some first-hand experience provided the basis for describing major wetland types, their status and major threats. Loss of biodiversity is a consequence both of a reduction in area and deterioration in condition. The information base for either change is highly variable geographically. Many countries lack accurate inventories, and for those with inventories, classifications differ, thus making comparisons difficult. Factors responsible for losses and degradation include diversions and damming of river flows, disconnecting floodplain wetlands from flood flows, eutrophication, contamination, grazing, harvests of plants and animals, global warming, invasions of exotics, and the practices of filling, dyking and draining. In humid regions, drainage of depressions and flats has eliminated large areas of wetlands. In arid regions, irrigated agriculture directly competes with wetlands for water. Eutrophication is widespread, which, together with effects of invasive species, reduces biotic complexity. In northern Europe and the northern Mediterranean, losses have been ongoing for hundreds of years, while losses in North America accelerated during the 1950s through to the 1970s. In contrast, areas such as China appear to be on the cusp of expanding drainage projects and building impoundments that will eliminate and degrade freshwater wetlands. Generalizations and trends gleaned from this paper should be considered only as a starting point for developing world-scale data sets. One trend is that the more industrialized countries are likely to conserve their already impacted, remaining wetlands, while nations with less industrialization are now experiencing accelerated losses, and may continue to do so for the next several decades. Another observation is that countries with both protection and restoration programmes do not necessarily enjoy a net increase in area and improvement in condition. Consequently, both reductions in the rates of wetland loss and increases in the rates of restoration are needed in tandem to achieve overall improvements in wetland area and condition.

1634. **Temperate Zone Fens of the Glaciated Midwestern USA.**
Amon, J. P.; Thompson, C. A.; Carpenter, Q. J.; and Miner, J.
Wetlands 22 (2): 301-317. (2002)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212.
Notes: Publisher: The Society of Wetland Scientists; DOI: 10.1043/ 0277-5212(2002)022(0301: TZFOTG)2.0.CO;2
Descriptors: USA/ Wetlands/ Glaciers/ Temperate Zone/ Boreal Forests/ Literature Review/ Species Diversity/ Groundwater/ Hydrogen Ion Concentration/ Root Zone/ Organic Matter/ Conductivity/ Fens/ Inland water environment/ Classification systems/ Hydrology/ Physicochemical properties/ community composition/ species diversity/ Habitat community studies

Abstract: A study of more than 70 fens in the Midwestern United States and a review of the literature indicates that these temperate zone wetlands may differ from fens of the boreal zone and are not adequately differentiated from them by present classification systems. Fens of the Midwestern temperate zone 1) are wetlands with high botanical diversity, 2) are supported in part by ground water with conductivity > 100mS/cm and circumneutral pH, 3) contain water in the root zone during most of the growing season yet are not usually inundated, and 4) accumulate organic and/or carbonate substrates. Individually, none of these descriptors is adequate to distinguish fens from other wetland communities of the Midwest such as marshes, sedge meadows, and wet prairies; yet, when they are taken together, such discrimination is possible. While fens of this zone share many species, our study does not support using indicator species because too few are both faithfully represented and geographically widespread. Midwestern temperate fens are sustained by forces of climate, landscape, and geology, which permit ground water to seep continuously into the root zone in a focused location. Since water availability in the temperate Midwest is less than in the boreal zone, continuous discharge is needed to maintain the saturation conducive to peat formation.

1635. **Temporary ponds and their invertebrate communities.**
Williams, D Dudley
Aquatic Conservation 7 (2): 105-117. (1997);
ISSN: 1052-7613
Descriptors: Aerial colonization/ Agricultural drainage/ Aquatic phase/ Competition/ Conservation/ Freshwater ecology/ Length/ Life history modification / Microcrustacean/ Migration/ Odonates/ Physiological tolerance/ Predation/ Seasonality/ Temporary ponds/ Water disappearance/ birds (Aves Unspecified)/ chironomids (Diptera)/ crustaceans (Crustacea Unspecified)/ mites (Acarina)/ snails (Gastropoda)/ springtails (Collembola)/ Aves (Aves Unspecified)/ Coleoptera (Coleoptera)/ Crustacea (Crustacea Unspecified)/ Hemiptera (Hemiptera)/ Odonata (Odonata)/ animals/ arthropods/ birds/ chelicerates/ chordates/ crustaceans/ insects/ invertebrates/ mollusks/ nonhuman vertebrates/ vertebrates/ Northeast North America/ Northwest Australia/ Britain/ UK
Abstract: 1. Temporary waters are bodies of water that experience a recurrent dry phase of varying length that is sometimes predictable in its onset and duration. The maximum number of temporary and permanent ponds in England and Wales in 1880 is estimated to be gt 1 million. A 1920s survey showed lowest densities in mountainous areas (0.12 km-2) and highest densities in ancient woodland and ancient agriculture areas (115 km-2). 2. The most important physical and chemical influences on the biota of temporary ponds are the length of the aquatic phase, pattern of disappearance of the water, and whether the latter is predictable or unpredictable. Biological influences include the degree of inter/intraspecific competition and predation, and the seasonal influx of aerial colonizers. 3. Temporary ponds from Britain, northeastern North America and northwestern Australia are compared and, despite large differences in climate and zoogeography, considerable similarity is evident amongst their faunas. Snails, microcrustaceans, aquatic mites, springtails, odonates, chironomids, and a high diversity of Hemiptera and Coleoptera are characteristic of these habitats. British ponds share at least 33 genera and three species with their North American counterparts. The three main evolved strategies by which invertebrates survive in temporary ponds are physiological tolerance, life history modification, and migration. populations in these ponds. 5. Agricultural drainage and pond 'improvement' schemes are seen as distinct threats to the survival of temporary ponds and should be reviewed in the context that these water bodies are not 'wasted' areas of land but natural features of the environment. It is recommended that the management of wetlands in Britain should be directed towards maintaining a high diversity of natural water bodies, including a variety of temporary pond types.

1636. **Testing a conceptual model of soil emissions of nitrous and nitric oxides.**
Davidson, Eric A; Keller, Michael; Erickson, Heather E; Verchot, Louis V; and Veldkamp, Edzo
Bioscience 50 (8): 667-680. (2000)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: nitric oxides: pollutant, toxin/ nitrous oxides: pollutant, toxin/ soil nitrogen: availability/ conceptual models/ disciplinary research/ ecotoxicology/ global warming/ habitat alteration/ microbial ecology/ nutrient cycling/ soil emissions

1637. **Theoretical and practical challenges to an IPM approach to weed management.**
Buhler, D. D.; Liebman, M.; and Obrycki, J. J.
Weed Science 48 (3): 274-280. (May 2000-June 2000)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: weeds/ weed control/ integrated pest management/ cropping systems/ herbicides/ conservation tillage/ erosion/ yield losses/ evolution/ plant communities/ selection pressure/ agricultural research/ literature reviews
This citation is from AGRICOLA.

1638. **Threats to imperiled freshwater fauna.**
Richter, B. D.; Braun, D. P.; Mendelson, M. A.; and Master, L. L.
Conservation Biology 11 (5): 1081-1093. (Oct. 1997)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
Descriptors: USA/ population decline/ freshwater environments/ aquatic animals/ conservation/ environmental stress/ Anthropogenic factors/ Pollution effects/ Eutrophication/ Sediment load/ River engineering/ Agricultural pollution/ Introduced species/ Freshwater fish/ Aquatic insects/ Freshwater molluscs/ Freshwater crustaceans/ Amphibiotic species/ Ecosystem disturbance/ Nature conservation/ Inland water environment/ United States/ Environmental Effects/ Regulated Rivers/ Sedimentation/ Exotic Species/ Hydrological Regime/ Mussels/ Fish/ Dams/ United States/ Conservation/ Effects on organisms/ Ecological impact of water development

Abstract: Threats to imperiled freshwater fauna in the U.S. were assessed through an experts survey addressing anthropogenic stressors and their sources. Specifically, causes of historic declines and current limits to recovery were identified for 135 imperiled freshwater species of fishes, crayfishes, dragonflies and damselflies, mussels, and amphibians. The survey was designed to identify threats with sufficient specificity to inform resource managers and regulators faced with translating information about predominant biological threats into specific, responsive actions. The findings point to altered sediment loads and nutrient inputs from agricultural nonpoint pollution; interference from exotic species; and altered hydrologic regimes associated with impoundment operations as the three leading threats nationwide, accompanied by many lesser but still significant threats. Variations in threats among regions and among taxa were also evident. Eastern species are most commonly affected by altered sediment loads from agricultural activities, whereas exotic species, habitat removal/damage, and altered hydrologic regimes predominate in the West. Altered sediment loading from agricultural activities and exotic species are dominant problems for both eastern mussels and fishes. However, eastern fishes also appear to be suffering from municipal nonpoint pollution (nutrients and sediments), whereas eastern mussels appear to be more severely affected by altered nutrient impacts from hydroelectric impoundments and agricultural runoff. Our findings suggest that control of nonpoint source pollution associated with agriculture activities should be a very high priority for agricultural producers and governmental support programs. Additionally, the large number of hydropower dams in the U.S. subject to federal re-licensing in coming years suggests a significant opportunity to restore natural hydrologic regimes in the affected rivers.

1639. **Threats to waterbirds and wetlands: Implications for conservation, inventory and research.**
O'Connell, Mark
Wildfowl 51: 1-15. (2000);
ISSN: 0954-6324
Descriptors: waterbirds (Aves)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Vertebrates/ biodiversity/ conservation implications/ demographic changes/ economic changes/ human activity/ social changes/ wetlands: habitat
Abstract: The world has undergone major social, economic and demographic changes in the last two centuries. Predictions suggest that during the next 100 years, even greater changes will occur and this will put increasing pressure on wetlands and their biodiversity. This paper examines the changes that have occurred, and the nature of threats facing waterbirds and wetlands as a result of human activities. The need for specific areas of research is identified, particularly in relation to detecting and measuring change and the need to provide solution-oriented research to underpin conservation action.

1640. **Tillage and allelopathic aspects of the corn-soybean rotation effect.**
Anderson, I. C. and Cruse, R. M.
In: Allelopathy: Organisms, processes, and applications/ Inderjit; Dakshini, K. M. M.; and Einhellig, F. A.; Series: ACS Symposium Series 582.
Washington, D.C.: American Chemical Society, 1995; pp. 184-192.
ISBN: 0-8412-3061-7
This citation is provided courtesy of CAB International/CABI Publishing.

1641. **Tillage and crop residue management practices for sustainable dryland farming systems.**
Unger, P. W.; Schomberg, H. H.; Dao, T. H.; and Jones, O. R.
Annals of Arid Zone 36 (3): 209-232. (1997);
ISSN: 0570-1791
This citation is provided courtesy of CAB International/CABI Publishing.

1642. **Tillage and fertilizing effects on sandy soils: Review and selected results of long-term experiments at Humboldt-University, Berlin.**
Ellmer F; Peschke H; Kohn W; Chmielewski FM; and Baumecker M
Journal of Plant Nutrition and Soil Science 163 (3): 267-272; 29 ref. (2000)
NAL Call #: 384 Z343A
This citation is provided courtesy of CAB International/CABI Publishing.

1643. **Tillage, mineralization and leaching: Phosphate.**
Addiscott, T. M. and Thomas, D.
Soil and Tillage Research 53 (3/4): 255-273. (2000)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1644. **A total system approach to sustainable pest management.**
Lewis, W. J.; Van Lenteren, J. C.; Phatak, S. C.; and Tumlinson, J. H.
Proceedings of the National Academy of Sciences 94 (23): 12243-12248. (1997);
ISSN: 0027-8424
Descriptors: reviews/ pest control/ crops/ agriculture/ Pest control/ Agricultural & general applied entomology
Abstract: A fundamental shift to a total system approach for crop protection is urgently needed to resolve escalating economic and environmental consequences of combating agricultural pests. Pest management strategies have long been dominated by quests for "silver bullet" products to control pest outbreaks. However, managing undesired variables in ecosystems is similar to that for other systems, including the human body and social orders. Experience in these fields substantiates the fact that therapeutic interventions into any system are effective only for short term relief because these externalities are soon "neutralized" by countermoves within the system. Long term resolutions can be achieved only by restructuring and managing these systems in ways that maximize the array of "built-in" preventive strengths, with therapeutic tactics serving strictly as backups to these natural regulators. To date, we have failed to incorporate this basic principle into the mainstream of pest management science and continue to

regress into a foot race with nature. In this report, we establish why a total system approach is essential as the guiding premise of pest management and provide arguments as to how earlier attempts for change and current mainstream initiatives generally fail to follow this principle. We then draw on emerging knowledge about multitrophic level interactions and other specific findings about management of ecosystems to propose a pivotal redirection of pest management strategies that would honor this principle and, thus, be sustainable. Finally, we discuss the potential immense benefits of such a central shift in pest management philosophy.

1645. **Toward Quantifying Water Pollution Abatement in Response to Installing Buffers on Crop Land.**
Dosskey, M. G.
Environmental Management 28 (5): 577-598. (2001)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: Water pollution control/ Agricultural runoff/ Nonpoint pollution/ Filtration/ Literature Review / Cultivated Lands/ Nonpoint Pollution Sources/ Best Management Practices/ Runoff/ Research Priorities/ Pollution control/ Agricultural pollution/ Buffers/ Environment management/ Pollution monitoring/ Rivers/ Lakes/ Land use/ Erosion control/ Surface water/ Evaluation/ buffer strips/ crop land buffers/ Freshwater pollution/ Water quality control/ Protective measures and control
Abstract: The scientific research literature is reviewed (i) for evidence of how much reduction in nonpoint source pollution can be achieved by installing buffers on crop land, (ii) to summarize important factors that can affect this response, and (iii) to identify remaining major information gaps that limit our ability to make probable estimates. This review is intended to clarify the current scientific foundation of the USDA and similar buffer programs designed in part for water pollution abatement and to highlight important research needs. At this time, research reports are lacking that quantify a change in pollutant amounts (concentration and/or load) in streams or lakes in response to converting portions of cropped land to buffers. Most evidence that such a change should occur is indirect, coming from site-scale studies of individual functions of buffers that act to retain pollutants from runoff: (1) reduce surface runoff from fields, (2) filter surface runoff from fields, (3) filter groundwater runoff from fields, (4) reduce bank erosion, and (5) filter stream water. The term filter is used here to encompass the range of specific processes that act to reduce pollutant amounts in runoff flow.

1646. **Towards a Unified System for Detecting Waterborne Pathogens.**
Straub, T. M. and Chandler, D. P.
Journal of Microbiological Methods 53 (2): 185-197. (2003)
NAL Call #: QR65.J68;
ISSN: 0167-7012.
Notes: Publisher: Elsevier Science B.V.; DOI: 10.1016/S0167-7012(03)00023-X
Descriptors: Pathogens/ Microbiological Studies/ Water Analysis/ Public Health/ Water Sampling/ Water Quality/ Detection/ Samples/ Purification/ Reviews/ Identification of pollutants/ Other water systems
Abstract: Currently, there is no single method to collect, process, and analyze a water sample for all pathogenic microorganisms of interest. Some of the difficulties in developing a universal method include the physical differences between the major pathogen groups (viruses, bacteria, protozoa), efficiently concentrating large volume water samples to detect low target concentrations of certain pathogen groups, removing co-concentrated inhibitors from the sample, and standardizing a culture-independent endpoint detection method. Integrating the disparate technologies into a single, universal, simple method and detection system would represent a significant advance in public health and microbiological water quality analysis. Recent advances in sample collection, on-line sample processing and purification, and DNA microarray technologies may form the basis of a universal method to detect known and emerging waterborne pathogens. This review discusses some of the challenges in developing a universal pathogen detection method, current technology that may be employed to overcome these challenges, and the remaining needs for developing an integrated pathogen detection and monitoring system for source or finished water.

1647. **Towards more rigorous assessment of biodiversity.**
Vanclay, J. K.
In: Assessment of biodiversity for improved forest planning: Proceedings of the Conference on Assessment of Biodiversity for Improved Planning. (Held 7 Oct 1996-11 Oct 1996 at Monte Verita, Switzerland.) Bachmann, P.; Kohl, M.; and Paivinen, R. (eds.)
Dordrecht: Kluwer Academic Publishers; pp. 211-232; 1998.
NAL Call #: SD1.F627-v.51;
ISBN: 0792348729
Descriptors: biodiversity/ assessment/ surveys/ sampling/ forest inventories/ literature reviews/ mathematical models/ habitats/ ecosystems/ indexes
This citation is from AGRICOLA.

1648. **Toxicity and Bioaccumulation of Sediment-Associated Contaminants Using Freshwater Invertebrates: A Review of Methods and Applications.**
Ingersoll, C. G.; Ankley, G. T.; Benoit, D. A.; Brunson, E. L.; Burton, G. A.; Dwyer, F. J.; Hoke, R. A.; Landrum, P. F.; Norberg-King, T. J.; and Winger, P. V.
Environmental Toxicology and Chemistry 14 (11): 1885-1894. (1995)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: reviews/ bioaccumulation/ Hyalella azteca/ Chironomus tentans/ Lumbriculus variegatus/ sediments/ freshwater ecosystems/ contaminants/ toxicity testing/ benthos/ invertebrates/ toxicity/ analytical methods/ bioassays/ pollution effects/ pollution tolerance/ toxicity tests/ water pollution/ sediment pollution/ chironomidae/ Diptera/ Toxicology and health/ Effects of pollution/ Methods and instruments/ Toxicology & resistance
Abstract: This paper reviews recent developments in methods for evaluating the toxicity and bioaccumulation of contaminants associated with freshwater sediments and summarizes example case studies demonstrating the application of these methods. Over the past

decade, research has emphasized development of more specific testing procedures for conducting 10-d toxicity tests with the amphipod Hyalella azteca and the midge Chironomus tentans. Toxicity endpoints measured in these tests are survival for H. azteca and survival and growth for C. tentans. Guidance has also been developed for conducting 28-d bioaccumulation tests with the oligochaete Lumbriculus variegatus, including determination of bioaccumulation kinetics for different compound classes. These methods have been applied to a variety of sediments to address issues ranging from site assessments to bioavailability of organic and inorganic contaminants using field-collected and laboratory-spiked samples. Survival and growth of controls routinely meet or exceed test acceptability criteria. Results of laboratory bioaccumulation studies with L. variegatus have been confirmed with comparisons to residues (PCBs, PAHs, DDT) present from synoptically collected field populations of oligochaetes. Additional method development is currently underway to develop chronic toxicity tests and to provide additional data-confirming responses observed in laboratory sediment tests with natural benthic populations.

1649. **Toxicity of mixtures of pesticides in aquatic systems.**
Deneer, John W
Pest Management Science 56 (6): 516-520. (2000)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: algae (Algae)/ insects (Insecta)/ molluscs (Mollusca)/ Algae/ Animals/ Arthropods/ Insects/ Invertebrates/ Microorganisms/ Mollusks/ Nonvascular Plants/ Plants/ aquatic systems
Abstract: The paper assesses the usefulness of the concept of 'concentration addition' (CA) for describing the joint effect of pesticides on aquatic organisms, based on literature data from 1972 to 1998. For more than 90% of 202 mixtures in 26 studies, CA was found to predict effect concentrations correctly within a factor of two. Although from a theoretical point of view the assumption of CA may be invalid when dealing with mixtures of compounds with dissimilar modes of action, the experimental results have usually been indistinguishable from that predicted by CA. Deviations from CA did occur, but were mostly limited in extent. Upward and downward deviations from CA were of comparable magnitude and frequency, and tended to cancel each other out. The combinations identified as most frequently leading to deviations from CA were those of an organophosphorus ester or a carbamate with either another organophosphorus ester or a synthetic pyrethroid.

1650. **Toxicity of Pesticides to Aquatic Microorganisms: A Review.**
Delorenzo, M. E.; Scott, G. I.; and Ross, P. E.
Environmental Toxicology and Chemistry 20 (1): 84-98. (2001)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: Aquatic microorganisms/ Reviews/ Pesticides/ Herbicides/ Atrazine/ Photosynthesis/ Pollution effects/ Toxicology/ Estuarine organisms/ Bioaccumulation/ Toxicity/ Decomposition/ Estuaries/ Ecosystems/ Microorganisms/ Toxicity/ Pesticides/ Ecology/ Micro organisms/ Aquatic organisms/ Bacteria/ Protozoa/ Toxicity testing/ Environmental impact/ Effects on organisms/ Effects of pollution/ Effects of Pollution/ Toxicology and health
Abstract: Microorganisms contribute significantly to primary production, nutrient cycling, and decomposition in estuarine ecosystems; therefore, detrimental effects of pesticides on microbial species may have subsequent impacts on higher trophic levels. Pesticides may affect estuarine microorganisms via spills, runoff, and drift. Both the structure and the function of microbial communities may be impaired by pesticide toxicity. Pesticides may also be metabolized or bioaccumulated by microorganisms. Mechanisms of toxicity vary, depending on the type of pesticide and the microbial species exposed. Herbicides are generally most toxic to phototrophic microorganisms, exhibiting toxicity by disrupting photosynthesis. Atrazine is the most widely used and most extensively studied herbicide. Toxic effects of organophosphate and organochlorine insecticides on microbial species have also been demonstrated, although their mechanisms of toxicity in such nontarget species remain unclear. There is a great deal of variability in the toxicity of even a single pesticide among microbial species. When attempting to predict the toxicity of pesticides in estuarine ecosystems, effects of pesticide mixtures and interactions with nutrients should be considered. The toxicity of pesticides to aquatic microorganisms, especially bacteria and protozoa, is an area of research requiring further study.

1651. **Toxicology and ecotoxicology of persistent organic microcontaminants in aquatic systems.**
Miniero, R.; Dellatte, E.; and Domenico, A. di
Annali dell'Istituto Superiore di Sanitŕ 38 (2): 131-135. (2002);
ISSN: 0021-2571
This citation is provided courtesy of CAB International/CABI Publishing.

1652. **Trace and toxic metals in wetlands: A review.**
Gambrell, R. P.
Journal of Environmental Quality 23 (5): 883-891. (Sept. 1994-Oct. 1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the symposium, "Wetland Processes and Water Quality," November 3-4, 1992, Minneapolis, MN. Includes references.
Descriptors: wetland soils/ upland soils/ heavy metals/ leaching/ immobilization/ soil ph/ redox reactions/ bioavailability/ plants
Abstract: The mobility and plant availability of many trace and toxic metals in wetland soils is often substantially different from upland soils. Oxidation-reduction (redox) and associated pH changes that occur in soils as a result of flooding or drainage can affect the retention and release of metals by clay minerals, organic matter, iron oxides, and, for coastal wetlands, sulfides. Except where a Hooded soil or sediment becomes strongly acid upon drainage and oxidation, as sometimes occurs, the processes immobilizing metals tend to be complimentary such that large-scale metal releases from contaminated soils and sediments do not occur with changing redox conditions. Metals tend to be retained

more strongly in wetland soils compared with upland soils.
This citation is from AGRICOLA.

1653. **Trace element inputs into soils by anthropogenic activities and implications for human health.**
Senesi, G. S.; Baldassarre, G.; Senesi, N.; and Radina, B.
Chemosphere 39 (2): 343-377. (July 1999)
NAL Call #: TD172.C54;
ISSN: 0045-6535 [CMSHAF].
Notes: Special issue: Matter and energy fluxes in the anthropocentric environment / edited by N. Senesi, J.A. Rice, and T.M. Miano. Paper presented at the XIII International Symposium on Environmental Biogeochemistry held September 21-26, 1997, Monopoli (Bari), Italy. Includes references.
Descriptors: soil pollution/ polluted soils/ trace elements/ air pollution/ air pollutants/ deposition/ fertilizers/ liming materials/ agricultural chemicals/ sewage sludge/ organic amendments/ irrigation water/ toxicity/ man/ literature reviews
This citation is from AGRICOLA.

1654. **Trace-level detection and identification of polar pesticides in surface water: The SAMOS approach.**
Brinkman, U A T; Slobodnik, J; and Vreuls, J J
Trends in Analytical Chemistry 13 (9): 373-381. (1994)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: analytical method/ drinking water/ gas chromatography/ liquid chromatography/ water pollution
© Thomson

1655. **Trace-level determination of pesticides in water by means of liquid and gas chromatography.**
Geerdink, R B; Niessen, W M A; and Brinkman, U A Th
Journal of Chromatography A 970 (1-2): 65-93. (2002)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: pesticide: water pollutant/ pesticide transformation product/ carrot: vegetable/ cauliflower: vegetable/ ground water/ onion: vegetable/ water pollution
Abstract: The trace-level determination of pesticides and their transformation products (TPs) in water by means of liquid and gas chromatography (LC and GC) is reviewed. Special attention is given to the use of (tandem) mass spectrometry for identification and confirmation purposes. The complementarity of LC- and GC-based techniques and the potential of comprehensive GCXGC are discussed, and also the impressive performance of time-of-flight mass spectrometry. It is also indicated that, in the near future, the TPs rather than the parent compounds should receive most attention-with a better understanding of matrix effects and eluent composition on the ionization efficiency of analytes being urgently required. Finally, the merits of using much shorter LC columns, or even no column at all (flow-injection analysis) in target analysis are shown, and a more cost-efficient and sophisticated strategy for monitoring programmes is briefly introduced.
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1656. **Trail Degradation as Influenced by Environmental Factors: A State-of-the-Knowledge Review.**
Leung, Yu-Fai and Marion, J. L.
Journal of Soil and Water Conservation 51 (2): 130-136. (1996)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
Descriptors: drainage patterns/ degradation/ land use/ recreation/ national parks/ soil erosion/ trails/ Erosion and sedimentation
Abstract: Human use and misuse of land has been causing extensive degradation of the very natural resources on which we depend. National parks, wilderness and other protected natural or semi-natural areas (referred to as natural areas hereafter) represent efforts to preserve our natural heritage from further exploitation. Such areas also provide outstanding recreational, research, and educational opportunities. However, resource impacts resulting from overuse and inappropriate management increasingly threaten these protected areas and erode their natural and cultural values. Among the many forms of recreational impact, those associated with trail development and use are often a major concern of natural area managers and visitors. Such impacts impair and degrade the functions that trails serve, including (1) protecting resources by concentrating traffic on a hardened tread, (2) providing recreational opportunities along aesthetically pleasing trail routes, and (3) facilitating recreational use by providing a transportation network. The extensive distribution of trails and their degrading condition in many natural areas can have pervasive environmental effects through alteration of natural drainage patterns, erosion and deposition of soil, introduction of exotic vegetation, and increasing human-wildlife conflicts. Degraded trails also threaten the quality of visitor experiences by making travel difficult or unsafe, or by diminishing visitors' perceptions of naturalness.
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1657. **Transfer of phosphorus from agricultural soils.**
Haygarth PM and Jarvis SC
Advances in Agronomy 66: 195-249. (1999)
NAL Call #: 30-Ad9
This citation is provided courtesy of CAB International/CABI Publishing.

1658. **Transformations of pesticides in the atmosphere: A state of the art.**
Atkinson, Roger; Guicherit, Rob; Hites, Ronald A; Palm, Wolf Ulrich; Seiber, James N; and De, Voogt Pim
Water, Air and Soil Pollution 115 (1-4): 219-243. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: pollutants/ toxins/ alpha hexachlorocyclohexane/ chloropicrin/ cis 1,3 chloropropane/ cycloate/ gamma hexachlorocyclohexane/ hexachlorobenzene/ hydroxide radicals/ methyl bromide/ methyl isothiocyanate/ parathion/ phorate/ phosphine/ trans 1,3 chloropropane/ trifluralin/ EPTC/ 1,2 dibromo 3 chloropropane/ atmospheric lifetimes/ atmospheric removal rates/ chemical reactions/ ecotoxicology/ particle phase/ pesticide transformation/ physical reactions/ reaction rates
Abstract: The current knowledge about transformation rates and products of pesticides in the atmosphere is reviewed. Reactive species and their concentrations in the atmosphere are presented. Reactions of pesticides with these species (including photolysis) in the gas and the particulate phase are evaluated from available experimental data. The potential of estimation methods is discussed. Experimental

techniques for laboratory and outdoor measurements are reviewed. Finally, an estimation is made of uncertainties in atmospheric lifetimes due to chemical or physical reactions. It is concluded that the most important transformation of pesticides in the atmosphere is due to reaction with OH radicals. Very few experimental data for pesticides are available though. The levels of uncertainty in OH radical concentrations are acceptable, however, for a proper estimation of atmospheric removal rates due to reactions with OH radicals of those pesticides for which experimental transformation rates (of homologues) are available.
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1659. **Transgenics, pest management, and the environment.**
Sharma, H. C. and Ortiz, R.
Current Science 79 (4): 421-437. (2000)
NAL Call #: 475 SCI23;
ISSN: 0011-3891
Descriptors: Sustainable development/ Pest control/ Environmental protection/ Bacillus thuringiensis/ Transgenic plants/ Transgenic animals/ Reviews/ Pest resistance/ Bacillus thuringiensis/ Insecta/ Environmental action/ Agricultural & general applied entomology/ General Environmental Engineering
Abstract: Genetic engineering of crop plants to confer resistance to insect pests offers an environmental friendly method of crop protection. Impressive results have been obtained with the expression of Bacillus thuringiensis (Bt) and other toxin genes in several crops. However, both exotic and plant-derived genes have some performance limitations, and there have been some failures in insect control through transgenic crops. The production and deployment of transgenic crops for pest control need to address the issues related to impact of the transgenic crops on the insect pests, ecological cost of resistance development, effects on the nontarget organisms, availability and distribution of the alternate host plants, and the potential for introgression of genes into the wild relatives of crops. There is a need for a more responsible public debate and better presentation of the benefits for a rational deployment of the genetically-transformed plants for sustainable crop production.
© Cambridge Scientific Abstracts (CSA)

1660. **Transport of bacteria from manure and protection of water resources.**
Unc, A. and Goss, M. J.
Applied Soil Ecology 25 (1): 1-18. (2004)
NAL Call #: QH541.5.S6A67;
ISSN: 0929-1393.
Notes: Number of References: 119
Descriptors: Agriculture/ Agronomy/ soil/ manure/ bacterial persistence/ surface chemistry/ escherichia coli/ soil columns/ organic contaminants/ surface properties/ aquifer sediments/ preferential flow/ fecal bacteria/ liquid manure/ porous media/ vadose zone
Abstract: Survival and transport of pathogens from manure in the environment depend on a number of complex phenomena. An important question is how the properties of such a complex environment as the soil-manure medium impact the persistence of bacteria within the vadose zone. First, manure can change the partitioning of precipitation water between infiltration (enhanced by solid manure) and surface runoff (stimulated by liquid manure). Components of manure, such as straw and coarse organic matter, can strain and filter micro-organisms from the transporting water. After infiltrating the soil, the retention of bacteria depends on the physical configuration of soil, the soil chemistry, and the properties of the microbial cells. Transport of bacteria in soils obeys the general laws pertinent to macropore flow and the interaction between particles and surfaces of variable charge. Detailed characterisation of the variable properties within the structured soil profile is a difficult task. Application of manure can result in significant changes in the physical and electrochemical properties of the soils and microbial cells. Such changes can affect the interaction between bacterial cells and soils in several ways: increase filtration, modify the kinetics of the physico-chemical interactions between charged surfaces, and alter the competition for retention sites between suspended soluble and particulate compounds. Survival of faecal bacteria is affected by the physical and chemical conditions existing prior to manure application as well as by conditions imposed by mixing soil and manure. Competitive interaction with native soil bacteria, in the soil-manure mixtures, is an important aspect governing survival of introduced organisms. (C) 2003 Elsevier B.V. All rights reserved.
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1661. **Treatment lagoons for animal agriculture.**
Hamilton, D. W.; Fathepure, B.; Fulhage, C.; Clarkson, W.; and Laiman, J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

1662. **Treatment of acid mine drainage by sulphate-reducing bacteria using permeable reactive barriers: A review from laboratory to full-scale experiments.**
Gibert, O; de, Pablo J; Cortina, J L; and Ayora, C
ReViews in Environmental Science and BioTechnology 1 (4): 327-333. (2002);
ISSN: 1569-1705
Descriptors: sulfate reducing bacteria (Bacteria): biological control agent/ Bacteria/ Eubacteria/ Microorganisms/ acid mine drainage/ permeable reactive barrier
© Thomson

1663. **Treatment of irrigation effluent water to reduce nitrogenous contaminants and plant pathogens.**
MacDonald, James D. and United States Israel Binational Agricultural Research and Development Fund.
Bet Dagan, Israel: BARD; ii, 47 leaves: ill. (1997)
Notes: Final report. Project no. IS-2122-92. Includes bibliographical references (leaves 22-24).
NAL Call #: TD930.T68--1997
Descriptors: Agricultural wastes/ Land treatment of wastewater
This citation is from AGRICOLA.

1664. **Treatment wetlands.**
Kadlec, Robert H. and
Knight, Robert L.
Boca Raton: Lewis Publishers; 893 p.: ill., maps. (1996)
Notes: Includes bibliographical references (p. 839-880) and index.
NAL Call #: TD755.K33--1996;
ISBN: 0873719301 (acid-free paper)
Descriptors: Sewage---Purification---Biological treatment/ Wetlands
This citation is from AGRICOLA.

1665. **Tree Shelters and Weed Control Increase the Survivorship of Riparian Plantings.**
Anon.
Watershed Protection Techniques 1 (1): 26. (1994);
ISSN: 1073-9610
Descriptors: Pennsylvania/ White Clay Creek/ seedlings/ weed control/ reforestation/ revegetation/ riparian vegetation/ monitoring/ reviews/ trees/ Control of water on the surface/ United States
Abstract: The Stroud Water Research Center has recently completed a long-term research project on the best techniques to establish native riparian forest buffers along streams in the Piedmont watersheds of Pennsylvania. Sweeney (1993) indicates that poor survival can be expected for planted seedlings, due to competition from weeds, drought, and animal predation. He stresses that weed control (twice annual mowing or careful application of herbicides) was the major factor influencing survival rates of seedlings.
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1666. **Tree windbreaks and shelter benefits to pasture in temperate grazing systems. [Erratum: 1998, v. 42 (2), p. 211.].**
Bird, P. R.
Agroforestry Systems 41 (1): 35-54. (1998)
NAL Call #: SD387.M8A3;
ISSN: 0167-4366 [AGSYE6].
Notes: Special issue: Windbreaks in support of agricultural production in Australia / edited by R. Prinsley. Includes references.
Descriptors: shelterbelts/ trees/ pastures/ grazing systems/ temperate climate/ forage/ grasses/ livestock/ performance/ growth/ plant competition/ plant height/ species differences/ spatial distribution/ literature reviews
This citation is from AGRICOLA.

1667. **Trees outside forests: Agro, community, and urban forestry.**
Long, A. J. and Nair, P. K. R.
New Forests 17/18 (1/3/1): 145-174. (1999)
NAL Call #: SD409.N48;
ISSN: 0169-4286.
Notes: Special issue: Planted forests: Contributions to the quest for sustainable societies / edited by J. R. Boyle, J. Winjum, K. Kavanagh and E. Jensen. Paper presented at a symposium held June 1995, Portland, Oregon. Includes references.
Descriptors: forest trees/ agroforestry/ forest plantations/ social forestry/ urban forestry/ community forestry/ sustainability/ private forestry/ genotype mixtures/ agricultural research/ subsistence/ land use/ profitability/ species diversity/ shifting cultivation/ home gardens/ literature reviews
Abstract: Planted forests are often considered to consist of tree plantings at a scale large enough to satisfy such objectives as commercial production of timber and fiber, protection of watersheds, and preservation of natural habitats. However, trees are planted also at greatly reduced scales in agroforestry systems or as community woodlots to provide a mixture of products and services to resident households, local communities, and regional cultures. Agroforestry systems represent a major form of small-scale tree planting, where trees are grown in purposeful combinations with agricultural crops and/or livestock in order to take advantage of tree-crop interactions, and thereby enhance crop production, diversify farm out-put, stabilize or improve soils, or ameliorate harsh environmental conditions. Some important examples of these systems in tropical countries include homegardens, alley cropping, improved fallows, intercropped trees for shade and fodder production, and trees planted in hedgerows and along fence lines. Throughout the tropics, there is a large variety of indigenous practices and species mixtures that represent adaptations of these systems to meet localized needs and opportunities. Research and development programs have supported the expansion and refinement of many of these systems during the last 20 years, but substantial constraints on tree planting still exist in the form of land-tenure practices, population pressures that relegate agroforestry practices to degraded lands, subsistence needs that prevent extended periods of tree growth, and insufficient technical information or technology dissemination. Agroforestry systems in temperate, industrialized. countries include combinations of trees, pasture, and livestock; fruit or nut trees interplanted with vegetable or grain crops; windbreaks and shelterbelts; multispecies riparian buffer strips; and forest farming systems for specialty crops. Compared to the tropics, however, temperate-zone systems tend to focus on one or two high-value crops, often involve some level of mechanization, and frequently represent an opportunistic approach to improving the economic profitability of farms rather than meeting subsistence needs. In both tropical and temperate regions, agroforestry systems and community woodlots will be an important component of new sustainable agriculture and environmental protection programs. Although species diversity is an essential feature of all agroforestry systems, community forests generally involve planting only a few species in small woodlots near farms, around villages, along roads, and as riparian buffers. Provincial or state governments and the local populace are often involved in landownership and plantation establishment. Major objectives of these forests are production of fuelwood for local consumption and of other tree products for market; soil stabilization, reclamation, or improvement; and protection of water quality. As with many other planted forests, the number of species widely used in community forests has been relatively small, with the genera Eucalyptus, Pinus, and Acacia providing the bulk of the species. Major issues with these 'planted forests' focus on rights for use of the products, tending responsibilities since trees are established, protection until trees are large enough for their designated use, increasing interest in using "native" species, and greater community involvement in planning and management. Trees planted along streets and waterways, or as woodlots in parks and other public places, represented a major group of planted forests in many urban and periurban landscapes. In addition providing of the same environmental services that agroforests and community forests do, these urban plantings have

unique aesthetic and recreational value. For much of the world's ever-increasing urban population, these may be the only tangible reference points for understanding planted forests. These relatively little-recognized forms of planted forests-planted trees, to be more appropriate--are now receiving much greater attention. There are, however, some serious technical and sociopolitico-institutional constraints to their development as more widely adopted systems in both tropical and temperate regions.
This citation is from AGRICOLA.

1668. **Trends in nutrients.**
Heathwaite AL; Johnes PJ; and Peters NE
Hydrological Processes 10 (2): 263-293; many ref. (1996)
NAL Call #: GB651.H93
This citation is provided courtesy of CAB International/CABI Publishing.

1669. **Trends in tillage practices in relation to sustainable crop production with special reference to temperate climates.**
Cannell, R. Q. and Hawes, J. D.
Soil and Tillage Research 30 (2/4): 245-282. (1994)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1670. **Turbidity, Suspended Sediment, and Water Clarity: A Review.**
Davies-Colley, R. J. and Smith, D. G.
Journal of the American Water Resources Association 37 (5): 1085-1102. (2001)
NAL Call #: GB651.W315;
ISSN: 1093-474X
Descriptors: Water quality (Natural waters)/ Turbidity/ Sediment/ Suspended solids/ Clarity/ Benthos/ Water Quality/ Light Penetration/ Sediments/ Transparency/ Water Quality Standards/ Suspended particulate matter/ Resuspended sediments/ Water Quality/ Water quality control/ Ocean circulation and currents
Abstract: Suspended sediment causes a range of environmental damage, including benthic smothering, irritation of fish gills, and transport of sorbed contaminants. Much of the impact, while sediment remains suspended, is related to its light attenuation, which reduces visual range in water and light availability for photosynthesis. Thus measurement of the optical attributes of suspended matter in many instances is more relevant than measurement of its mass concentration. Nephelometric turbidity, an index of light scattering by suspended particles, has been widely used as a simple, cheap, instrumental surrogate for suspended sediment, that also relates more directly than mass concentration to optical effects of suspended matter. However, turbidity is only a relative measure of scattering (versus arbitrary standards) that has no intrinsic environmental relevance until calibrated to a `proper' scientific quantity. Visual clarity (measured as Secchi or black disc visibility) is a preferred optical quantity with immediate environmental relevance to aesthetics, contact recreation, and fish habitat. Contrary to common perception, visual clarity measurement is not particularly subjective and is more precise than turbidity measurement. Black disc visibility is inter-convertible with beam attenuation, a fundamental optical quantity that can be monitored continuously by beam transmissometry. Visual clarity or beam attenuation should supplant nephelometric turbidity in many water quality applications, including environmental standards.
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1671. **Twenty-five year review of conservation tillage in the Southern U.S.: Perspective from industry.**
Bradley, J. F.
In: Making conservation tillage conventional: Building a future on 25 years of research -- Proceedings of 25th Annual Southern Conservation Tillage Conference for Sustainable Agriculture. (Held 24 Jun 2002-26 Jun 2002 at Auburn, AL.)
Santen, E. van (eds.)
Auburn, AL: Alabama Agricultural Experiment Station, Auburn University; pp. 20-24; 2002.
This citation is provided courtesy of CAB International/CABI Publishing.

1672. **Two-stage system for prioritizing riparian restoration at the stream reach and community scales.**
Harris, Richard and Olson, Craig
Restoration Ecology 5 (4 [supl.]): 34-42. (1997)
NAL Call #: QH541.15.R45R515;
ISSN: 1061-2971
Descriptors: plant (Plantae)/ Plants/ community structure/ geomorphology/ prioritization/ riparian restoration: community scale, stream reach scale/ riparian vegetation/ species composition
Abstract: This paper describes a two-stage system for prioritizing stream reaches and riparian communities along a given river for protection or restoration. The system uses associations between geomorphology and riparian vegetation at stream reach and community scales as a basis for defining reference conditions. First-stage reach classification involves collecting and analyzing data from topographic maps and aerial photographs. These data, along with judgment-based criteria for ranking reaches relative to reference conditions, are used to classify stream reaches as suitable for protection, recommended for mitigation or restoration within existing site-specific regulatory procedures, or requiring further analysis to evaluate community-scale restoration needs. Second-stage field sampling is conducted on the reaches needing further analysis to determine the riparian communities present, the associations between communities and floodplain landforms, and reference community conditions. This stage requires collection of field data on geomorphic conditions, plant species composition, and plant community structure. Cluster analysis or a comparable technique is used to classify plant communities associated with floodplain landforms and identify reference conditions for each landform. Community structure and species composition are compared to reference conditions to define restoration possibilities at the community scale. The combined results from stream reach and community scale analysis provide a strategy for protecting and restoring riparian resources for a whole river. Implementation requires further site-specific information on hydrology, geomorphology, and other factors.
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1673. **Two-toxin strategies for management of insecticidal transgenic crops: Can pyramiding succeed where pesticide mixtures have not?**
Roush, R T
Philosophical Transactions of the Royal Society of London B: Biological Sciences 353 (1376): 1777-1786. (1998)
NAL Call #: 501 L84Pb;
ISSN: 0962-8436
Descriptors: Bt toxin / Bacillus thuringiensis Bt gene (Endospore forming Gram Positives)/ cotton (Malvaceae): fiber crop/ Helicoverpa (Lepidoptera): agricultural pest/ Angiosperms/ Animals/ Arthropods/ Dicots/ Insects/ Invertebrates/ Plants/ Spermatophytes/ Vascular Plants/ insect pest resistance/ transgenic crops
Abstract: Transgenic insect-resistant crops that express toxins from Bacillus thuringiensis (Bt) offer significant advantages to pest management, but are at risk of losing these advantages to the evolution of resistance in the targeted insect pests. All commercially available cultivars of these crops carry only a single Bt gene, and are particularly at risk where the targeted insect pests are not highly sensitive to the Bt toxin used. Under such circumstances, the most prudent method of avoiding resistance is to ensure that a large proportion of the pest population develops on non-transgenic 'refuge' hosts, generally of the crop itself. This has generated recommendations that 20% or more of the cotton and maize in any given area should be nontransgenic. This may be costly in terms of yields and may encourage further reliance on and resistance to pesticides. The use of two or more toxins in the same variety (pyramiding) can reduce the amount of refuge required to delay resistance for an extended period. Cross-resistance among the toxins appears to have been overestimated as a potential risk to the use of pyramids (and pesticide mixtures) because cross-resistance is at least as important when toxicants are used independently. Far more critical is that there should be nearly 100% mortality of susceptible insects on the transgenic crops. The past failures of pesticide mixtures to manage resistance provide important lessons for the most efficacious deployment of multiple toxins in transgenic crops.
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1674. **U.S. soil erosion rates: Myth and reality.**
Trimble, S. W. and Crosson, P.
Science 289 (5477): 248-250. (2000)
NAL Call #: 470 Sci2;
ISSN: 0036-8075
This citation is provided courtesy of CAB International/CABI Publishing.

1675. **Uncertainities in current estimates of emissions of ammonia in the United Kingdom.**
Lee, D. S. and Dollard, G. J.
Environmental Pollution 86 (3): 267-277. (1994)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491 [ENPOEK]
Descriptors: ammonia/ emission/ atmosphere/ animal husbandry/ sources/ pollution/ environmental impact/ vehicles/ fertilizer industry/ vegetation/ degradation/ literature reviews/ UK/ coal combustion/ waste incineration/ human sources
This citation is from AGRICOLA.

1676. **Undamming Rivers: A Review of the Ecological Impacts of Dam Removal.**
Bednarek, A. T.
Environmental Management 27 (6): 803-814. (2001)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: Dams/ Rivers/ Environmental restoration/ River engineering/ Restoration/ Fluvial morphology/ Habitat/ Sediment transport/ Ecosystem resilience/ Environmental impact/ Migratory species / Stream flow rate/ Cost benefit analysis/ Biota/ Regulated Rivers/ Environmental Quality/ Sediment Load/ Streamflow/ Alteration of Flow/ Pisces/ fish passage/ dam removal/ Reclamation/ Protective measures and control/ Environmental action/ Ecological impact of water development
Abstract: Dam removal continues to garner attention as a potential river restoration tool. The increasing possibility of dam removal through the FERC relicensing process, as well as through federal and state agency actions, makes a critical examination of the ecological benefits and costs essential. This paper reviews the possible ecological impacts of dam removal using various case studies. Restoration of an unregulated flow regime has resulted in increased biotic diversity through the enhancement of preferred spawning grounds or other habitat. By returning riverine conditions and sediment transport to formerly impounded areas, riffle/pool sequences, gravel, and cobble have reappeared, along with increases in biotic diversity. Fish passage has been another benefit of dam removal. However, the disappearance of the reservoir may also affect certain publicly desirable fisheries. Short-term ecological impacts of dam removal include an increased sediment load that may cause suffocation and abrasion to various biota and habitats. However, several recorded dam removals have suggested that the increased sediment load caused by removal should be a short-term effect. Preremoval studies for contaminated sediment may be effective at controlling toxic release problems. Although monitoring and dam removal studies are limited, a continued examination of the possible ecological impacts is important for quantifying the resistance and resilience of aquatic ecosystems. Dam removal, although controversial, is an important alternative for river restoration.
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1677. **Understanding farmstead odors: An annotated review.**
Hamilton, D. W. and Arogo, J.
Professional Animal Scientists 15 (4): 203-210. (Dec. 1999)
NAL Call #: SF51.P76;
ISSN: 1080-7446
Descriptors: farmyard manure/ odors/ odor emission/ concentration/ organolepsis/ persistence/ volatile compounds/ organic acids/ organic sulfur compounds/ nitrogenous compounds/ phenols/ alcohols/ aldehydes/ ketones/ characteristics/ sensory evaluation/ literature reviews/ odor intensity
This citation is from AGRICOLA.

1678. **Understanding rangeland biodiversity.**
Blench, R.; Sommer, Florian.; and Overseas Development Institute (London, England
London: Overseas Development Institute; 52 p.: ill.; Series: Working paper (Overseas Development Institute (London, England)) no. 121. (1999)
Notes: "September 1999" "Results of ODI research presented in preliminary form for discussion and critical comment"--Cover. Includes bibliographical references (p. 45-52).

NAL Call #: SF85-.B64-1999;
ISBN: 0850034329
Descriptors: Rangelands/ Biological diversity conservation
This citation is from AGRICOLA.

1679. **Unwanted agricultural pesticides: State disposal programs.**
Centner, Terence J
Journal of Environmental Quality 27 (4): 736-742. (1998)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: pesticides: agrichemical/ environmental quality/ environmental risks/ health risks/ pesticide disposal: state programs
Abstract: Millions of pounds of unwanted pesticides have accumulated in storage barns throughout our country. The potential environmental and health risks posed by this situation have garnered public attention and governmental action. While the possession of unwanted pesticides generally is not illegal, agricultural producers need to follow requisite legal requirements and dispose of pesticides properly to avoid legal infractions. The federal government has published the Universal Waste Rule so that it is easier to dispose of unwanted pesticides through waste pesticide collection programs. Nearly every state has initiated efforts to collect and dispose of accumulated pesticides in a safe manner, but many programs only address a part of the problem. For many states, the lack of implementation of funding or a permanent mechanism for the collection of unwanted pesticides means that pesticides will continue to present risks to our society.
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1680. **The Upper St. Johns River Basin Project: Merging flood control with aquatic ecosystem restoration and preservation.**
Miller, Steven J.; Lee, Mary Ann; and Lowe, Edgar F.
Transactions of the North American Wildlife and Natural Resource Conference 63: 156-170. (1998)
NAL Call #: 412.9 N814;
ISSN: 0078-1355
Descriptors: ecosystem restoration/ flood control/ floodplain management/ water quality/ wetlands/ Upper St. Johns River Basin Project/ Florida/ Conservation
© Thomson

1681. **The USDA Forest Service pesticide spray behavior and application development program: An overview.**
Barry, J. W.
Journal of the American Mosquito Control Association 12 (2, part 2): 342-352. (1996)
NAL Call #: QL536.J686;
ISSN: 8756-971X
This citation is provided courtesy of CAB International/CABI Publishing.

1682. **Use and reuse of saline-sodic waters for irrigation of crops.**
Goyal, S. S.; Sharma, S. K.; and Rains, D. W.
Journal of Crop Production 7 (1/2): 131-162. (2003)
NAL Call #: SB1.J683;
ISSN: 1092-678X
This citation is provided courtesy of CAB International/CABI Publishing.

1683. **The use of animal waste as a crop fertilizer.**
Ap Dewi, I.
In: Pollution in livestock production systems/ Ap, Dewi I.; Axford, R. F. E.; Marai, I. F. M.; and Omed, H. M., 1994; pp. 309-331
This citation is provided courtesy of CAB International/CABI Publishing.

1684. **The use of buffer zones to protect water quality: A review.**
Norris, V.
Water Resources Management 7 (4): 257-272. (1993)
NAL Call #: TC401.W27;
ISSN: 0920-4741 [WRMAEJ]
Descriptors: surface water/ runoff water/ water pollution/ pollution control/ protection/ zoning/ vegetation/ watersheds/ reviews/ Australia/ vegetated buffer zones
Abstract: It is popularly accepted that vegetated buffer zones are effective in removing water pollutants from surface runoff. However, there is a paucity of detailed information about establishing and maintaining buffer zones under different conditions, particularly in large catchments with diverse land uses. This paper reviews information on the application and effectiveness of vegetated buffer zones, and seeks to provide guidelines on their use for water quality control. Investigations into the use of buffer zones are grouped here into three major categories: studies of runoff plots or confined field areas; studies of operational forestry catchments; and studies of agricultural catchments. The degree of effectiveness of buffer zones for water pollution control in all these categories is generally attributed either to physical properties of the buffer zones (such as width, slope, vegetative cover, or soil type) or to the type of pollutant encountered. However, it is clear that although buffer zones have been shown to work well under small scale, experimental conditions, they lack success for water quality control on a broad catchment basis. In this respect, it is important that runoff must enter a buffer zone as shallow, overland flow in order to be slowed or detained, and that excessively channelised runoff will pass through a buffer zone unhindered. Buffer zones positioned close to sources of surface water pollution are therefore more likely to succeed in controlling water quality. It is suggested that although buffer zones are capable of removing pollutants from surface runoff, the proximity of buffer zones to sources of pollution is more important to their effectiveness than has been generally recognised. In view of this, the successful use of buffer zones for water quality control would require that they be comprehensively arranged along streams and around pollution sources in a catchment, and therefore that a large proportion of catchment area be set aside for this purpose. The real value of buffer zones in any situation would rest not only on their ability to control water quality, but on a number of other benefits and costs associated with maintaining large areas of natural vegetation.
This citation is from AGRICOLA.

1685. **Use of constructed wetlands for urban stream restoration: A critical analysis.**
Helfield, James Mark and Diamond, Miriam L
Environmental Management 21 (3): 329-341. (1997)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: Conservation/ Contaminant Input/ Delta Marsh Restoration/ Don River/ Toronto/ Urban Stream Restoration/ Water Quality/ Wetland Processes
Abstract: Investigation of a delta marsh restoration project proposed for the Don River in Toronto, Ontario, underlines several concerns about constructed wetland projects

designed for water quality improvement and aquatic habitat enhancement. The Don is a highly urbanized river that has undergone significant physiographic modifications and continually receives a complex mixture of conventional, metallic, and organic contaminants from multiple point and nonpoint sources. Rather than providing permanent removal of urban contaminants, wetland processes offer a limited capacity for temporary storage of contaminant inputs, and potential reactions may actually produce more toxic and/or bioavailable forms of some chemicals. These processes tend to result in the concentration of watershed contaminants in wetland vegetation and sediments. As the restored marsh would be available for spawning and feeding by aquatic fauna, the potential exists for chemical bioconcentration and biomagnification through the aquatic community. Accordingly, wetland systems are not suited to the dual purposes of water quality improvement and aquatic habitat enhancement. Upstream controls, including source reduction of contaminant inputs, are recommended as essential components of all constructed wetland projects.

1686. **Use of constructed wetlands to process agricultural wastewater.**
Peterson, Hans G
Canadian Journal of Plant Science 78 (2): 199-210. (1998)
NAL Call #: 450-C16;
ISSN: 0008-4220
Descriptors: nitrogen / phosphorus/ agriculture/ constructed wetland usage/ organics
Abstract: Constructed wetlands are emerging as a serious challenge to conventional wastewater treatment because of lower construction and operating costs, less requirement for trained personnel, more flexibility, and lower susceptibility to variations in waste loading rates. Water quality improvements can be achieved by removal of plant nutrients, such as N and P, organics (natural and man-made) as well as inorganic contaminants. Wetland treatment is now advocated by regulatory agencies and has been determined as the technology of choice by municipalities and industries required to meet stringent discharge regulations. These same regulations have not usually been imposed on the agricultural community, but deteriorating water sources will likely change this regulatory anomaly. Use of this technology in treating agricultural wastewater is still in its infancy with few, although rapidly expanding, applications. This paper aims to highlight different aspects of wetland treatment by exploring its use for the treatment of agricultural run-off as well as wastewater from the agri-food industry. It is concluded that natural wetlands will be quite limited in absorbing agricultural wastewater while constructed wetlands can be designed for optimum pollutant removal.

1687. **Use of electronic noses for detection of odour from animal production facilities: A review.**
Nimmermark, S.
Water Science and Technology 44 (9): 33-41. (2001)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223
This citation is provided courtesy of CAB International/CABI Publishing.

1688. **The use of environmental radionuclides as tracers in soil erosion and sedimentation investigations: Recent advances and future developments.**
Zapata, F.
Soil and Tillage Research 69 (1/2): 3-13. (2003)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1689. **Use of herbicide-tolerant crops as a component of an integrated weed management program.**
Knezevic, S. Z. and Cassman, K. G.
Crop Management (March): 0-7. (2003)
This citation is provided courtesy of CAB International/CABI Publishing.

1690. **The use of higher plants as bioindicators.**
Markert, B. A.; Breure, A. M.; and Zechmeister, H. G.
In: Bioindicators and biomonitors: Principles, concepts and applications/ Markert, B. A.; Breure, A. M.; and Zechmeister, H. G., 2003; pp. 423-463.
ISBN: 0-08-044177-7
This citation is provided courtesy of CAB International/CABI Publishing.

1691. **The use of imaging radars for ecological applications: A review.**
Kasischke, E. S.; Melack, J. M.; and Dobson, M. C.
Remote Sensing of Environment 59 (2): 141-156. (1997)
NAL Call #: Q184.R4;
ISSN: 0034-4257
This citation is provided courtesy of CAB International/CABI Publishing.

1692. **Use of innovative tools to increase nitrogen use efficiency and protect environmental quality in crop rotations.**
Delgado, J A; Ristau, R J; Dillon, M A; Duke, H R; Stuebe, A; Follett, R F; Shaffer, M J; Riggenbach, R R; Sparks, R T; Thompson, A; Kawanabe, L M; Kunugi, A; and Thompson, K
Communications in Soil Science and Plant Analysis 32 (7-8): 1321-1354. (2001)
NAL Call #: S590.C63;
ISSN: 0010-3624
Descriptors: chlorophyll: monitoring/ nitrate: nutrient, pollutant, sap concentrations, shallow underground water table removal/ nitrogen: crop use efficiency, leaching, nutrient, pollutant/ nutrients: erosion leaching, pollutants/ grains (Gramineae): deep rooted, small/ winter cover crops (Angiospermae)/ Angiosperms/ Monocots/ Plants/ Spermatophytes/ Vascular Plants/ environmental quality: protection/ fine particles: erosion leaching/ organic matter: erosion leaching/ sandy coarse soils: nutrient leaching susceptibility/ sandy soil cropping systems: nitrogen status, nutrient balancing/ soil quality protection/ wind erosion
Abstract: Cropping systems grown over sandy coarse soils are susceptible to nutrient leaching due to local thunderstorms and irrigation. Additionally, erosion can contribute to removal of nutrients, soil organic matter, and fine particles. Balancing nutrients for these systems while protecting water and soil quality requires best management practices (BMPs). Crop rotations with deeper rooted small grains and winter cover crops reduced potential losses of fine particles, soil organic matter, nitrogen,

and other nutrients due to wind erosion and protected soil and water quality. The cropping system N status can be monitored by assessing chlorophyll, sap NO3--N concentrations and N indexes of the canopy. The Nitrogen Leaching Economic Analysis Package (NLEAP) model simulated residual soil NO3--N and soil water and showed that there is potential to use precision farming to improve NUE. Simulations of the system showed that BMPs increased NUE and that NO3--N can potentially be removed from the shallow underground water table protecting water quality. These results show that with the application of models, and tools to monitor the N status of the above-ground canopy, such as chlorophyl readings, sap NO3--N concentrations, N indices, and other new technologies such as precision farming and remote sensing, nutrient use efficiency in the new millennium will be significantly increased, environmental quality will be conserved, and product quality will be improved at the farm level for the benefit of producers, processors and consumers.

1693. **The use of invertebrate soil fauna in monitoring pollutant effects.**
Cortet, J.; Gomot-de Vauflery, A.; Poinsot-Balaguer, N.; Gomot, L.; Texier, C.; and Cluzeau, D.
European Journal of Soil Biology 35 (3): 115-134. (1999);
ISSN: 1164-5563
This citation is provided courtesy of CAB International/CABI Publishing.

1694. **The use of live biocatalysts for pesticide detoxification.**
Chen, Wilfred and Mulchandani, Ashok
Trends in Biotechnology 16 (2): 71-76. (1998)
NAL Call #: TP248.13.T72;
ISSN: 0167-7799
Descriptors: biocatalysts/ Escherichia coli (Enterobacteriaceae): decomposer, genetically engineered organism/ Bacteria/ Eubacteria/ Microorganisms
Abstract: During the past decade, numerous microorganisms capable of degrading pesticides have been isolated, and detoxification processes based on these live biocatalysts have been developed. Recently, novel detoxification strategies using genetically engineered microorganisms with extended degradative capabilities have been investigated and, in some cases, shown to be more effective. One promising approach for the detoxification of organophosphate pesticides uses genetically engineered Escherichia coli with surface-expressed organophosphorus hydrolase. Continuous efforts in this direction are required, in conjunction with a search for microorganisms capable of degrading pesticides rapidly, to establish efficient and cost-effective large-scale processes for pesticide detoxification.

1695. **The Use of Macrophyte-Based Systems for Phosphorus Removal: An Overview of 25 Years of Research and Operational Results in Florida.**
Debusk, T. A.; Dierberg, F. E.; and Reddy, K. R.
Water Science and Technology 44 (11-12): 39-46. (2001)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: 7. International Conference on Wetland Systems for Water Pollution Control 2000, Lake Buena Vista, FL [USA], 11-16 Nov 2000; Source: Wetland Systems for Water Pollution Control 2000; Editors: Kadlec, R. H. //Reddy, K. R.;
ISBN: 1843394073
Descriptors: United States, Florida/ Water Pollution Control/ Wetlands/ Performance Evaluation/ Phosphorus Removal/ Macrophytes/ Case Studies/ Reviews/ Case study/ Agricultural runoff/ Wastewater treatment/ Historical account/ United States, Florida/ Water quality control/ Water Treatment/ Freshwater pollution/ Water Pollution: Monitoring, Control & Remediation/ Wastewater treatment processes
Abstract: Phosphorus (P) removal from wastewaters and surface runoff using macrophyte-based systems (MBS) has been a topic of great interest in Florida for over 25 years. During this period, P removal by both treatment wetlands and floating aquatic macrophyte systems has been evaluated from both a research and operational standpoint. Several factors have contributed to the increased focus on the use of MBS for P removal. First, there exist no conventional technologies that can cost-effectively achieve the low outflow P concentrations required to protect the integrity of Florida's relatively pristine surface waters. Second, because MBSs typically provide some water storage, they can accommodate the wide ranges of flows typical for runoff sources such as agricultural drainage waters. Finally, many regions in Florida have sufficient area for deployment of the relatively land-intensive MBS technologies. The first P removal work in Florida was initiated in the mid-1970s, and involved pilot-scale research on domestic wastewater treatment by natural wetlands. Parallel studies were performed with managed (periodically harvested) floating plant systems (i.e., Eichhornia crassipes) for tertiary treatment. Since that time. the range of operational systems that have been deployed include emergent macrophyte-based and forested wetlands, managed floating plant systems, and submerged macrophyte-based systems. Waters treated by MBS include domestic effluents, agricultural runoff and eutrophic lake waters. Phosphorus removal targets for MBS in Florida have been as low as 10 mu g/L. In this paper, we summarize research and operational results for MBS in Florida over the past 25 years.

1696. **The use of macrophytes in bioremediation.**
Wood, B. and McAtamney, C.
Biotechnology Advances 12 (4): 653-662. (1994)
NAL Call #: TP248.2.B562;
ISSN: 0734-9750 [BIADDD].
Notes: Special issue: Biotechnology and industry: Present and future / edited by C.R. Barnett, J.S.G. Dooley, A.P. McHale, and P.G. McKenna. Includes references.
Descriptors: waste water treatment/ bioremediation/ wetlands/ reviews/ reed bed systems/ constructed wetlands
This citation is from AGRICOLA.

1697. **Use of nuclear techniques in soil erosion and siltation studies: IAEA activities.**
Zapata, F.; Garcia Agudo, E.; Hera, C.; Rozanski, K.; and Frohlich, K.
In: Nuclear techniques in soil-plant studies for sustainable agriculture and environment preservation: Proceedings of a conference. (Held 17 Oct 1994-21 Oct 1994 at Vienna, Austria.)
Vienna: International Atomic Energy Agency (IAEA); pp. 631-642; 1995.
ISBN: 92-0-100895-3
This citation is provided courtesy of CAB International/CABI Publishing.

1698. **Use of prescribed fire for vegetation management.**
Feller, M. C.
In: Integrated forest vegetation management: Options and applications -- Proceedings of the fifth British Columbia Forest Vegetation Management Workshop. (Held 29 Nov 1993-30 Nov 1993 at Richmond, British Columbia, Canada.) Gomeau, P. G.; Harper, G. J.; Blanche, M. E.; Boateng, J. O.; and Gilkeson, L. A. (eds.); pp. 17-34; 1996.
Notes: FRDA report 251;
ISSN: 0835-0752
NAL Call #: SD14.B7F7
Descriptors: forest management/ vegetation management/ prescribed burning/ silviculture/ ecosystems/ fire effects/ fire ecology/ plant morphology/ forest ecology/ site preparation/ fuel appraisals / plant succession/ seed banks/ pioneer species/ phenology/ seasonal variation/ literature reviews/ British Columbia
This citation is from AGRICOLA.

1699. **Use of spent mushroom substrate for growing containerized woody ornamentals: An overview.**
Chong, C. and Rinker, D. L.
Compost Science and Utilization 2 (3): 45-53. (Summer 1994)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X.
Notes: Paper presented at the symposium, "Spent Mushroom Substrate, March 11-14, 1994, Philadelphia, Pennsylvania. Includes references.
Descriptors: ornamental woody plants/ container grown plants/ growth/ growing media/ salinity/ physicochemical properties/ leaves/ nutrient content/ waste utilization
This citation is from AGRICOLA.

1700. **USEPA biomonitoring and bioindicator concepts needed to evaluate the biological integrity of aquatic systems.**
Lazorchak, J. M.; Hill, B. H.; Brown, B. S.; McCormick, F. H.; Engle, V. D.; Lattier, D. J.; Bagley, M. J.; Griffith, M. B.; Maciorowski, A. F.; and Toth, G. P.
In: Bioindicators and biomonitors: Principles, concepts and applications/ Markert, B. A.; Breure, A. M.; and Zechmeister, H. G., 2003; pp. 831-874.
ISBN: 0-08-044177-7
This citation is provided courtesy of CAB International/CABI Publishing.

1701. **Users guide to description, propagation and establishment of native shrubs and trees for riparian areas in the intermountain West.**
Ogle, Daniel G.; Hoag, J. Chris.; Scianna, Joseph D.; and United States. Natural Resources Conservation Service. Plant Materials Program (U.S.).
Boise, Idaho; Bozeman, Mont.: USDA, Natural Resources Conservation Service; Series: Technical note (United States. Natural Resources Conservation Service) no. 32. (2000)
Notes: Title from web page. "February, 2000" "Plant Materials Program." Description based on content viewed Oct. 28, 2002. Includes bibliographical references.
NAL Call #: aS627.A35-O56-2000
http://plant-materials.nrcs.usda.gov/pubs/idpmctn320200.pdf
Descriptors: Trees---West---United States---Identification/ Riparian ecology---West---United States/ Revegetation---West---United States/ Soil conservation---West---United States/ Bioengineering---West---United States/ Erosion---West---United States
This citation is from AGRICOLA.

1702. **Using a drum composter to produce compost from cattle manure.**
Malkki S; Klemola E; and Szmidt RAK
Acta Horticulturae 469: 139-148. (1998).
Notes: Conference: Proceedings of the international symposium on composting and use of composted materials for horticulture, Auchincruive, Ayr, UK, 5-11 April 1997
This citation is provided courtesy of CAB International/CABI Publishing.

1703. **Using aerial photographs to assess proper functioning condition of riparian-wetland areas: Riparian area management.**
Prichard, Donald E.; United States. Bureau of Land Management. PFC Aerial Photo Interpretation Team; and National Applied Resource Sciences Center (U.S.).
Denver, CO: U.S. Dept. of the Interior, Bureau of Land Management, National Applied Resource Sciences Center; iii, 41 p.: col. ill., col. maps; Series: Technical reference (United States. Bureau of Land Management) 1737-12. (1996)
Notes: Shipping list no.: 97-0077-P. "September 1996"--Report documentation p. "BLM/RS/ST-96/007+1737"--P. [2] of cover. Includes bibliographical references (p. 19). SUDOCS: I 53.35:1737-12.
NAL Call #: QH541.5.R52U85--1996
Descriptors: Riparian areas---United States---Management/ Wetland conservation---United States/ Aerial photography in watershed management---United States
This citation is from AGRICOLA.

1704. **Using algae to assess environmental conditions in wetlands.**
Stevenson, R. Jan.; McCormick, Paul V.; Frydenborg, Russ.; United States. Environmental Protection Agency. Office of Water; United States. Environmental Protection Agency. Office Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Original title: Using algae to assess environmental conditions in wetlands (#11); Title from web page. "March 2002." "Prepared jointly by U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)" "EPA-822-R-02-021." Description based on content viewed April 14, 2003. Includes bibliographical references.

NAL Call #: QH541.15.I5-S74-2002
http://www.epa.gov/waterscience/criteria/wetlands/11Algae.pdf
Descriptors: Indicators---Biology---United States/ Environmental indicators---United States---Mathematical models/ Algae---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

1705. **Using amphibians in bioassessment of wetlands.**
Sparling, Donald W.; United States. Environmental Protection Agency. Office of Water.; United States. Environmental Protection Agency. Health and Ecological Criteria Division.; and United States. Environmental Protection Agency. Wetlands Division.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Using amphibians in bioassessment of wetlands. (#12).Title from web page. "March 2002." "Prepared jointly by the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)" "EPA-822-R-02-022." Description based on content viewed March 31, 2003. Includes bibliographical references.
NAL Call #: QH541.15.I5-M472-2002
http://www.epa.gov/waterscience/criteria/wetlands/12Amphibians.pdf
Descriptors: Wetlands management---United States/ Indicators---Biology---United States/ Environmental indicators---United States/ Monitoring, Biological---United States/ Amphibians---United States
This citation is from AGRICOLA.

1706. **Using chorioallantoic membranes for non-lethal assessment of persistent organic pollutant exposure and effect in oviparous wildlife.**
Cobb, G. P.; Bargar, T. A.; Pepper, C. B.; Norman, D. M.; Houlis, P. D.; and Anderson, T. A.
Ecotoxicology 12 (1): 31-45. (2003)
NAL Call #: RA565.A1 E27;
ISSN: 0963-9292
This citation is provided courtesy of CAB International/CABI Publishing.

1707. **Using cover crops to manage arthropod pests of orchards: A review.**
Bugg, R. L. and Waddington, C.
Agriculture, Ecosystems and Environment 50 (1): 11-28. (1994)
NAL Call #: S601 .A34;
ISSN: 0167-8809.
Notes: Conference: 19. International Congress of Entomology, Beijing (People's Rep. China), 28 Jun-4 Jul 1992
Descriptors: orchards / biological control/ cover crops/ Agricultural & general applied entomology/ Control
Abstract: A review of entomological studies of cover crops for tree nuts, pome fruits, stone fruits, and citrus suggests both opportunities and challenges. Various cover crops harbor distinctive complexes of beneficial and pest arthropods, and diverse trophic relationships have been well documented in the literature. More study is required to determine: (1) whether cover cropping modifies orchard microclimate and target crop nutritional status and thereby influences pest dynamics; (2) whether and how cover crop species composition, spatial interspersion of species, and management by irrigation, mowing, and tillage affect build-up and movement of arthropods, and resultant pest damage to the target crop.
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1708. **Using ecological relationships of wildlife as templates for restoring Southwestern forests.**
Reynolds, R. T.; Block, W. M.; and Boyce, D. A.
In: Conference on Adaptive Ecosystem Restoration and Management restoration of cordilleran conifer landscapes of North America. (Held 6 Jun 1996-8 Jun 1996 at Flagstaff, Arizona.)
Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 35-43; 1996.
NAL Call #: aSD11.A42-no.278
Descriptors: pinus ponderosa/ wildlife/ ecosystems/ strix occidentalis/ accipiter gentilis/ endangered species/ wildlife conservation/ habitats/ predator prey relationships/ food chains/ forests/ botanical composition/ plant communities/ chains/ sustainability/ forest management/ literature reviews/ Southwestern states of United States
This citation is from AGRICOLA.

1709. **Using geochemical and statistical tools to identify irrigated areas that might contain high selenium concentrations in surface water: Irriation drainage in the western United States creates unforseen environmental problems.**
Naftz, David L. and Geological Survey (U.S.).
Washington, DC: U.S. Dept. of the Interior, National Irrigation Water Quality Program, U.S. Geological Survey; Series: Fact sheet (Geological Survey (U.S.)) FS-96-077. (1997)
Notes: Caption title. "August 1996." Includes bibliographical references.
NAL Call #: S618.6.S4N34-1997
http://water.usgs.gov/pubs/FS/FS-077-96/
Descriptors: Selenium---Environmental aspects---West---United States/ Irrigation water---Pollution---West---United States
This citation is from AGRICOLA.

1710. **Using nutrient uptake patterns to develop efficient nitrogen management strategies for vegetables.**
Sanchez, C. A. and Doerge, T. A.
HortTechnology 9 (4): 601-606. (Oct. 1999-Dec. 1999)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198.
Notes: Proceedings of the workshop on Patterns and physiology of nutrient use in horticultural crops: Implications for fertilizer efficiency held July 11-16, 1998, Charlotte, North Carolina. Includes references.
Descriptors: vegetables/ crops/ nitrogen/ crop management/ nutrient uptake/ soil fertility/ leaching/ denitrification/ losses from soil/ nitrogen content/ nutrient requirements/ split dressings/ sidedressing/ controlled release/ fertigation/ irrigation/ literature reviews
Abstract: Nitrogen (N) in a soil that is not immediately taken up by a crop is subject to leaching, denitrification and other mechanisms of loss. Nitrogen uptake studies identify the total amount of N accumulated by the crop and the period of peak demand. This information can be used to devise management strategies aimed at

supplying N preceding anticipated uptake. Split sidedress application, fertigation, and use of controlled release fertilizers (CRN) are all viable options for N management, depending on the crop production scenario and available infrastructure. Soil and plant tissue testing can be useful feedback tools for adjusting N applications for soil contributions of N and unexpected N losses. Efficient irrigation is of paramount importance in achieving efficient N fertilization regardless of management practice.
This citation is from AGRICOLA.

1711. **Using remote photography in wildlife ecology: A review.**
Cutler, T. L. and Swann, D. E.
Wildlife Society Bulletin 27 (3): 571-581. (1999)
NAL Call #: SK357.A1W5;
ISSN: 0091-7648
This citation is provided courtesy of CAB International/CABI Publishing.

1712. **Using the past to predict the future: Lake sediments and the modelling of limnological disturbance.**
Anderson, N John
Ecological Modelling 78 (1-2): 149-172. (1995)
NAL Call #: QH541.15.M3E25;
ISSN: 0304-3800
Descriptors: history/ mathematical modelling/ simulation/ water quality
Abstract: Most lakes have been disturbed to varying degrees but for an individual lake the timescale of these disturbances is rarely known. Lake sediments, however, can be used as natural archives of perturbation histories, e.g. acidification and eutrophication. At present the use of simple weighted averaging models permits the reconstruction of a variety of water chemical variables from diatom and other microfossils preserved in lake sediments (pH, total phosphorus, salinity and lakewater temperature). Sediment records can, therefore, provide lake-specific background data for lake management as well as information about their ecological histories. The common models used in paleolimnology (dating, transfer-functions) are reviewed and their role in environmental monitoring discussed. Predictions of future lake water quality following lake restoration methods tend to be made from dynamic mathematical models, but they are also used for hindcasting (e.g. the MAGIC model of catchment acidification). A problem with using dynamic models is that they are often site-specific and require calibration for a given lake. Combined with reliable dating, chemical reconstructions from microfossil-based transfer functions offer the possibility of testing hindcast predictions derived from dynamic mathematical models, e.g. for salinity, TP and pH. In this way, sediment microfossil-based models can assist with the parameterization of more complex, dynamic models of contemporary processes. In this review, comparisons between the two approaches (sediment-based and dynamic models) are given and possible future interactions outlined. Validation of mathematical models by palaeolimnological data might enhance their predictive ability when used for forecasting take recovery. There is clearly, however, a need for a more rigorous approach to paleolimnology, i.e. critical hypothesis generation. Multidisciplinary studies of lake disturbance. that combine paleolimnology, dynamic modelling and contemporary process studies, would also be beneficial.
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1713. **Using vegetation to assess environmental conditions in wetlands.**
Fennessy, Slobhan.; United States. Environmental Protection Agency. Health and Ecological Criteria Division; United States. Environmental Protection Agency. Wetlands Division; and United States. Environmental Protection Agency. Office of Water.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Original title: Using vegetation to assess environmental conditions in wetlands (#10); Title from web page. "March 2002." Major contributors: Slobhan Fennessy and others. "Prepared jointly by the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)" "EPA-822-R-02-020." Description based on content viewed March 31, 2003. Includes bibliographical references.
NAL Call #: QH541.15.I5-M473-2002
http://www.epa.gov/waterscience/criteria/wetlands/10Vegetation.pdf
Descriptors: Plant indicators---United States/ Indicators---Biology---United States/ Wetland management---United States/ Environmental monitoring---United States
This citation is from AGRICOLA.

1714. **Using water of marginal quality for crop production: Major issues.**
Shalhevet, Joseph
Agricultural Water Management 25 (3): 233-269. (1994)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: plant (Plantae Unspecified)/ Angiospermae (Angiospermae)/ angiosperms/ plants/ spermatophytes/ vascular plants/ agriculture/ drainage/ fertilizer/ hydraulic conductivity/ irrigation/ soil salinity/ yield
Abstract: A considerable amount of data is available regarding the effect of soil salinity on crop yield. Most of the data was obtained under uniform spatial and temporal distribution of salts, at high levels of fertility and with crop established prior to the introduction of saline conditions. In practice, under realistic field conditions, uniformity is the exception rather than the rule, soil fertility may not be optimal and salinity may be present before the crop is established. In addition, crops may have different sensitivities at different stages of growth. This review attempts to answer the principal questions which are relevant to the use of marginal quality water for irrigation. Duration of exposure and stage of growth: plants are more sensitive during the seedling stage than during later stages of growth. But the preponderant temporal effect of salinity is the duration of exposure. Spatial distribution: the best estimate of the effective salinity when salt is non-uniformly distributed with depth is the mean salinity within the root zone. Under some conditions normalization on the water uptake basis is superior. Soil fertility: the level of soil fertility has no effect on the tolerance of crops to salinity. Varietal differences: differences in salt tolerance among varieties exist mainly in fruit trees, which are specifically sensitive to chloride and sodium salts. Differences among field and garden crops are not common and are usually small. Irrigation requirement: crop water

production functions relating yield to evapotranspiration are not influenced by water salinity. It is still controversial whether reduction in water uptake with increasing salinity is the cause or the result of reduction in growth. Leaching requirement: leaching is the key to the successful use of saline water for irrigation. Under normal field conditions with free drainage the leaching provided by the normal inefficiencies in irrigation should be sufficient to control salinity. When leaching is necessary, it should be provided at the time when the soil salinity reaches hazardous levels. Irrigation frequency: the bulk of the evidence shows no advantage to increasing irrigation frequency when saline water is used, except possibly under excessive leaching. Fertilizer application: the response to nitrogen and potassium fertilization under non-saline conditions is the same as or even greater than under saline conditions. Excessive phosphorous application may be toxic at high salinity, especially in hydroponic conditions. Availability of more than one water source: blending of saline with non-saline water is a questionable practice. It is preferable to use the non-saline water source early in the growing season and the source of saline water successively. Irrigation method: drip irrigation, where feasible, gives the greatest advantages when saline water is used. Sprinkler irrigation may cause leaf burn on sensitive crops. The damage may be reduced by night irrigation and by irrigating continually rather than intermittently. Drainage: the critical depth to the water table is determined mainly by the aeration requirement of the crop, as long as a net downward flux of water is maintained by natural or properly designed man made drainage system. The design drainage coefficient is determined by the leaching requirement. Soil hydraulic conductivity (K) and drainable porosity: important parameters in drainage design, are strongly influenced by the composition and concentration of the irrigation water. The higher the sodium adsorption ratio (SAR), the greater the reduction in K. The detrimental effect of high SAR is mitigated as the total salt concentration increases.

1715. **Using winter cover crops to improve soil and water quality.**
Dabney, S. M.; Delgado, J. A.; and Reeves, D. W.
Communications in Soil Science and Plant Analysis 32 (7/8): 1221-1250. (2001)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Special issue: Potential use of innovative nutrient management alternatives to increase nutrient use efficiency, reduce losses, and protect soil and water quality/edited by J. Delgado. Proceedings of the Annual Conference of the Soil and Water Conservation Society held Aug. 8-11, 1999, Biloxi, Mississippi. Includes references.
Descriptors: cover crops/ secale cereale/ triticum aestivum/ winter/ erosion control/ water erosion/ nutrients/ losses from soil/ water quality/ pesticide residues/ water pollution/ pollution control/ soil fertility/ soil properties/ crop production/ daucus carota/ spinacia oleracea/ lactuca sativa/ solanum tuberosum/ literature reviews/ Colorado
Abstract: This article reviews literature about the impacts of cover crops in cropping systems that affect soil and water quality and presents limited new information to help fill knowledge gaps. Cover crops grow during periods when the soil might otherwise be fallow. While actively growing, cover crops increase solar energy harvest and carbon flux into the soil, providing food for soil macro and microorganisms, while simultaneously increasing evapotranspiration from the soil. Cover crops reduce sediment production from cropland by intercepting the kinetic energy of rainfall and by reducing the amount and velocity of runoff. Cover crops increase soil quality by improving biological, chemical and physical properties including: organic carbon content, cation exchange capacity, aggregate stability, and water infiltrability. Legume cover crops contribute a nitrogen (N) to subsequent crops. Other cover crops, especially grasses and brassicas, are better at scavenging residual N before it can leach. Because growth of these scavenging cover crops is usually N limited, growing grass/legume mixtures often increases total carbon inputs without sacrificing N scavenging efficiency. Cover crops are best adapted to warm areas with abundant precipitation. Water use by cover crops can adversely impact yields of subsequent dryland crops in semiarid areas. Similarly, cooler soil temperatures under cover crop residues can retard early growth of subsequent crops grown near the cold end of their range of adaptation. Development of systems that reduce the costs of cover crop establishment and overcome subsequent crop establishment problems will increase cover crop utilization and improve soil and water quality.
This citation is from AGRICOLA.

1716. **The utility of movement corridors in forested landscapes.**
Niemela, J.
Scandinavian Journal of Forest Research (suppl.3): 70-78. (2001)
NAL Call #: SD1.S34;
ISSN: 0282-7581.
Notes: Special issue: Science and the management of boreal forest biodiversity / edited by S. Larsson and K. Danell. Paper presented at a workshop held September 27-30, 1999, Olofsfors, Sweden. Includes references.
Descriptors: forests/ landscape/ habitats/ survival/ populations/ persistence/ forest management/ nature reserves/ fragmentation/ literature reviews
This citation is from AGRICOLA.

1717. **Utilization of resistant cultivars as components of Integrated Crop Protection.**
Hartleb, H.; Heitefuss, R.; and Hoppe, H. H.
In: Resistance of crop plants against fungi/ Hartleb, H.; Heitefuss, R.; and Hoppe, H. H.
Jena, Germany: G. Fischer, 1997; pp. 449-469.
ISBN: 3437353381
NAL Call #: SB750.R47-1997
Descriptors: plant disease control/ disease resistance/ cultivars/ genetic resistance/ pest management/ decision making/ fungicides/ leaves/ crop yield/ susceptibility/ split dressings/ application date/ virulence/ literature reviews
This citation is from AGRICOLA.

1718. **The value of buffer zones for the conservation of biodiversity.**
Boatman, N. D.
In: Brighton Crop Protection Conference: Pests & Diseases, 1998: Proceedings of an International Conference. (Held 16 Nov 1998-19 Nov 1998 at Brighton, UK.); Vol. 3.

Farnham, UK: British Crop Protection Council; pp. 939-950; 1998.
ISBN: 0-901396-52-5
This citation is provided courtesy of CAB International/CABI Publishing.

1719. **Variable-source-area controls on phosphorus transport: Bridging the gap between research and design.**
Gburek, W. J.; Drungil, C. C.; Srinivasan, M. S.; Needleman, B. A.; and Woodward, D. E.
Journal of Soil and Water Conservation 5 (6): 534-543. (Nov. 2002-Dec. 2002)
NAL Call #: 56.8 J822;
ISSN: 0022-4561 [JSWCA3]
Descriptors: phosphorus/ losses from soil/ indexes/ watersheds / transport processes/ runoff/ runoff water/ water erosion/ universal soil loss equation/ fields/ agricultural soils/ rain/ hydrology/ soil fertility/ Pennsylvania
This citation is from AGRICOLA.

1720. **Vegetated Stream Riparian Zones: Their Effects on Stream Nutrients, Sediments, and Toxic Substances.**
Correll, D.
Smithsonian Environmental Research Center, 1999.
Notes: 8th edition (text/html)
http://www.serc.si.edu/SERC_web_html/pub_ripzone.htm
Descriptors: riparian areas/ water quality/ information sources/ conservation buffers/ filter strips/ floodplains/ vegetation/ ground cover plants/ herbaceous plants/ riparian forests/ grasses/ hydrologic factors/ geomorphology/ water quality criteria/ trace elements / heavy metals/ nitrogen/ nitrites/ nitrates/ ammonia/ phosphorus/ herbicides/ salts/ organic matter/ total suspended solids/ denitrification/ evapotranspiration/ nitrification/ infiltration (hydrology)/ soil water movement/ sediment deposition/ biogeochemical cycles/ TSS
Abstract: SERC produced this annotated and indexed bibliography of the world's literature on buffer strips and their interactions with hyporheic zones and floodplains.

1721. **Vegetation-based indicators of wetland nutrient enrichment.**
Craft, C.; United States. Environmental Protection Agency. Health and Ecological Criteria Division; United States. Environmental Protection Agency. Wetlands Division; and United States. Environmental Protection Agency. Office of Water.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2003.
Notes: [Methods for evaluating wetland condition #16] Title from web page. "March 2002." Prepared jointly by: the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetland Division (Office of Wetlands, Oceans, and Watersheds). "EPA-822-R-02-024." Includes bibliographical references.
NAL Call #: QH76.5.N8-V47-2002
http://www.epa.gov/waterscience/criteria/wetlands/16Indicators.pdf
Descriptors: wetlands / ecology/ land use/ nutrient enrichment/ nutrient enrichment/ vegetation/ environmental management

1722. **Vegetation corridors: A literature review with comments from a Swedish forest perspective.**
Nohlgren, Eva. and Gustafsson, Lena.
Uppla, Sweden: SkogForsk; 40 p.: ill. (1995)
Notes: Includes bibliographical references (p. 34-38).
NAL Call #: SD211.R47--1995-no.1
This citation is from AGRICOLA.

1723. **Vegetation dynamics on rangelands: A critique of the current paradigms.**
Briske, D D; Fuhlendorf, S D; and Smeins, F E
Journal of Applied Ecology 40 (4): 601-614. (2003)
NAL Call #: 410 J828;
ISSN: 0021-8901
Descriptors: ecological thresholds/ equilibrium systems/ methodology/ non equilibrium systems/ paradigm shifts/ range condition/ rangeland ecology/ spatial scales/ temporal scales/ vegetation dynamics: event driven
Abstract: 1. Rangeland ecologists have been debating the validity of two current paradigms for the evaluation of vegetation dynamics on rangelands. This debate frequently contrasts the conventional model of continuous and reversible vegetation dynamics (range model) with a more contemporary model that can accommodate discontinuous and non-reversible vegetation change (state-and-transition model). 2. The range and the state-and-transition models are conceptually related to the equilibrium and non-equilibrium paradigms within ecology, respectively. The methodological dichotomy that has developed between the range and the state-and-transition models has fostered the perception that these two ecological paradigms are mutually exclusive. We challenge this perception and contend that both methodologies and their corresponding paradigms are non-exclusive. 3. Equilibrium and non-equilibrium ecosystems are not distinguished on the basis of unique processes or functions, but rather by the evaluation of system dynamics at various temporal and spatial scales. Consequently, ecosystems may express both equilibrium and non-equilibrium dynamics. This confirms early interpretations that ecosystems are distributed along a continuum from equilibrium to non-equilibrium states. 4. Although both equilibrium and non-equilibrium dynamics occur in numerous ecosystems, the empirical evidence is frequently confounded by (i) uncertainty regarding the appropriate evidence necessary to distinguish between paradigms; (ii) disproportionate responses among vegetation attributes to climate and grazing; (iii) comparisons among systems with varying degrees of managerial involvement; and (iv) the evaluation of vegetation dynamics at various spatial and temporal scales. 5. Synthesis and applications. This critique supports the conclusion that a paradigm shift has not taken place in rangeland ecology, but rather, the debate has forced a more comprehensive interpretation of vegetation dynamics along the entirety of the equilibrium-non-equilibrium continuum. Therefore, the rangeland debate should be redirected from the dichotomy between paradigms to one of paradigm integration.
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1724. **Vegetation growth in rivers: Influences upon sediment and nutrient dynamics.**
Clarke, S. J.
Progress in Physical Geography 26 (2): 159-172. (2002);
ISSN: 0309-1333
Descriptors: Vegetation cover/ Bottom topography/ Hydrology/ Hydrodynamics/ Nutrient cycles/ Sediment dynamics/ Rivers/

Vegetation/ Sediments/ Nutrients/ Geomorphology/ Fluvial Sediments/ River Flow/ Dynamics of lakes and rivers/ Water and plants
Abstract: Hydrological and geomorphological research in river environments has largely ignored the influence of instream vegetation growth; focusing rather on the role of riparian vegetation as a control on bank stability or as a potential buffer for dissolved and particulate material entering the channel from the hillslope. However, in many lowland streams instream vegetation may be abundant and reach high levels of biomass during the growing season. These instream plants (macrophytes) have a significant effect on flow, sediment and nutrient dynamics. Plant growth may cause increased frictional resistance to flow and through flow diversion may have a short- to medium-term influence on instream channel geomorphology. Additionally, this effect of plants upon flow velocities within the channel has an impact on sedimentation patterns. Rooted plants also function as a link between bed sediments and the water column, thus plants have a key role in the cycling of nutrients between these two components of the fluvial system. This, combined with the uptake and temporary storage of nutrients by the plants and the retention of fine sediments within dense plant stands, has the result that plants within rivers are an integral component of nutrient dynamics. A review of research on the role of macrophytes in fluvial system nutrient dynamics is presented and identifies the need for an increased understanding and recognition of the role of plants in the functioning of fluvial systems as a whole.

1725. **Vegetation management and ecosystem disturbance: Impact of glyphosate herbicide on plant and animal diversity in terrestrial systems.**
Sullivan, Thomas P and Sullivan, Druscllia S
Environmental Reviews 11 (1): 37-59. (2003)
NAL Call #: GE140.E59;
ISSN: 1181-8700
Descriptors: glyphosate herbicide: pesticide, soil pollutant, toxin/ Alces alces [moose] (Cervidae): bioindicator/ Capreolus capreolus (Cervidae): bioindicator, deer/ Lepus spp. [hare] (Leporidae): bioindicator/ Odocoileus spp. (Cervidae): bioindicator, deer/ plant (Plantae): bioindicator/ Animals/ Artiodactyls/ Chordates/ Lagomorphs/ Mammals / Nonhuman Mammals/ Nonhuman Vertebrates/ Plants/ Vertebrates/ agro ecosystem/ biodiversity/ crop production/ forest ecosystem/ species richness/ temperate climate/ terrestrial ecosystem/ vegetation management/ weed control

1726. **Vegetation management for the maintenance and conservation of butterfly habitats in temperate human-dominated landscapes.**
Smallidge, P. J. and Leopold, D. J.
Landscape and Urban Planning 38 (3-4): 259-280. (1997)
NAL Call #: QH75.A1L32;
ISSN: 0169-2046.
Notes: Special issue: Wildlife habitats in human dominated landscapes
Descriptors: habitat/ environment management/ conservation/ vegetation/ Ecosystem management/ Natural disturbance/ Ecosystem disturbance/ Land use/ Fragmentation/ Lepidoptera/ Papilionoidea/ Lepidoptera/ Butterflies/ Management/ Human Population Biosphere Interactions/ Populations & general ecology
Abstract: Many temperate butterfly species occur in habitats where human activities have altered the natural or long-term disturbance regime, and current activities modify the structure and availability of butterfly habitats over several spatial and temporal scales. Indeed, human activities modify key ecological processes sufficiently that the maintenance of some butterfly populations depends on human intervention to provide suitable habitat. Combined changes in historic and current disturbance regimes and human land-use practices necessitate active vegetation and habitat management to conserve and expand many butterfly populations. Efforts to protect temperate butterfly habitats often have resulted in successional changes that reduce habitat suitability. Butterfly habitats commonly deteriorate through a reduced intensity and frequency of long-term disturbance or management patterns that result in smaller and fragmented patches of early successional habitat. Fragmentation of otherwise continuous habitats can result in the forced dependence of a metapopulation structure. Because some butterfly larvae require one or a few host plants or adults are selective for nectar or oviposition sites, habitat management plans that include selection of an appropriate site for subsequent vegetation management activities may enhance conservation efforts. Vegetation management activities within an area can be coordinated to provide a mosaic landscape with habitats suitable for numerous species. Recommended vegetation management strategies vary with plant community type, historic disturbance regime, desired vegetation structure and composition, spatial pattern of habitat patches, land ownership patterns, and economic constraints. Because butterflies respond directly and indirectly to vegetation management and to the mosaic nature of habitat patches within the landscape, management plans must accommodate the constraints of the regional landscape and the spatial and temporal dynamics of the prescribed disturbance or management regime. We review efforts to manage temperate plant communities for butterfly habitat, and discuss general strategies for developing a vegetation management program for butterfly habitats in human-dominated landscapes. A case study of Karner blue butterfly habitat conservation efforts is provided.

1727. **Viewpoint: Benefits and impacts of wildlife water developments.**
Rosenstock, S. S.; Ballard, W. B.; and DeVos, J. C. Jr.
Journal of Range Management 52 (4): 302-311. (July 1999)
NAL Call #: 60.18-J82;
ISSN: 0022-409X [JRMGAQ]
Descriptors: game birds/ water resources/ arid lands/ predators/ wildlife management/ ovis canadensis/ odocoileus virginianus/ odocoileus hemionus/ chiroptera/ antilocapra americana/ wild birds/ desert rodents/ lagomorpha/ adverse effects/ reptiles/ water quality/ cost benefit analysis/ duration/ experimental design/ literature reviews/ callipepla/ zenaida
Abstract: Resource managers in the western United States have long assumed that water was a key limiting

factor on wildlife populations in arid habitats. Beginning in the 1940s-1950s, state and federal resource management agencies initiated water development programs intended to benefit game species and other wildlife. At least 5,859 such developments have been built in 11 western states. Most state wildlife management agencies in the western United States have ongoing wildlife water development programs that vary greatly in extent. Ranchers and range managers also have developed water sources for livestock, many of which also are used by wildlife. Recently, critics have suggested that wildlife water developments have not yielded expected benefits, and may negatively impact wildlife by increasing predation, competition, and disease transmission. Based upon a comprehensive review of scientific literature, we conclude that wildlife water developments have likely benefitted many game and non-game species, but not all water development projects have yielded expected increases in animal distribution and abundance. Hypothesized negative impacts of water developments on wildlife are not supported by data and remain largely speculative. However, our understanding of both positive and negative effects of wildlife water developments is incomplete, because of design limitations of previous research. Long-term, experimental studies are needed to address unanswered questions concerning the efficacy and ecological effects of water developments. We also recommend that resource managers apply more rigorous planning criteria to new developments, and expand monitoring efforts associated with water development programs.
This citation is from AGRICOLA.

1728. **Volatile fatty acids as odor indicators of swine manure: A critical review.**
Zhu, J.; Riskowski, G. L.; and Torremorell, M.
Transactions of the ASAE 42 (1): 175-182. (1999)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: pig manure/ volatile fatty acids/ odors/ indicators/ bacteria/ odor abatement/ catabolism
Abstract: Determination of odor indicators in swine manure is critical for many aspects of developing effective odor control techniques. Past research has used volatile fatty acids (VFAs) as an odor indicator; however, using all VFAs can still be misleading. This article presents the available information regarding the mechanisms in microbiology and biochemistry of producing volatile fatty acids in swine manure and an extensive discussion on using VFAs as odor indicators. Long chain and branching VFAs (C4-C9) may represent the offensiveness of malodors in swine manure better than short and straight chain acids and thus should receive further research to correlate them with odor indicators. Two bacterial genera, Eubacterium and Clostridium, appear to be the most likely major contributors to the production of odorous compounds, such as volatile fatty acids, in swine manure. More research is needed to identify the species within these two genera to determine the types and quantities of odorous compounds produced by different species.
This citation is from AGRICOLA.

1729. **A VSA-based strategy for placing conservation buffers in agricultural watersheds.**
Qiu, Z. Y.
Environmental Management 32 (3): 299-311. (2003)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X.
Notes: Number of References: 80; Publisher: Springer-Verlag
Descriptors: Environment/ Ecology/ conservation buffers/ water quality/ landscape planning/ benefit cost analysis/ variable source areas/ source area hydrology/ filter strips/ forested catchments/ runoff generation/ pollution control/ topmodel/ model/ soil/ quality/ drainage
Abstract: Conservation buffers have the potential to reduce agricultural nonpoint source pollution and improve terrestrial wildlife habitat, landscape biodiversity, flood control, recreation, and aesthetics. Conservation buffers, streamside areas and riparian wetlands are being used or have been proposed to control agricultural nonpoint source pollution. This paper proposes an innovative strategy for placing conservation buffers based on the variable source area (VSA) hydrology. VSAs are small, variable but predictable portion of a watershed that regularly contributes to runoff generation. The VSA-based strategy involves the following three steps: first, identifying VSAs in landscapes based on natural characteristics such as hydrology, land use/cover, topography and soils; second, targeting areas within VSAs for conservation buffers; third, refining the size and location of conservation buffers based on other factors such as weather, environmental objectives, available funding and other best management practices. Building conservation buffers in VSAs allows agricultural runoff to more uniformly enter buffers and stay there longer, which increases the buffer's capacity to remove sediments and nutrients. A field-scale example is presented to demonstrate the effectiveness and cost-effectiveness of the within-VSA conservation buffer scenario relative to a typical edge-of-field buffer scenario. The results enhance the understanding of hydrological processes and interactions between agricultural lands and conservation buffers in agricultural landscapes, and provide practical guidance for land resource managers and conservationists who use conservation buffers to improve water quality and amenity values of agricultural landscape.
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1730. **Waste management and utilization in food production and processing.**
Boersma, L. L. and Murarka, I. P.
Ames, IA: Council for Agricultural Science and Technology; Task force report no. 124, 1995. 125 p.
ISBN: 1887383026
Descriptors: waste management/ crop production/ livestock production/ fertilizer application/ crop residues/ recycling/ food processing
This citation is from AGRICOLA.

1731. **Waste management for hog farms: Review.**
Svoboda IF and Jones A
Asian Australasian Journal of Animal Sciences 12 (2): 295-304; 32 ref. (1999)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

1732. **Water analysis: Emerging contaminants and current issues.**
Richardson, S. D.
Analytical Chemistry (Washington) 75 (12): 2831-2857. (2003);
ISSN: 0003-2700
This citation is provided courtesy of CAB International/CABI Publishing.

1733. **Water and nutrient management for greenhouses.**
Cornell Controlled Environment Agriculture Working Group.; Sailus, Martin.; and Weiler, Thomas C.
Ithaca, N.Y.: Northeast Regional Agricultural Engineering Service; 102 p.: ill.; Series: NRAES 56. (1996)
Notes: Includes bibliographical references (p. 100-102).
NAL Call #: S675.C67--1996
Descriptors: Greenhouse plants---Irrigation
Abstract: Preparing stock solutions for proportioners; selecting substrate; interpreting leaf, substrate, and water test results; and estimating crop nutrient needs are necessary skills for managing a greenhouse for zero runoff. This publication will help greenhouse managers learn these skills. The book begins with discussions on general crop needs, balancing nutrient applications with crop demand, and the units used in measuring fertilizer quantities. Subsequent chapters go into more detail about specific components of the root zone: water, fertilizer, substrate, temperature, and the biotic environment. How to use a fertilizer proportioner and the features of a well-designed water and nutrient delivery system are discussed as well.
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1734. **Water Conservation, Competition and Quality in Western Irrigated Agriculture: An Overview of the W-190 Regional Research Project, 1994-99.**
Gopalakrishnan, C.
International Journal of Water Resources Development 16 (2): 177-185. (2000)
NAL Call #: TD201.I56;
ISSN: 0790-0627.
Notes: Special issue: Water and agriculture in the American West; DOI: 10.1080/07900620050003099
Descriptors: Water Conservation/ Irrigation Water/ Agriculture/ Water Supply/ Water Demand/ Water Allocation/ Research Priorities/ Water Resources Management/ United States/ Water supplies/ Water demand/ Water management/ Conservation in agricultural use/ Underground Services and Water Use
Abstract: Irrigated agriculture in the American West has experienced a variety of problems in respect of the supply, demand, allocation and management of water. In an effort to address some of these issues, a regional research project (W-190) entitled `Water Conservation, Competition and Quality in Western Irrigated Agriculture' was set up in 1994, initially for a five-year period. The papers published in this special issue of IJWRD are the upshot of research conducted to meet the three specific objectives of this project. This paper presents an overview and assessment of research carried out under this project, by objective and by state, during its first five-year period.
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1735. **The Water Hyacinth: An Environmental Friend or Pest? A Review.**
Mehra, A.; Farago, M. E.; Banerjee, D. K.; and Cordes, K. B.
Resource and Environmental Biotechnology 4: 255-281. (1999);
ISSN: 1358-2283
Descriptors: Water Hyacinth/ Survival/ Stress/ Water Temperature/ Organic Compounds/ Industrial Wastewater/ Wastewater Treatment/ Reviews/ Planting Management/ Literature reviews/ Freshwater weeds/ Ecosystem management/ Bioaccumulation/ Plant control/ Water pollution treatment/ Biotechnology/ Aquatic plants/ Phytoremediation/ Animal feeds/ Fertilizers/ Biogas/ Evapotranspiration/ Freshwater pollution/ Pest control/ Eichhornia crassipes/ Hydrilla verticillata/ Wastewater treatment processes/ Mechanical and natural changes/ Environmental action/ Control of water on the surface
Abstract: The water hyacinth, a potential environmental resource and also a persistent pest, is reviewed in terms of both its usefulness to clean wastewaters and its detrimental effects on water bodies which need proper management and control. Although there is considerable literature on the bioaccumulation capacity of the plant and its potential for metal removal from wastewaters, its use for the removal of organic contaminants from industrial wastewaters has not received much attention. The ability of the water hyacinth to survive under stress and wide ranging temperature, pH and saline conditions enhances its ability for treating wastewaters. Moreover, the plant can be utilized for animal feed, biofertilizer production, biogas production, paper manufacture and also for integrated rural development. The detrimental effects of the water hyacinth are strongly linked with its capacity to multiply and spread very rapidly as a weed and thus cause problems for navigation in waterways, increase flooding, block water intakes to hydropower plants and irrigation channels, decrease the amount of fresh water in water bodies by evapotranspiration, damage fish habitats and reduce fishing opportunities, and increase sedimentation of lakes and reservoirs. The plant needs to be properly managed by means of physical, biological and chemical control methods to prevent further serious problems.
© Cambridge Scientific Abstracts (CSA)

1736. **Water in food production and processing: Quantity and quality concerns.**
Kirby, R. M.; Bartram, J.; and Carr, R.
Food Control 14 (5): 283-299. (2003);
ISSN: 0956-7135
This citation is provided courtesy of CAB International/CABI Publishing.

1737. **Water in pig nutrition: Physiology, allowances and environmental implications.**
Mroz, Z.; Jongbloed, A. W.; Lenis, N. P.; and Vreman, K.
Nutrition Research Reviews 8: 137-164. (1995)
NAL Call #: QP141.A1N87;
ISSN: 0954-4224 [NREREX]
Descriptors: pigs/ nutritional state/ body water/ water metabolism/ drinking water/ water intake/ water excretion / urine/ feces/ animal physiology/ environmental factors/ diet/ body weight/ nutrient requirements/ circadian rhythm/ piglets/ growth period/ sow pregnancy/ sow lactation/ blood/ manures/ sodium chloride/ literature reviews
This citation is from AGRICOLA.

1738. **Water in the West: The challenge for the next century: Report of the Western Water Policy Review Advisory Commission.**
United States. Western Water Policy Review Advisory Commission.
Denver, Colo.: Western Water Policy Review Advisory Commission; 1 v. (various pagings): ill., maps (some col.). (1998)
Notes: Final report; "June 1998." Shipping list no.: 99-0021-P. Includes bibliographical references.
NAL Call #: HD1695.A17-U54-1998
Descriptors: Water resources development---Government policy---West U.S./ Water---Law and legislation---West U.S./ Water supply---Government policy---West U.S./ Watershed management---Government policy---West U.S./ Water rights---West U.S.
This citation is from AGRICOLA.

1739. **Water management strategies for salinity control.**
Van Schilfgaarde, J.
Tasks for Vegetation Science (28): 371-377. (1993)
NAL Call #: QK1.T37;
ISSN: 0167-9406.
Notes: In the series analytic: Towards the rational use of high salinity tolerant plants. 2. Agriculture and forestry under marginal soil water conditions / edited by H. Lieth and A.A. Al Masoom. Proceedings of the 1st ASWAS Conference held December 8-15, 1990, Al Ain, United Arab Emirates. Literature review. Includes references.
Descriptors: crop production/ irrigation/ irrigation water/ saline water/ brackish water/ salinity/ water management/ arid regions/ literature reviews/ irrigated farming
This citation is from AGRICOLA.

1740. **Water Quality and Agriculture: Status, Conditions, and Trends.**
Sutton, J. D. and U.S. Department of Agriculture, Natural Resources Conservation Service.
U. S. Department of Agriculture [Also available as: Working Paper #16], 1997 (application/pdf)
http://www.nrcs.usda.gov/technical/land/pubs/WP16.pdf
Descriptors: water quality/ water quality analysis/ water quality criteria/ soil quality/ soil erosion/ agrochemicals/ nutrient management/ nonpoint source pollution/ environmental monitoring/ agricultural policy/ governmental programs and projects
Abstract: National opinion surveys reflect the public's concern that sediment from agricultural land, pesticides, and fertilizers from animal wastes and chemical applications may be contributing to surface and ground water pollution. This publication documents the national and regional status of and trends in water quality from the early 1980s to the early 1990s relative to these agricultural substances. It sets the stage for subsequent analysis of projected resource conditions under alternative social, economic, and environmental policies.

1741. **Water quality and poultry production.**
King, A. J.
Poultry Science 75 (7): 852-853. (1996);
ISSN: 0032-5791
This citation is provided courtesy of CAB International/CABI Publishing.

1742. **Water-quality assessment of part of the upper Mississippi River Basin, Minnesota and Wisconsin: Review of selected literature.**
Andrews, William J. and Geological Survey (U.S.).
Mounds View, Minn.: U.S. Dept. of the Interior, U.S. Geological Survey; vi, 21 p.: col. maps; Series: Water-resources investigations report 96-4149. (1996)
Notes: "Contribution from the National Water-Quality Assessment Program." "National Water-Quality Assessment study unit"--Cover. Shipping list no.: 97-0017-P. Includes bibliographical references (p. 10-21). SUDOCS: I 19.42/4:96-4149.
NAL Call #: GB701.W375--no.96-4149
Descriptors: Water quality---Mississippi River---Watershed/ Water quality management---Mississippi River---Watershed/ Groundwater---Mississippi River---Watershed---Quality
This citation is from AGRICOLA.

1743. **Water quality effect of rangeland beef cattle excrement.**
Nader, G.; Tate, K. W.; Atwill, R.; and Bushnell, J.
Rangelands 20 (5): 19-25. (1998)
NAL Call #: SF85.A1R32;
ISSN: 0190-0528
This citation is provided courtesy of CAB International/CABI Publishing.

1744. **Water quality for irrigation and human consumption: A literature review and results from a case study in Eritrea: A minor field study.**
Fox, Patrick.
Uppsala: Swedish University of Agricultural Sciences, International Rural Development Centre; 80, 12, 5 p.: ill., maps; Series: Working paper (Sveriges lantbruksuniversitet. International Rural Development Centre) 252. (1994)
Notes: Includes bibliographical references (p. 77-79).
NAL Call #: HD1401.W675--no.252
This citation is from AGRICOLA.

1745. **Water quality functions of riparian forest buffer systems in the Chesapeake Bay Watershed: A report of the Nutrient Subcommittee of the Chesapeake Bay Program.**
Lowrance, R.; Altier, L. S.; Newbold, J. D.; Schnabel, R. R.; Groffman, P. M.; Denver, J. M.; Correll, D. L.; Gilliam, J. W.; Robinson, J. L.; Brinsfield, R. B.; Staver, K. W.; Lucas, W.; and Todd, A. H.
Annapolis, MD: U.S. Environmental Protection Agency for the Chesapeake Bay Program EPA 903-R-95-004; 67 p. (1995)
NAL Call #: TD225.C43W383 1995
http://www.epa.gov/cgi-bin/claritgw?op-Display&document=clserv:Other:0836;&rank=4&template=epa
Descriptors: Water quality management---Chesapeake Bay Watershed---Md and Va/ Riparian forests---Chesapeake Bay Watershed---Md and Va/ Chesapeake Bay Watershed/ Nonpoint source pollution---Chesapeake Bay Watershed---Md and Va
This citation is from AGRICOLA.

1746. **Water quality impacts of forest fertilization with nitrogen and phosphorus.**
Binkley, Dan; Burnham, Heather; and Allen, H Lee
Forest Ecology and Management 121 (3): 191-213. (1999)
NAL Call #: SD1.F73;
ISSN: 0378-1127
Descriptors: nitrate: pollutant/ nitrogen: fertilizer/ phosphorus: fertilizer/ streamwater quality
Abstract: The drinking-water quality of streamwater in forests is typically very good, exceeding the quality of

water in areas with other types of land use. Streams draining agricultural lands in the United States average about nine times greater concentrations of nitrate and phosphate than streams draining forested areas. Forest fertilization commonly increases nutrient concentrations in streamwater, and large increases could lead to unacceptable degradation of water quality. This review summarizes information from studies of forest fertilization around the world, and evaluates the responses of streamwater chemistry. In general, peak concentrations of nitrate-N in streamwater increase after forest fertilization, with a few studies reporting concentrations as high as 10-25 (mg N)/l as nitrate. Increases in average concentrations of nitrate are much lower than the peak values, and the highest annual average nitrate-N concentration ever reported was 4 (mg N)/l. Relatively high concentrations of streamwater nitrate-N tend to occur with repeated fertilization, use of ammonium nitrate (rather than urea), and fertilization of N-saturated hardwood forests. Ammonium-N concentrations may also show large peaks following fertilization (up to 15 (mg N)/l), but annual averages remain <0.5 (mg N)/l. Fertilization with phosphate can lead to increased peak concentrations of >1 (mg P)/l, but annual averages remain <0.25 (mg P)/l. No evidence has been reported of detectable effects of forest fertilization on the composition or productivity of stream communities, but more detailed studies may be warranted (especially in relation to P fertilization). Major limitations in current knowledge include the effects of repeated fertilization in short-rotation plantations, fertilization of large landscapes rather than small stands, and the effects of fertilization on streamwater chemistry in tropical plantations.

1747. **Water reclamation and reuse.**
Smith, R. G.
Water Environment Research 65 (4): 371-374. (June 1993)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: Literature review. Includes references.
Descriptors: water pollution/ water purification/ waste water treatment/ water reuse/ irrigation water/ United States/ U.S. Environmental Protection Agency (EPA)
This citation is from AGRICOLA.

1748. **Water reclamation and reuse.**
Smith, R. G. and Walker, M. R.
Water Environment Research 66 (4): 378-383. (June 1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: water/ reclamation/ water reuse/ planning/ management/ irrigation water/ drainage water/ literature reviews
This citation is from AGRICOLA.

1749. **Water reclamation and reuse.**
Smith, R. G.
Water Environment Research 67 (4): 488-495. (June 1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: water reuse/ groundwater recharge/ water resources/ waste water/ irrigation/ irrigation water/ literature reviews/ water recycling
This citation is from AGRICOLA.

1750. **Water reclamation and reuse.**
Van Riper, C. and Geselbracht, J.
Water Environment Research 68 (4): 516-520. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: water reuse/ water purification/ reclamation/ irrigation water/ waste water/ literature reviews/ reclaimed water
This citation is from AGRICOLA.

1751. **Water reclamation and reuse.**
Van Riper, C. and Geselbracht, J.
Water Environment Research 70 (4): 586-590. (June 1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: water purification/ water reuse/ waste water/ waste water treatment/ groundwater recharge/ literature reviews/ irrigation water
This citation is from AGRICOLA.

1752. **Water relations of riparian plants from warm desert regions.**
Smith, S. D.; Devitt, D. A.; Sala, A.; Cleverly, J. R.; and Busch, D. E.
Wetlands 18 (4): 687-696. (1998)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
This citation is provided courtesy of CAB International/CABI Publishing.

1753. **Water Repellency in Soils: A Historical Overview.**
Debano, L. F.
Journal of Hydrology 231-232 (1-4): 4-32. (2000)
NAL Call #: 292.8 J82;
ISSN: 0022-1694.
Notes: Special issue: Water repellency in soils
Descriptors: Water Repellent Soils/ Soil Absorption Capacity/ Soil Properties/ Soil Types/ Water Harvesting / Productivity/ Ecosystems/ Water in soils
Abstract: The purpose of this paper is to document some of the more important highlights of the research and historical aspects concerning soil water-repellency. This effort traces the evolution of interests and concerns in water repellency from basic studies in the nineteenth century to the earlier part of the 20th century and up to our current-day understanding of this subject. The interactions among different scientific disciplines, various manager-scientists efforts, and specific scientific and management concerns are presented chronologically. This growing interest in water repellency generated an earlier conference in 1968 which was devoted exclusively to water repellency and has since initiated productive discussions and debate on water repellency during several peripherally related national and international conferences. The 1968 conference held in Riverside, California (USA), mainly involved scientists from the United States and Australia. Since this early conference, a large body of information has been published in a wide range of scientific disciplines throughout the world. This worldwide attention has produced many recent research findings, which have improved the understanding of water-repellent soils, particularly of the dynamics of the water movement and redistribution in these unique systems. Intermingled with the effort in water repellency is a related, although somewhat separate, body of information dealing with soil aggregation and water harvesting, which are important for improving the productivity of fragile and ecosystems. A summary is presented of the literature on water repellency, showing changes in subject areas and national interests over time.

1754. **Water resource investments in irrigated agriculture: A conservation basebook.**
Pavelis, George A.; Anwer, Muhammad Sarfraz.; Colorado State University. Dept. of Sociology. Water Laboratory; United States. Bureau of Reclamation; and United States. Natural Resources Conservation Service. Resource Economics and Social Sciences Division.
Fort Collins, Colo.: Dept. of Sociology Water Laboratory, Colorado State University; viii, 138 p.: col. ill., col. maps. (2002)
Notes: Interim report: Management practice study III: Social and economic sustainability of irrigated family farms in the West.; Research in collaboration with the U.S. Bureau of Reclamation, with support from the Resource Economics and Social Science Division of the Natural Resources Conservation Service, USDA. "December 2002." Includes bibliographical references (p. 106-107).
NAL Call #: TD388-.P38-2002
Descriptors: Water conservation---West---United States/ Irrigated farming---Economic aspects---West---United States
This citation is from AGRICOLA.

1755. **Water-sediment controversy in setting environmental standards for selenium.**
Hamilton, Steven J and Lemly, A Dennis
Ecotoxicology and Environmental Safety 44 (3): 227-235. (1999)
NAL Call #: QH545.A1E29;
ISSN: 0147-6513
Descriptors: selenium: environmental standards, national water quality criterion, pollutant/ environmental contamination
Abstract: A substantial amount of laboratory and field research on selenium effects to biota has been accomplished since the national water quality criterion was published for selenium in 1987. Many articles have documented adverse effects on biota at concentrations below the current chronic criterion of 5 mug/L. This commentary will present information to support a national water quality criterion for selenium of 2 mug/L, based on a wide array of support from federal, state, university, and international sources. Recently, two articles have argued for a sediment-based criterion and presented a model for deriving site-specific criteria. In one example, they calculate a criterion of 31 mug/L for a stream with a low sediment selenium toxicity threshold and low site-specific sediment total organic carbon content, which is substantially higher than the national criterion of 5 mug/L. Their basic premise for proposing a sediment-based method has been critically reviewed and problems in their approach are discussed.
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1756. **Water-use efficiency on irrigation systems: A review of research carried out under DFID's engineering research programme.**
Brown, D.
Agricultural Water Management 40 (1): 139-147. (Mar. 1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774 [AWMADF].
Notes: Annex 1; Special issue: More from less: Improving irrigation water-use efficiency / edited by W. Stephens, T. Hess, R.C. Carter and P. Howsam. Includes references.
Descriptors: water management/ water use efficiency/ irrigation systems/ research support/ research projects/ UK/ department for international development
This citation is from AGRICOLA.

1757. **Waterborne pathogens in agricultural watersheds.**
Rosen, B. H. and Croft, R.
Ithaca, NY: Natural Resource, Agriculture, and Engineering Service; 62 p. (2001); *ISBN:* 0935817689
Descriptors: pathogens/ agricultural watersheds/ monitoring/ Cryptosporidium parvum/ Giardia/ Escherichia coli O157:H7/ Campylobacter/ algal blooms / disease control
Abstract: This publication introduces waterborne pathogens, the disease-causing organisms that contaminate water. Key organisms of concern are described in detail, including Escherichia coli 0157:H7, Cryptosporidium parvum, and Giardia species. Indicator bacteria that are normally monitored for water quality are described as well. Waterborne Pathogens in Agricultural Watersheds represents a proactive approach for reducing overall pathogen loading within a watershed. The viability of organisms in an agricultural setting is discussed, along with relevant management practices for controlling waterborne pathogens at their source. Harmful algal blooms are also addressed, although these organisms do not fall neatly into the category of pathogen. While foodborne pathogens are not specifically described in this publication, the pathogens that are described may contaminate both food and water.
© Natural Resource, Agriculture and Engineering Service (NRAES)

1758. **Watershed abatement costs for agricultural phosphorus.**
Johansson, R. C. and Randall, J.
Water Resources Research 39 (4): NIL_9-NIL_16. (2003)
NAL Call #: 292.8 W295;
ISSN: 0043-1397
Descriptors: Environment/ Ecology/ Civil Engineering/ nonpoint source pollution/ phosphorus/ abatement cost/ pollution abatement/ management/ index/ scale
Abstract: [1] Agricultural, nonpoint pollution has increasingly become the focus of state and federal water quality mitigation efforts. However, this pollution is spatially dispersed and temporally uncertain, making regulatory efforts aimed at its abatement difficult. For these reasons, policymakers have concentrated on reducing the potential of agricultural, nonpoint sources to emit pollutants. Because the majority of the nonpoint pollution originates from a minority of U. S. cropland, these efforts have often been targeted using indices, such as the phosphorus index. This paper develops the concept of a phosphorus index to explicitly include heterogeneous productivity, which is necessary to efficiently target nonpoint pollution efforts. Such targeting can improve cost effectiveness and increase the scope of voluntary conservation programs designed to mitigate agricultural phosphorus pollution.
© Thomson ISI

1759. **Watershed-based management strategies for the prevention and abatement of polluted agricultural runoff.**
Frarey, L. C. and Jones, H. H.
Environmental Monitoring and Assessment 41 (2): 109-124. (June 1996)
NAL Call #: TD194.E5;
ISSN: 0167-6369 [EMASDH].
Notes: Special issue: Environmental quality in watersheds / edited by V.G.G. Mennella and L.C. Frarey. Includes references.

Descriptors: livestock farming/ livestock feeding/ runoff/ water pollution/ pollution control/ watersheds/ watershed management/ agricultural land/ environmental impact/ environmental legislation/ federal government/ state government/ Texas/ Arkansas/ United States/ point source pollution/ concentrated animal feeding operations/ Clean Water Act of 1972/ U.S. Environmental Protection Agency (EPA)/ Texas Institute for Applied Environmental Research
This citation is from AGRICOLA.

1760. **Watershed effects of biosolids land application: Literature review.**
Draeger, Kathryn J.
Alexandria, VA: Water Environment Research Foundation; 1 v. (various pagings): ill., maps. (1999)
Notes: "Project 96-REM-2." "Final report"--Cover. Includes bibliographical references.
NAL Call #: TD774-.W38-1999;
ISBN: 1893664007
Descriptors: Land treatment of wastewater/ Sewage sludge as fertilizer/ Sewage disposal in the ground / Watershed management
This citation is from AGRICOLA.

1761. **Watershed level risk assessment of nitrogen and phosphorus export.**
Wickham, James D and Wade, Timothy G
Computers and Electronics in Agriculture 37 (1-3): 15-24. (2002)
NAL Call #: S494.5.D3C652;
ISSN: 0168-1699
Descriptors: nitrogen: environmental impact, export, nutrient, pollutant, water pollutant/ phosphorus: environmental impact, export, nutrient, pollutant, water pollutant/ land mass cover
Abstract: Land cover composition across a watershed is a principal factor in controlling the amount of nitrogen and phosphorus exported from a watershed. A well developed literature of nutrient export coefficients by land-cover class was used to model the risk of equaling or exceeding specified levels of nutrient export. The model was applied to about 1000 comparatively small watersheds mapped for the state of Maryland for environmental analysis and planning. Risk estimates generally increased from west to east, but numerous areas of high variability were evident. Risk of exceeding specified levels of nitrogen and phosphorus export were nonlinearly related to the amount of forest in the watershed. Risk increased more dramatically for phosphorus and nitrogen when forest dropped below between 90 and 95%, respectively. Bifurcations in this nonlinear relationship were the result of the relative abundance of agriculture and urban land in the watershed. The nonlinear relationship between percentage forest and risk increased more dramatically for phosphorus and less dramatically for nitrogen when urban was relatively more abundant than agriculture. Regional-scale variation in risk is discussed in terms of its relevance to environmental management.
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1762. **Watershed management contributions to land stewardship: A literature review.**
Baker, Malchus B. and Rocky Mountain Research Station
Fort Collins, CO: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station; Series: General technical report RMRS GTR-71-WWW. (2000)
Notes: Title from title screen. "December 2000." Includes bibliographical references.
NAL Call #: aSD144.A14-G46-no.-71
http://www.fs.fed.us/rm/pubs/rmrs_gtr71.pdf
Descriptors: Watershed management---Bibliography
This citation is from AGRICOLA.

1763. **Watershed management for potable water supply: Assessing the New York City strategy.**
National Research Council (U.S.). Committee to Review the New York City Watershed Management Strategy.
Washington, D.C.: National Academy Press; xiii, 549 p.: ill. (2000)
NAL Call #: TD225.N5-W38-2000;
ISBN: 0309067774
http://www.nap.edu/books/0309067774/html/
Descriptors: Water quality management---New York, NY/ Watershed management---New York, NY/ Drinking water---New York, NY/ Water supply---New York, NY/ Phosphorus---Environmental aspects---New York NY
This citation is from AGRICOLA.

1764. **Watershed-scale hydrologic and nonpoint-source pollution models: Review of mathematical bases.**
Borah, D. K. and Bera, M.
Transactions of the ASAE 46 (6): 1553-1566. (2003)
NAL Call #: 290.9 Am32T;
ISSN: 0001-2351.
Notes: Number of References: 87
Descriptors: Agriculture/ Agronomy/ agriculture/ agrochemical/ hydrology/ modeling/ nonpoint source pollution / sediment/ water quality/ watershed/ sediment/ runoff/ transport/ Illinois/ nitrate/ system/ AGNPS model/ flood/ SHE model/ ANSWERS model/ CASC2D model/ DWSM (model)/ KINEROS model/ PRMS model
Abstract: A clear understanding of a model is important for its appropriate use. In this article, eleven watershed scale hydrologic and nonpoint-source pollution models are reviewed: AGNPS, AnnAGNPS, ANSWERS, ANSWERS-Continuous, CASC2D, DWSM, HSPF KINEROS, MIKE SHE, PRMS, and SWAT AnnAGNPS, ANSWERS- Continuous, HSPF, and SWAT are continuous simulation models useful for analyzing long-term effects of hydrological changes and watershed management practices, especially agricultural practices. AGNPS, ANSWERS, DWSM, and KINEROS are single rainfall event models useful for anal wing severe actual or design single-event storms and evaluating watershed management practices, especially structural practices. CASC2D, MIKE SHE, and PRMS have both long-term and single-event simulation capabilities. Mathematical bases, the most important and critical elements of these mathematical models, were identified and compiled. In this article, a comprehensive summary of the compilation is presented in tabular form. The flow-governing equations and their solution methods used in each of the eleven models are discussed. The compilation of the mathematical bases of these models would be useful to determine the problems, situations, or conditions for which the models are most suitable, the accuracies and uncertainties expected, their full potential uses and limitations, and directions for their enhancements or new developments. AGNPS, AnnAGNPS, DWSM, HSPF MIKE SHE, and SWAT were found to have all the three major components (hydrology, sediment, and chemical) applicable to watershed-scale

catchments. SWAT is a promising model for continuous simulations in predominantly agricultural watersheds, and HSPF is promising for mixed agricultural and urban watersheds. Among the single-event models, DWSM provides a balance between the simple but approximate and the computationally intensive models and, therefore, is a promising storm event model for agricultural watersheds.
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1765. **Watershed systems (PL-534): Hydraulic research of the past, present, and future.**
Hanson GJ and Temple DM.
In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)
St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); 10 p.; 1998.
Notes: ASAE Paper no. 982015
NAL Call #: S671.3 .A54
This citation is provided courtesy of CAB International/CABI Publishing.

1766. **Weathering and erosion aspects of small catchment research.**
Bricker, O. P.; Paces, T.; Johnson, C. E.; and Sverdrup, H.
In: Biogeochemistry of small catchments: A tool for environmental research/ Moldan, B. and Cerny, J. Chichester, UK: John Wiley & Sons, 1994; pp. 85-105.
ISBN: 0-471-93723-1
This citation is provided courtesy of CAB International/CABI Publishing.

1767. **Weed management in conservation crop production systems.**
Locke, M. A.; Reddy, K. N.; and Zablotowicz, R. M.
Weed Biology and Management 2 (3): 123-132. (2002);
ISSN: 1444-6162
This citation is provided courtesy of CAB International/CABI Publishing.

1768. **Weed management in conservation tillage systems for wheat production in North and South America.**
Moyer, J R; Roman, E S; Lindwall, C W; and Blackshaw, R E
Crop Protection 13 (4): 243-259. (1994)
NAL Call #: SB599.C8;
ISSN: 0261-2194
Descriptors: triticum aestivum/ conservation tillage/ no-tillage/ minimum tillage/ weeds/ weed control/ herbicides/ chemical control/ cover crops/ continuous cropping/ double cropping/ literature reviews/ North America/ South America/ Angiospermae (Angiospermae)/ Triticum spp. (Gramineae)/ angiosperms/ monocots/ plants/ spermatophytes/ vascular plants/ glyphosate/ annuals/ cropping sequences/ erosion control/ herbicides/ perennials
Abstract: Soil erosion by wind or water is a serious problem in North and South America. When no-till or reduced tillage is used to control erosion, the density of certain annual and perennial weeds can increase and new weed control techniques are usually required, The effects of conservation tillage on annual and perennial weeds, weeds that are spread by wind, plants from rangelands and pasture as weeds and volunteer plants as weeds are reviewed. Current weed control methods with minimum tillage, herbicides, cover crops and other cultural practices in conservation tillage systems in North and South America are described. Some producers are successfully controlling weeds in continuous summer cropping systems in North America and in double cropping systems that include wheat in the winter and soybean or corn in the summer in Brazil, Argentina and southeastern United States. Successful conservation tillage systems usually involve cropping sequences of three or more crop types and several herbicides. In these cropping sequences, the ground is covered with a crop during most of the period in which the climate is favorable for weed growth. Perennial weeds are a problem in all tillage systems and there is a general dependence on glyphosate for perennial weed control. In successful conservation tillage systems, the amount and cost of herbicides used is similar to that for herbicides used in conventional tillage systems.
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1769. **Weed management practices in natural ecosystems: A critical overview.**
Reinhardt, C. F.
Koedoe 1: 67-74. (2000);
ISSN: 0075-6458
Descriptors: Control programs/ Weeds/ Herbicides/ Biological control/ Methodology/ Management
Abstract: Increasing public pressure against the use of pesticides and other agricultural inputs has placed increased emphasis on the development of ecologically based pest management. One distinct reaction of the Weed Science discipline has been the swing away from herbicide research to increased research on the basic biology and ecology of weeds in hopes of reduced reliance on "technological crutches" such as herbicides and other practices that are potentially harmful to the environment. Biological control is the long-standing alternative to the use of herbicides and interest in the former practice has been boosted by the realization that the use of herbicides may lead to the development of herbicide resistance in weed populations, and that herbicide residues occur in surface and groundwater. Supporters of herbicide use would point out that biological control is generally not effective in crop production systems, and is basically slow-acting. Debates between protagonists for the exclusive use of one or the other weed management practice tend to obscure the benefits that integration of different techniques are likely to have. For natural ecosystems it is proposed that integration of the more subtle practice of biological control with the use of herbicides, which relatively quickly overwhelm a biological system with mortality, is likely to be the most effective weed management tool. Different weed management practices that could be considered in natural ecosystems are discussed in terms of three key performance rating criteria, viz. activity, selectivity and persistence In this concise review, general discussion is focussed on the fundamentals of weed management practices, with the view to promote concept-based approaches that are critical for the development of effective weed management strategies.
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1770. **Weed prevention: Priority research for alternative weed management.**
Jordan, N.
Journal of Production Agriculture 9 (4): 485-489. (1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
This citation is provided courtesy of CAB International/CABI Publishing.

1771. **Weed thresholds: Theory and applicability.**
Swanton, C. J.; Weaver, S.; Cowan, P.; Acker, R. van.; Deen, W.; and Shreshta, A.
Journal of Crop Production 2 (1): 9-29. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler. Includes references.
Descriptors: weeds/ weed control/ integrated pest management/ tolerance/ genotype mixtures/ crop weed competition/ growth models/ cropping systems/ guidelines/ plant density/ crop yield/ yield losses/ literature reviews/ integrated weed management
This citation is from AGRICOLA.

1772. **Weighing the health risks of airborne particulates.**
Reichhardt, Tony
Environmental Science and Technology 29 (8): 360A. (1995)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: human (Hominidae)/ animals/ chordates/ humans/ mammals/ primates/ vertebrates/ air quality standards/ epidemiology/ morbidity/ mortality
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1773. **Welcome to reality: An overview of a low-input sustainable agriculture (LISA) project in small fruit.**
Goulart, B. L.
HortTechnology 6 (4): 354-359. (Oct. 1996-Dec. 1996)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: small fruits/ fragaria/ rubus/ low input agriculture/ farm inputs/ crop production/ sustainability/ integrated pest management/ research projects/ agricultural research/ extension education/ sustainable agriculture research and education
This citation is from AGRICOLA.

1774. **The WEPP watershed model: Hydrology and erosion.**
Ascough, J. C. II.; Baffaut, C.; Nearing, M. A.; and Liu, B. Y.
Transactions of the ASAE 40 (4): 921-933. (July 1997-Aug. 1997)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ].
Notes: Subtitle: [Part] I.
Descriptors: water erosion/ watersheds/ catchment hydrology/ transport processes/ mathematical models/ prediction/ accuracy/ water erosion prediction project/ scale models
Abstract: The Water Erosion Prediction Project (WEPP) watershed scale model is a continuous simulation tool that extends the capability of the WEPP hillslope model to provide erosion prediction technology for small cropland and rangeland watersheds. The model is based on fundamentals of erosion theory, soil and plant science, channel flow hydraulics, and rainfall-runoff relationships, and contains hillslopes, channels, and impoundments as the primary components. The hillslope and channel components can be further divided into hydrology and erosion components. Channel infiltration is calculated by a Green-Ampt Mein-Larson infiltration equation. A continuous channel water balance is maintained, including calculation of evapotranspiration, soil water percolation, canopy rainfall interception, and surface depressional storage. The channel peak runoff rate is calculated using either a modified Rational equation or the equation used in the CREAMS model. Flow depth and hydraulic shear stress along the channel are computed by regression equations based on a numerical solution of the steady state spatially varied flow equations. Detachment, transport, and deposition within constructed channels or concentrated flow gullies are calculated by a steady state solution to the sediment continuity equation. The impoundment component routes runoff and sediment through several types of impoundment structures, including farm ponds, culverts, filter fences, and check dams. The purpose of this article is to provide an overview of the model conceptual framework and structure. In addition, detailed mathematical representations of the processes simulated by the channel hydrology and erosion components are presented. The processes simulated by the impoundment component are not described in this article, but it does include impoundment effects on watershed model channel peak discharge and time of concentration calculations.
This citation is from AGRICOLA.

1775. **WEPS and WEPP science commonality project.**
Fox, F. A.; Flanagan, D. C.; Wagner, L. E.; and Deer-Ascough, L.
In: Soil erosion research for the 21st century. Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough, J. C. and Flanagan, D. C. (eds.); pp. 376-379; 2001. *ISBN:* 1-892769-16-6
This citation is provided courtesy of CAB International/CABI Publishing.

1776. **Wetland and environmental applications of GIS.**
Lyon, J. G. and McCarthy, Jack
Boca Raton: CRC Press; 373 p., 8 p. of plates: ill. (some col.), maps (some col.); Series: Mapping sciences series. (1995)
NAL Call #: GB622.W47--1995;
ISBN: 0873718976 (alk. paper)
Descriptors: Wetlands---Remote sensing/ Geographic information systems
This citation is from AGRICOLA.

1777. **Wetland birds: Habitat resources and conservation implications.**
Weller, Milton Webster.
Cambridge, UK: Cambridge University Press; xv, 271 p., [26] p. of plates: ill., map. (1999)
Notes: Contents note: Introduction -- Wetlands: what, where, and why -- Major groups of birds that use wetlands -- Water and other resource influences -- Foods, feeding tactics, strategies, and guilds -- Bird mobility and wetland predictability -- Other behavioral and physical influences on wetland living -- Spatial and structural patterns -- Habitat dynamics: water, plant succession, and time -- Population consequences of wetland abundance and quality -- How birds influence wetlands -- Conservation implications -- Measures of bird habitat use and quality -- Current status and some conservation

problems -- Conservation and management strategies -- Outlook.
NAL Call #: QL698.95-.W45-1999;
ISBN: 0521633265 (hb); 0521633621 (pb)
Descriptors: Water birds---Ecology/ Wetland animals---Ecology / Birds, Protection of
This citation is from AGRICOLA.

1778. **Wetland ecology: Principles and conservation.**
Keddy, Paul A.
Cambridge, UK; New York, NY: Cambridge University Press; xiv, 614 p.: ill., maps; Series: Cambridge studies in ecology. (2000)
Notes: Includes bibliographical references (p. [543]-593).
NAL Call #: QH541.5.M3-K44-2000;
ISBN: 0521780012 (hb); 0521783674 (pb)
Descriptors: Wetland ecology/ Wetland conservation
This citation is from AGRICOLA.

1779. **Wetland indicators: A guide to wetland identification, delineation, classification, and mapping.**
Tiner, Ralph W.
Boca Raton, Fla.: Lewis Publishers; 392 p., 8 p. of plates: ill. (some col.), maps. (1999)
NAL Call #: GB624.T564-1999;
ISBN: 0873718925 (alk. paper)
Descriptors: Wetlands---United States/ Wetland ecology---United States/ Plant indicators---United States
This citation is from AGRICOLA.

1780. **Wetland landscape characterization.**
Lyon, J. G.
Chelsea, MI: Ann Arbor Press; vii, 135 p.: ill. (2001)
Notes: Includes bibliographical references (p. 109-129) and index.
NAL Call #: QH87.3-.L96-2001;
ISBN: 1575041219
Descriptors: Wetlands---Remote sensing/ Geographic information systems/ Ecological mapping/ Wetland ecology
This citation is from AGRICOLA.

1781. **Wetland management and conservation of rare species.**
Doust, Lesley Lovett and Doust, Jon Lovett
Canadian Journal of Botany 73 (7): 1019-1028. (1995);
ISSN: 0008-4026
Descriptors: Plantae (Plantae Unspecified)/ plants/ ethics/ genetics/ habitat protection/ habitat quality/ legislation
Abstract: The value of wetland is now widely recognized; some legislation requires 'no net loss' of wetlands, although economic incentives still exist for wetland conversion. Rare plants may be protected by law; however, wetlands are rarely managed specifically to converse rare species. Furthermore, it is not always clear how the environment should be manipulated to increase the abundance of such species, since necessary autecological details are rarely available. Species conservation involves demographic and genetic elements, as well as ethical decisions about the merits of transplanting or importing genes through controlled pollinations. Rare species may serve as indicators of habitat quality, although this will depend on the reasons behind the species' rarity. There is a need for multiple-use management plans that incorporate species- and habitat-conservation goals and that implement overall strategies to maintain or enhance the total quantity and quality of wetlands.
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1782. **Wetland Mercury Research: A Review With Case Studies.**
Rood, B. E.
Current Topics in Wetland Biogeochemistry 2: 73-108. (1996);
ISSN: 1076-4674
Descriptors: United States, Florida, Everglades/ wetlands/ mercury/ case studies/ contamination/ literature review/ literature reviews/ biogeochemical cycle/ pollution effects/ biogeochemistry/ United States, Florida, Everglades/ case reports/ Sources and fate of pollution/ Behavior and fate characteristics/ Geochemistry of sediments/ Freshwater pollution
Abstract: Interestingly, there is a paucity of information regarding the role that wetlands play in the regional and global cycles of mercury (Zillioux et al., 1993). Eugene Odum has said that "a healthy wetland is an indicator of a healthy watershed" (Oglethorpe Power Corporation, 1990). As such, there is a compelling need to: 1) evaluate the status of mercury contamination in a variety of wetland types, both impacted and unimpacted by regional anthropogenic activities, 2) examine chemical and biological transformations of mercury under the unique ambient conditions associated with wetlands, and 3) reconstruct trends of mercury accumulation in wetlands preserved in the sediment record. The goals of this literature review are to provide wetland scientists with an overview of current issues and observations regarding research of environmental mercury contamination, to identify the critical need for mercury researchers to incorporate detailed wetland studies into current research, and to overview current studies of mercury in wetlands including a case study of mercury paleoecological research in the Florida Everglades.
© Cambridge Scientific Abstracts (CSA)

1783. **Wetland planting guide for the northeastern United States: Plants for wetland creation, restoration, and enhancement.**
Thunhorst, Gwendolyn A.
St. Michaels, Md.: Environmental Concern; v, 179 p.: ill. (1993)
NAL Call #: SB475.9.W48T48-1993;
ISBN: 1883226023
Descriptors: Wetland landscape design---Northeastern States/ Wetland planting---Northeastern States/ Wetland plants---Northeastern States/ Native plants for cultivation---Northeastern States/ Natural landscaping---Northeastern States/ Restoration ecology---Northeastern States
This citation is from AGRICOLA.

1784. **Wetland plants: Biology and ecology.**
Cronk, J. K. and Fennessy, M. Siobhan.
Boca Raton, Fla.: Lewis Publishers; 462 p.: ill., maps. (2001)
Notes: Includes bibliographical references (p. 389-438) and index; Contents note: Introduction to wetland plants -- Wetland plant communities -- The physical environment of wetland plants -- Adaptations to growth conditions in wetlands -- Reproduction of wetland angiosperms -- The primary productivity of wetland plants -- Community dynamics in wetlands -- Invasive plants in wetlands -- Wetland plants in restored and constructed wetlands -- Wetland plants as biological indicators.

NAL Call #: QK938.M3-C76-2001;
ISBN: 1566703727 (alk. paper)
Descriptors: Wetland plants/ Wetlands/ Wetland ecology
This citation is from AGRICOLA.

1785. **Wetland plants: More than just a pretty face?**
Nuttall, C. A.
Land Contamination and Reclamation 11 (2): 173-180. (2003);
ISSN: 0967-0513
This citation is provided courtesy of CAB International/CABI Publishing.

1786. **Wetland policy issues.**
Leitch, J. A.
Ames, Iowa: Council for Agricultural Science and Technology, 1994. 47 p.
Notes: "February 1994."
Descriptors: Wetlands---Issues and policy
This citation is from AGRICOLA.

1787. **Wetland processes and water quality: A symposium overview.**
Reddy, K. R. and Gale, P. M.
Journal of Environmental Quality 23 (5): 875-877. (Sept. 1994-Oct. 1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA].
Notes: Paper presented at the symposium, "Wetland Processes and Water Quality," November 3-4, 1992, Minneapolis, MN. Includes references.
Descriptors: wetlands/ water quality/ conferences/ paper summaries
Abstract: Wetlands are ecotones that buffer the interactions of terrestrial and aquatic systems. Considered wastelands until relatively recently, their value is currently being recognized with greater public awareness and development of a national policy. Wetlands protect aquatic systems from upland environments through sedimentation and filtration of runoff providing environments for nutrient assimilation. Likewise, wetlands can protect uplands from aquatic systems by diverting and dissipating floodwater volume and energy. Major research needs in the area of wetland science include: (i) wetland delineation, (ii) characterization of wetland soils, and (iii) biogeochemical processes in soil and water column regulating the water quality. This overview provides a brief introduction to the papers presented at a symposium entitled "Wetland Processes and Water Quality" sponsored by Division A-5 of the American Society of Agronomy and So Divisions within the Soil Science Society of America.
This citation is from AGRICOLA.

1788. **Wetland restoration, flood pulsing, and disturbance dynamics.**
Middleton, Beth.
New York: J. Wiley; xi, 388 p.: ill., maps. (1999)
Notes: Includes bibliographical references (p. 303-369) and index.
NAL Call #: QH541.5.M3M54-1999;
ISBN: 047129263X (cloth)
Descriptors: Wetland ecology/ Restoration ecology
This citation is from AGRICOLA.

1789. **Wetland restoration in central Europe: Aims and methods.**
Pfadenhauer, J. and Grootjans, A.
Applied Vegetation Science 2 (1): 95-106. (May 1999)
NAL Call #: QK900-.A66;
ISSN: 1402-2001 [AVSCFC].
Notes: Special issue: From basic to applied ecology -- vegetation science for nature conservation / edited by S. Gusewell, J. Pfadenhauer, and E. van der Maarel. Includes references.
Descriptors: wetlands/ reclamation/ emission/ air pollutants/ fens/ water/ species diversity/ plant communities/ botanical composition/ spatial variation/ temporal variation/ land use/ quantitative analysis/ qualitative analysis/ groundwater/ water quality/ literature reviews/ central Europe
This citation is from AGRICOLA.

1790. **Wetland rice soils as sources and sinks of methane: A review and prospects for research.**
Kumaraswamy, S.; Rath, A. K.; Ramakrishnan, B.; and Sethunathan, N.
Biology and Fertility of Soils 31 (6): 449-461. (2000)
NAL Call #: QH84.8.B46;
ISSN: 0178-2762
Descriptors: flooded rice/ rice soils/ paddy soils/ soil bacteria/ anaerobes/ methane production/ methane/ oxidation/ emission/ oryza sativa/ roots/ pollution control/ fertilizers/ pesticides/ nitrification inhibitors/ community ecology/ biological activity in soil/ literature reviews/ methanotrophy
This citation is from AGRICOLA.

1791. **Wetland Risk Assessment.**
Pascoe, G. A.
Environmental Toxicology and Chemistry 12 (12): 2293-2307. (1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: wetlands/ contamination/ risk assessment/ United States/ reviews/ ecosystems/ ecological effects / environmental effects/ pollutants/ geochemistry/ risks/ ecological crisis/ ecosystem disturbance/ Wetlands/ Toxicity testing/ Freshwater pollution/ Environment
Abstract: Wetlands represent unique environments for assessing ecological risks. Habitats may vary from riverine to basin type and include such diverse media as surface waters, sediments, soils, and ground water, with both terrestrial and aquatic biota. Given the diversity of wetland habitats, a number of species may be expected to be fairly unique to a particular site. Wetland ecosystems may be impacted by chemical contamination or by nonchemical stressors such as temperature or suspended solids. A key to assessing ecological risks to chemically contaminated wetlands is determining the degree of contaminant bioavailability from multiple environmental media. Chemical and physical factors of the various wetland habitats must be evaluated for their role in chemical release, transformation, and availability. Approaches to assessing ecological risks may extend from simple benchmark or literature comparisons to direct measurement of exposure and toxicity through laboratory and/or field tests. To increase the utility of wetland risk assessments, the uncertainty inherent in the complex habitats and in the chemistry that governs contaminant bioavailability should be minimized. This can be most readily accomplished by applying an assessment methodology triad of ecology, chemistry, and toxicology to characterize ecological risks. Literature toxicity information and laboratory and field data are used to evaluate potential threats to individuals or species in each trophic level of the wetland food web. The ecological data are integrated with this information to assess whether the concentrations of contaminants and the observed or predicted toxicity relate to actual ecological effects. The ecological relevance of the expected or measured biological responses is

of prime importance in predicting risks to the wetland ecosystem. Applications of this approach to risk assessments are presented as case studies of metals-contaminated wetlands at Milltown Reservoir, Montana, and Kesterson Reservoir, California.

1792. **Wetland soils: Genesis, hydrology, landscapes, and classification.**
Richardson, J. L. and Vepraskas, Michael J.
Boca Raton, Fla.: Lewis Publishers; 417 p., 8 p. of plates: ill. (some col.), maps. (2001)
NAL Call #: S592.17.H93-W48-2001;
ISBN: 1566704847 (alk. paper)
Descriptors: Hydric soils/ Wetlands
This citation is from AGRICOLA.

1793. **Wetland soils of the prairie potholes.**
Richardson, J. L.; Arndt, J. L.; and Freeland, J.
Advances in Agronomy 52: 121-171. (1994)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: wetland soils/ prairie soils/ prairies/ soil properties/ soil sequences/ literature reviews/ Alberta/ Saskatchewan/ Manitoba/ north central states of USA
This citation is from AGRICOLA.

1794. **Wetlands.**
Mitsch, William J. and Gosselink, James G.
New York: Van Nostrand Reinhold; xiii, 722 p.: ill., maps. (1993)
Notes: 2nd ed.; Includes bibliographical references (p. 643-698) and index.
NAL Call #: QH541.5.M3M59-1993;
ISBN: 0442008058
Descriptors: Wetland ecology---United States/ Wetlands---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

1795. **Wetlands.**
Mitsch, William J. and Gosselink, James G.
New York: John Wiley; xiii, 920 p.: ill., maps. (2000)
Notes: 3rd ed.; Includes bibliographical references (p. 785-892) and indexes.
NAL Call #: QH104-.M57-2000;
ISBN: 047129232X (cloth: alk. paper)
Descriptors: Wetland ecology---United States/ Wetlands---United States/ Wetland management---United States
This citation is from AGRICOLA.

1796. **Wetlands and ground water in the United States.**
Stone, Andrew W. and Stone, Amanda J. Lindley
Dublin, Ohio: American Ground Water Trust; Concord, N.H.: Audubon Society of New Hampshire; iv, 100 p.: ill. (1994)
Notes: Includes bibliographical references (p. 79-82).
NAL Call #: GB624.S76--1994;
ISBN: 0964118602
Descriptors: Wetlands---United States/ Groundwater---United States
This citation is from AGRICOLA.

1797. **Wetlands: Characteristics and boundaries.**
National Research Council (U.S.), Committee on Characterization of Wetlands
Washington, D.C.: National Academy Press; xvii, 307 p.: ill., maps. (1995)
NAL Call #: QH87.3.W475--1995;
ISBN: 0309051347 (cloth)
http://www.nap.edu/books/0309051347/html/
Descriptors: Wetlands / Wetland ecology/ Wetland conservation---Government policy---United States
This citation is from AGRICOLA.

1798. **Wetlands classification.**
Detenbeck, Naomi Elizabeth.; United States. Environmental Protection Agency. Office of Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.
Notes: Original title: Wetlands classification (#7); Title from web page. "March 2002." "EPA-822-R-02-017." "Prepared jointly by the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division Office." Description based on content viewed April 10, 2003. Includes bibliographical references.
NAL Call #: QH541.5.M3-D47-2002
http://www.epa.gov/waterscience/criteria/wetlands/7Classification.pdf
Descriptors: Wetlands---United States/ Wetlands---United States ---Classification
This citation is from AGRICOLA.

1799. **Wetlands: Guide to science, law, and technology.**
Dennison, Mark S. and Berry, James F.
Park Ridge, N.J., U.S.A.: Noyes Publications; xxiv, 439 p.: ill., maps. (1993)
Notes: Includes bibliographical references (p. 352-383) and indexes.
NAL Call #: QH87.3.D45--1993;
ISBN: 081551333X (cloth):
Descriptors: Wetlands/ Wetland conservation/ Wetlands---Law and legislation---United States/ Wetland ecology
This citation is from AGRICOLA.

1800. **Wetlands: History, current status, and future.**
Hook, D. D.
Environmental Toxicology and Chemistry 12 (12): 2157-2166. (Dec. 1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268 [ETOCDK].
Notes: Annual Review Issue: Wetland Ecotoxicology and Chemistry. Includes references.
Descriptors: wetlands/ bogs/ fens/ moorland/ history/ uses/ environmental protection/ projections/ literature reviews
This citation is from AGRICOLA.

1801. **Wetlands in the northern Great Plains: A guide to values and management.**
Berry, Charles R.; Buechler, Dennis G.; Wentz, W. Alan.; South Dakota State University. Cooperative Extension Service; and U.S. Prairie Pothole Joint Venture.
Washington, D.C.?: U.S. Fish and Wildlife Service; Brookings, S.D.: Agricultural Extension Service, South Dakota State University; 13 p.: col. ill. (1993)
Notes: Caption title. "Published by a cooperative agreement between the U.S. Fish and Wildlife Service (U.S. Prairie Pothole Joint Venture) and the Agricultural Extension Service, South Dakota State University, Brookings, S.D. Funding was provided by the U.S. Fish and Wildlife Service, the Federal Highway Administration, and the U.S. Army Corps of Engineers"--P. 13. "Update of Wetland values and management ... 1981"--P. 13.

NAL Call #: QH541.5.M3B47--1993
Descriptors: Wetland ecology Great Plains/ Wetlands Great Plains
This citation is from AGRICOLA.

1802. **Wetlands of the interior southeastern United States: Conference summary statement.**
Trettin, C. C.; Aust, W. M.; Davis, M. M.; Weakley, A. S.; and Wisniewski, J.
Water, Air and Soil Pollution 77 (3/4): 199-205. (Oct. 1994)
NAL Call #: TD172.W36;
ISSN: 0049-6979 [WAPLAC].
Notes: Special issue: Wetlands of the interior southeastern United States / edited by C.C. Trettin, W.M. Aust, and J. Wisniewski. Proceedings of the Southern Appalachian Man and the Biosphere Conference on "Wetland Ecology, Management, and Conservation," held September 28-30, 1993, Knoxville, Tennessee. Includes references.
Descriptors: wetlands/ plant communities/ plant ecology/ community ecology/ ecosystems/ nature conservation/ conferences/ southeastern states of USA
This citation is from AGRICOLA.

1803. **What is watershed stability? A review of the foundation concept of dynamic equilibrium in watershed management: Proceedings of the Sixth Biennial Watershed Management Conference, Sixth Biennial Watershed Management Conference (Held 23-25 October 1996 at Lake Tahoe, California/Nevada).**
Sommarstrom, Sari
Davis, CA: Centers for Water and Wildland Resources, University of California; Series: Water Resources Center report no. 92; vi, 193 p.: ill. (1997)
Notes: "April 1997."
NAL Call #: TD224.C2W37--no.92;
ISBN: 1887192069
Descriptors: Watershed management---United States---Congresses/ Watersheds---United States---Congresses/ Watershed management---California---Congresses
This citation is from AGRICOLA.

1804. **Which decision support tools for the environmental management of nitrogen?**
Meynard, J. M.; Cerf, M.; Guichard, L.; Jeuffroy, M. H.; and Makowski, D.
Agronomie 22 (7/8): 817-829. (2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627
This citation is provided courtesy of CAB International/CABI Publishing.

1805. **White Paper Summaries.**
Humenik, F.; Rice, M.; and National Center for Manure and Animal Waste Management.
National Center for Manure and Animal Waste Management, 2001.
Notes: 64 pp.; Produced through a USDA Fund for Rural America Grant (application/pdf)
http://www.cals.ncsu.edu/waste_mgt/natlcenter/summary.pdf

1806. **White papers on animal agriculture and the environment.**
National Center for Manure & Animal Waste Management; Midwest Plan Service; and United States. Dept. of Agriculture
Raleigh, NC: National Center for Manure & Animal Waste Management, 2002.
NAL Call #: TD930.2-.W45-2002
Descriptors: Animal waste---Environmental aspects/ Agricultural wastes---Environmental aspects/ Manures
Abstract: Topics covered include: odor mitigation; site selection of animal operations; air quality and emissions; production/waste management systems; health effects; particulate matter emissions; ammonia emissions; land application; treatment lagoons; animal diets; closure of earthen manure structures; remediation and legal structures; innovative policies; pathogens; manure marketing; and cost benefit analysis to improve social welfare.
This citation is from AGRICOLA.

1807. **Why Bacillus thuringiensis insecticidal toxins are so effective: Unique features of their mode of action.**
Aronson, Arthur I and Shai, Yechiel
FEMS Microbiology Letters 195 (1): 1-8. (2001);
ISSN: 0378-1097
Descriptors: Bacillus thuringiensis toxins: insecticide, toxin/ Bacillus thuringiensis (Endospore forming Gram Positives)/ Diptera (Diptera)/ Animals/ Arthropods/ Bacteria/ Eubacteria/ Insects/ Invertebrates/ Microorganisms
Abstract: The spore-forming bacterium Bacillus thuringiensis produces intracellular inclusions comprised of protoxins active on several orders of insects. These highly effective and specific toxins have great potential in agriculture and for the control of disease-related insect vectors. Inclusions ingested by larvae are solubilized and converted to active toxins in the midgut. There are two major classes, the cytolytic toxins and the delta-endotoxins. The former are produced by B. thuringiensis subspecies active on Diptera. The latter, which will be the focus of this review, are more prevalent and active on at least three orders of insects. They have a three-domain structure with extensive functional interactions among the domains. The initial reversible binding to receptors on larval midgut cells is largely dependent upon domains II and III. Subsequent steps involve toxin insertion into the membrane and aggregation, leading to the formation of gated, cation-selective channels. The channels are comprised of certain amphipathic helices in domain I, but the three processes of insertion, aggregation and the formation of functional channels are probably dependent upon all three domains. Lethality is believed to be due to destruction of the transmembrane potential, with the subsequent osmotic lysis of cells lining the midgut. In this review, the mode of action of these delta-endotoxins will be discussed with emphasis on unique features.
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1808. **Wildlife damage management research needs: Perceptions of scientists, wildlife managers, and stakeholders of the USDA/Wildlife Services program.**
Bruggers, Richard L; Owens, Richard; and Hoffman, Thomas
International Biodeterioration and Biodegradation 49 (2-3): 213-223. (2002)
NAL Call #: QH301.I54;
ISSN: 0964-8305
Descriptors: bird (Aves): pest/ human (Hominidae)/ mammal (Mammalia): pest/ Animals/ Birds/ Chordates/ Humans/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Primates/ Vertebrates/ USDA/ APHIS Wildlife Services program/ administrative guidance/ agriculture/

aquaculture/ aviation/ invasive species/ legislative guidance/ livestock/ overabundant populations/ research needs assessment/ scientist perceptions/ stakeholder perceptions/ timber/ wildlife damage management research/ wildlife manager perceptions/ wildlife borne diseases/ wildlife human conflicts
Abstract: This paper presents the results of a nationwide research needs assessment of the important wildlife-human conflict issues and associated research needs of the USDA/APHIS-Wildlife Services (WS) program and its stakeholders. Thirty-six WS State Directors, 23 WS/National Wildlife Research Center (NWRC) scientists and 6 members of the National Wildlife Services Advisory Committee (NWSAC) to the US Secretary of Agriculture responded to a request for participation. This paper compares these current research needs with previous regional and national research needs assessments for wildlife damage management in the United States. Important national problems identified included issues related to aviation, timber, agriculture, aquaculture, and livestock industries, as well as wildlife-borne diseases, invasive species, and overabundant wildlife populations. This assessment provides useful input, along with legislative and administrative guidance, to NWRC for allocating resources to specific research projects that address the WS program's needs for knowledge and new methods.
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1809. **Wildlife exposure to organophosphorus insecticides.**
Sanchez Hernandez, J. C.
Reviews of Environmental Contamination and Toxicology 172: 21-63. (2001)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: organophosphorus insecticides/ exposure/ cholinesterase/ markers/ monitoring/ wildlife/ nontarget organisms/ literature reviews
This citation is from AGRICOLA.

1810. **Wind erosion air quality project: An interim report of the Northwest Columbia Plateau.**
Papendick, Robert I.; Veseth, Roger; United States. Environmental Protection Agency; and Washington State University. College of Agriculture and Home Economics
Pullman, Wash.: Washington State University, College of Agriculture and Home Economics; Series: Miscellaneous publication (Washington State University. College of Agriculture and Home Economics) no. 184; 63 p.: ill. (some col.), maps (some col.). (1996)
Notes: "December 1996." Includes bibliographical references (p. 62-63).
NAL Call #: TD883.5.W22C65--1996
Descriptors: Air Pollution---Washington State---Columbia Plateau/ Air quality---Washington State---Columbia Plateau/ Wind erosion---Washington State---Columbia Plateau/ Soil conservation---Washington State---Columbia Plateau
This citation is from AGRICOLA.

1811. **Wind erosion and air quality research needs in the Pacific Northwest.**
Saxton, K. E.
In: 1993 International Summer Meeting sponsored by The American Society of Agricultural Engineers and The Canadian Society of Agricultural Engineering. (Held 20 Jun 1993-23 Jun 1993 at Spokane, Washington.) St. Joseph, Mich.: American Society of Agricultural Engineers; 16 p.; 1993.
Notes: Paper no. 932121; Papers of the American Society of Agricultural Engineers;
ISSN: 0149-9890
NAL Call #: 290.9-Am32P
Descriptors: wind erosion/ air quality/ dust/ particles/ dust control/ research/ Pacific states of USA
This citation is from AGRICOLA.

1812. **Windbreaks and specialty crops for greater profits.**
Brandle, J. R.; Hodges, L.; and Stuthman J.
In: Agroforestry and sustainable systems symposium proceedings. (Held 7 Aug 1994-10 Aug 1994 at Fort Collins, Colorado.)
Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 81-91; 1995.
NAL Call #: aSD11.A42-no.261
Descriptors: shelterbelts/ trees/ shrubs/ wind/ wind erosion/ crop yield/ crop quality/ earliness/ crop management/ habitats/ sustainability/ microclimate/ stresses/ planting date/ harvesting date/ economic analysis/ literature reviews
This citation is from AGRICOLA.

1813. **Windbreaks as a pesticide drift mitigation strategy: A review.**
Ucar, T. and Hall, F. R.
Pest Management Science 57 (8): 663-675. (Aug. 2001)
NAL Call #: SB951-.P47;
ISSN: 1526-498X [PMSCFC]
Descriptors: windbreaks/ pesticides/ application/ drift/ spraying/ deposition/ literature reviews/ drift mitigation strategies
Abstract: The use of natural and artificial barriers to mitigate pesticide drift from agricultural and forest applications is discussed. This technique has been considered as an alternative to current methods at a time when environmental concerns are under great public scrutiny. There has been a variety of research experiments on this subject from New Zealand to The Netherlands which have documented reductions in spray drift of up to 80-90%. However, there are still enormous data gaps to utilize this method accurately. The aerodynamic factors of wind barriers and shelter effects on crop growth and yield have been well investigated. In contrast, some of the important aspects of drift mitigation, eg porosity and turbulence, have been difficult to obtain and no standard methodologies are currently available to evaluate and classify windbreaks and shelterbelts or to determine their efficiency in reducing drift. Thus there is a significant opportunity to incorporate windbreaks into the tool set of drift mitigation tactics. Government policies, initiatives, legislation, etc, which currently address water quality, BMP, stewardship, buffers, etc, are issues which so far have not included windbreaks as a valuable drift mitigation strategy.
This citation is from AGRICOLA.

1814. **Winter habitat of selected stream fishes and potential impacts from land-use activity.**
Cunjak, R. A.
In: Workshop on the science and management for habitat conservation and restoration strategies (HabCARES) in the great lakes / Comptes rendus d'un atelier sur la science et la gestion des stratégies de conservation et de restauration des

habitats (HabCARES) dans le bassin des Grands Lacs. (Held Nov 1994 at Kempenfelt, Ontario, Canada.)
Kelso, J. R. (eds.)
Ottawa, Ontario, Canada: National Research Council of Canada; pp. 267-282; 1996.
Notes: Also published as: Canadian journal of fisheries and aquatic sciences / Journal canadien des sciences halieutiques et aquatiques [can. J. Fish. Aquat. Sci./J. Can. Sci. Halieut. Aquat.] 53 (supplement 1);
ISSN: 0706-652X
Descriptors: habitat/ habitat selection/ winter/ environmental impact/ land use/ metabolism/ habitat improvement/ rivers/ Salmonidae/ Canada/ Conservation, wildlife management and recreation
Abstract: This paper reviews the habitat characteristics and the behaviour of selected stream fishes during winter in temperate-boreal ecosystems. Emphasis is placed on the salmonid fishes upon which most winter research has been directed. As space is the primary factor regulating stream fish populations in winter, aspects of winter habitat are considered at various spatial scales from microhabitat to stream reach to river basin. Choice of winter habitat is governed by the need to minimize energy expenditure, with the main criterion being protection from adverse physicochemical conditions. The distance moved to wintering habitats, and the continued activity by many fishes during the winter, need to be considered when making management decisions regarding fish habitat. How habitat is affected by land-use activity in stream catchments is discussed with reference to impacts from water withdrawal, varying discharge regimes, and erosion or sedimentation. Even stream enhancement practices can deleteriously affect stream habitat if project managers are unaware of winter habitat requirements and stream conditions. Maintenance of habitat complexity, at least at the scale of stream sub-basin, is recommended to ensure the diversity of winter habitats for fish communities.

1815. **Year end review of recycling and composting.**
Glenn, J.
Biocycle 38 (12): 49-53. (Dec. 1997)
NAL Call #: 57.8-C734;
ISSN: 0276-5055
Descriptors: waste utilization/ United States
This citation is from AGRICOLA.

Subject Index

Author Index