Animal Agriculture and EPA

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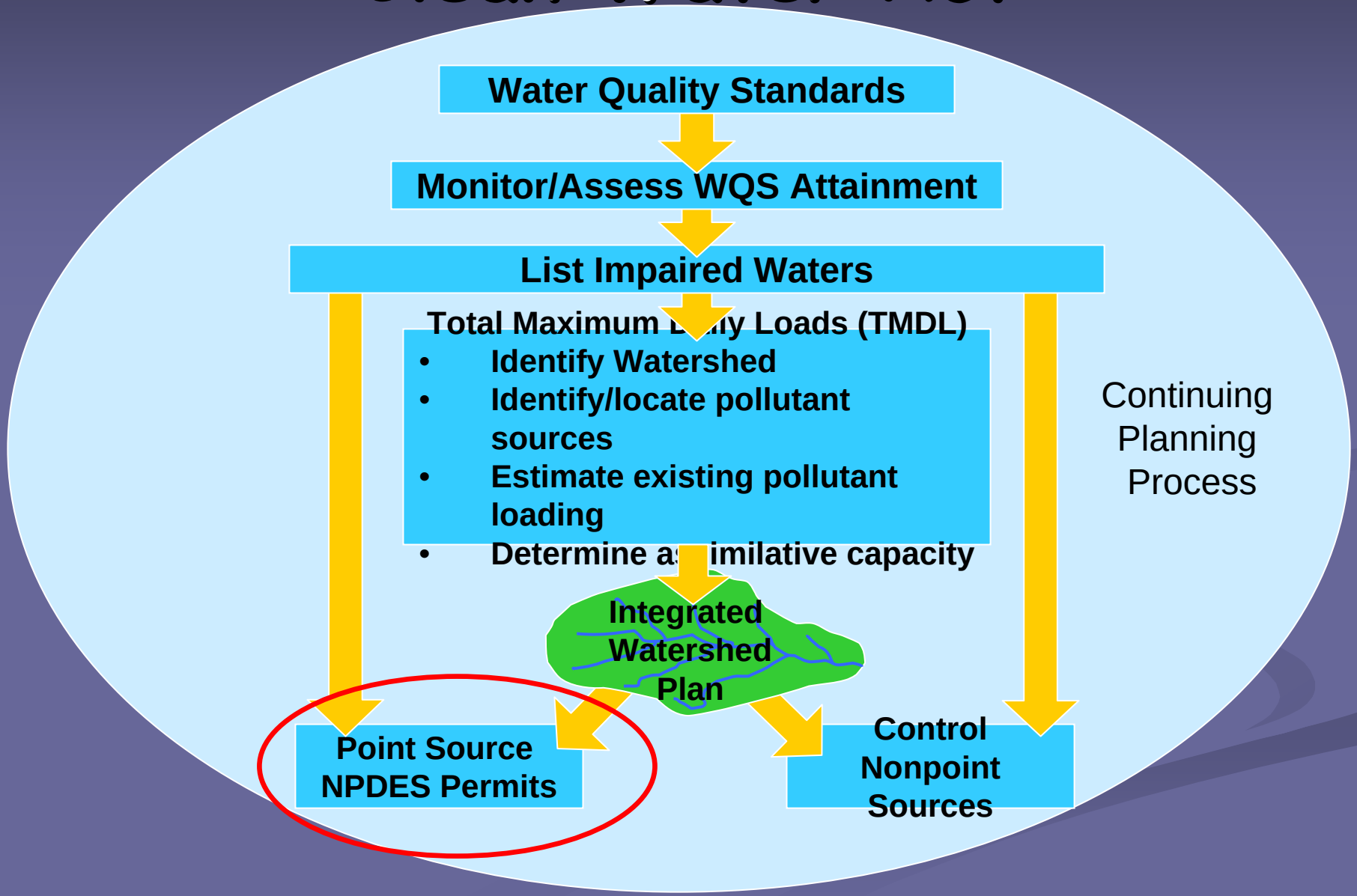
- Recap of Clean Water Act structure
- Relationship of animal agriculture to the Clean Water Act
- Animal agriculture and the Clean Air Act
- USDA programs to evaluate environmental impacts of conservation programs

Clean Water Act Goal

"Restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

- Point Sources
- Water Quality Standards
  - Nutrients, biological, metals, toxics
- Nonpoint Sources
- Total Maximum Daily Loads

Clean Water Act



Agricultural Point Sources

CWA point source definition

- Concentrated animal feeding operations (CAFOs) defined as point sources
- Conveyances from farm fields carrying discharges not specifically exempted
- Industrial discharge from agricultural processing plants

- **Specific exemptions**
  - Agriculture stormwater discharge
  - Irrigation return flows

CAFO Definitions

Animal Feeding Operation (nonpoint source)

- Confines animals for 45 days in 12 months
- Sustains no vegetation in confinement area

Concentrated Animal Feeding Operation

- Based on size thresholds and
  - Large -- size alone
  - Medium
    - Stream running through confinement area
    - Man-made conveyance to surface water
  - Small (designation)
    - Same criteria as Medium
    - Significant contributor of pollutants
    - On-site inspection

Animal Sector	CAFO Thresholds (number of animals)		
	Large	Medium	Small
cattle or cow/calf pairs, veal calves	1,000 +	300 - 999	< 300
mature dairy cattle	700 +	200 - 699	< 200
swine (55 pounds +)	2,500 +	750 - 2,499	< 750
swine (< 55 pounds)	10,000 +	3,000 - 9,999	< 3,000
horses	500 +	150 - 499	< 150
sheep or lambs	10,000 +	3,000 - 9,999	< 3,000
turkeys	55,000 +	16,500 - 54,999	< 16,500
laying hens/ broilers (liquid systems)	30,000 +	9,000 - 29,999	< 9,000
chickens other than laying hens (dry systems)	125,000 +	37,500 - 124,999	< 37,500
laying hens (dry systems)	82,000 +	25,000 - 81,999	< 25,000
ducks (dry systems)	30,000 +	10,000 - 29,999	< 10,000
ducks (liquid systems)	5,000 +	1,500 - 4,999	< 1,500

CAFO Rule

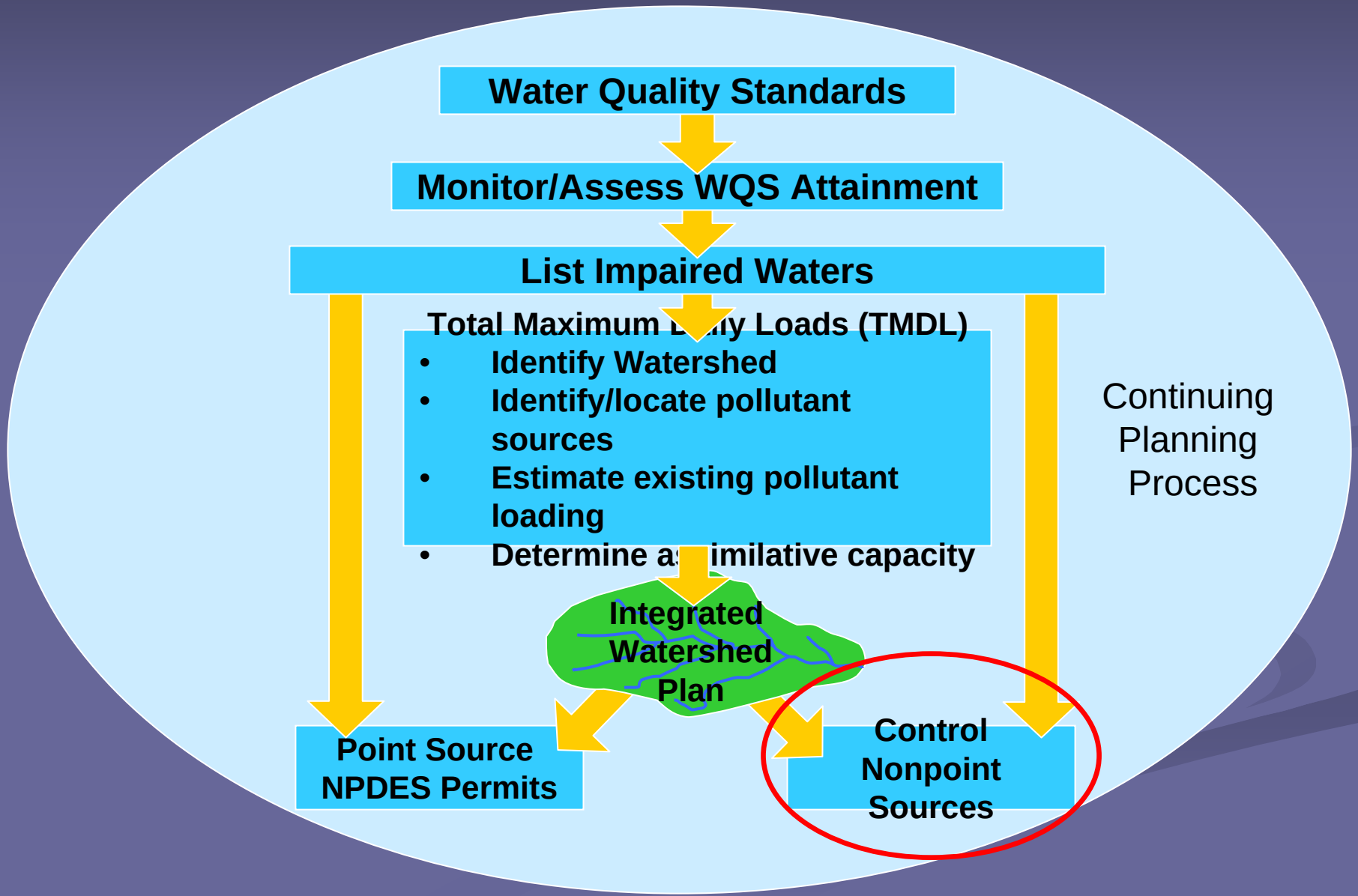
Applicability

- 18,800 CAFOs
  - ~ 5% of AFOs, 60% of AFO manure
- Only CAFOs that discharge or proposed to discharge must get a NPDES permit.
- Runoff from manure applied according to a nutrient management plan is not a discharge (exempt agricultural stormwater).

Requirements

- Production Area
  - Zero runoff, unless a 25-year/24-hour storm event.
- Land Application
  - Nutrient management plans, publicly available
  - Plans must “minimize runoff of N and P” in manure.
  - Most existing plans based on N.

Clean Water Act



Nonpoint Sources

- §319 program
  - Grants to states
  - Many projects target agriculture, especially nutrient reductions and coordination with USDA Farm Bill conservation programs.
  - $200 million per year
  - Agriculture Management Measures guidance
- Clean Water State Revolving Loan Fund (SRF)
  - Loans to implement state nonpoint source plans, including agriculture
  - 15 states use the SRF for agriculture
  - Over $120 million in agriculture projects

USDA Conservation Programs

- Voluntary
- Financial and technical assistance
- Approximately $4 billion in 2006
- Working lands or land retirement

USDA Conservation Programs Working Lands

- Environmental Quality Incentives Program (EQIP)
  - Cost-share up to 75% for conservation practices
  - 1-10 year contracts
  - Structural and management practices
  - $1 billion annually
- Conservation Security Program (CSP)
  - Reward the best, encourage the rest
  - 3 tiers of payments
  - 2006- $256 million

USDA Conservation Programs Land Retirement

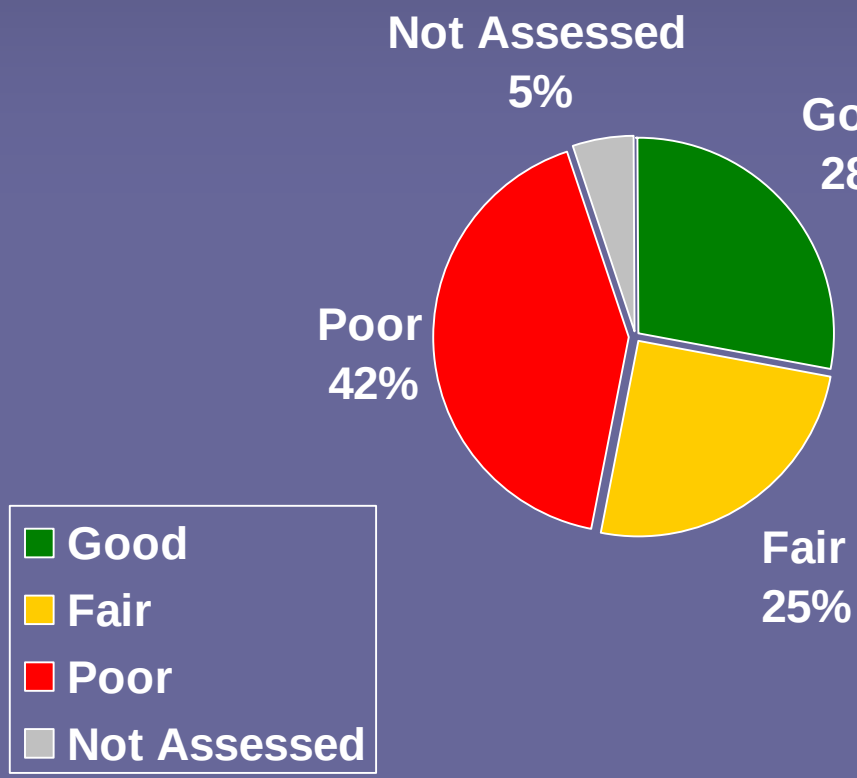
Conservation Reserve Program (CRP)

- 10 to 15 year contracts
- 39.2 million acres
- General sign-up=bids based on national environmental index
- Continuous sign-ups for “highly desirable environmental practices”: filter strips, grassed waterways, riparian buffers, public wellhead areas

Wetlands Reserve Program (WRP)

- permanent or 30 year easements
- ~150,000 acres/year
- 2.275 million acre cap

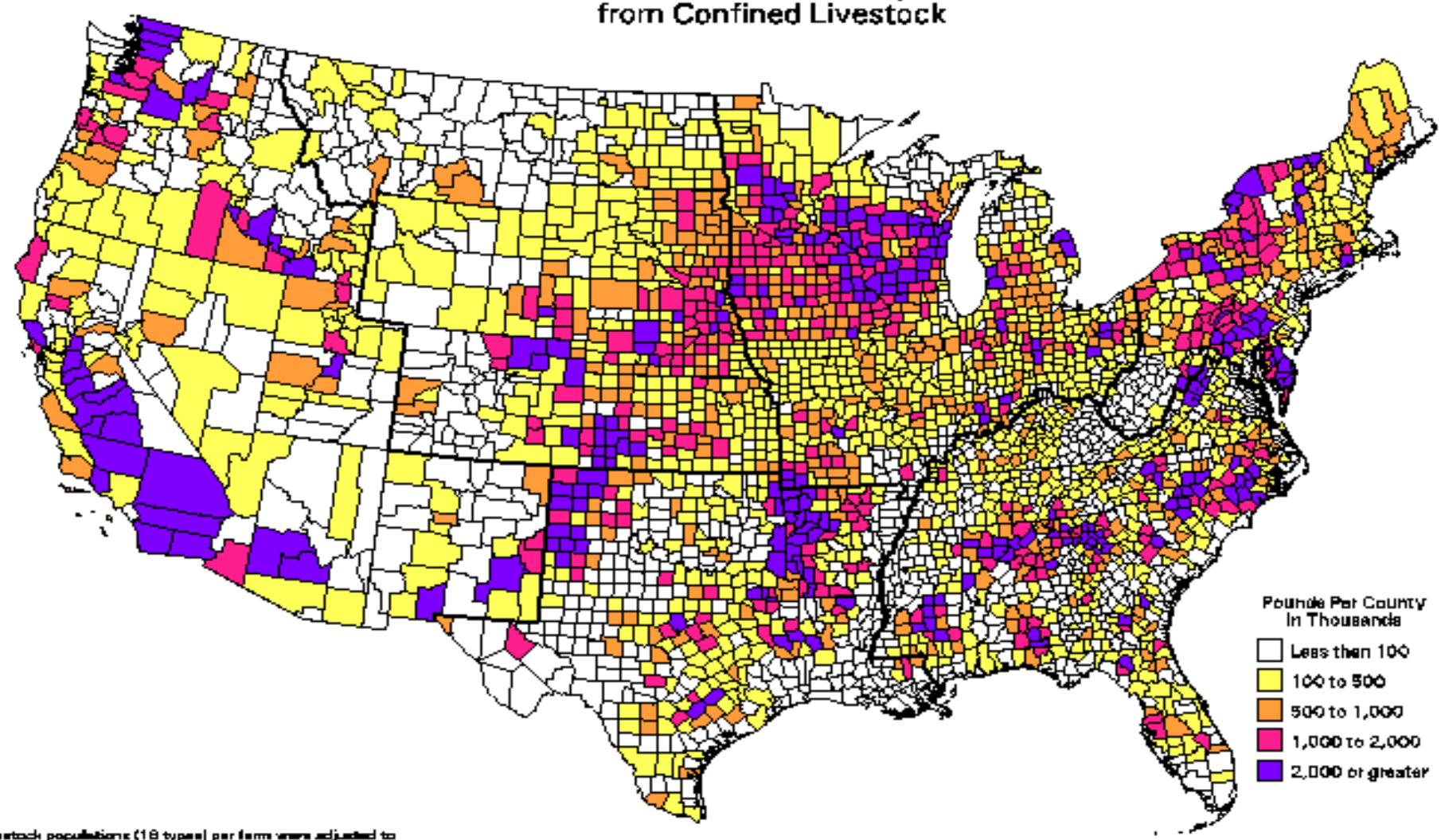
2006 Wadeable Streams Assessment



Biological Condition of Streams (Index of Biotic Condition)

- 28% of streams in good condition, compared to least-disturbed reference condition.
- Across the US 25-30% of streams have high levels of nutrients or excess sedimentation. **These streams are twice as likely to have poor biology**.

Map 1: Estimated Manure Nitrogen Production from Confined Livestock



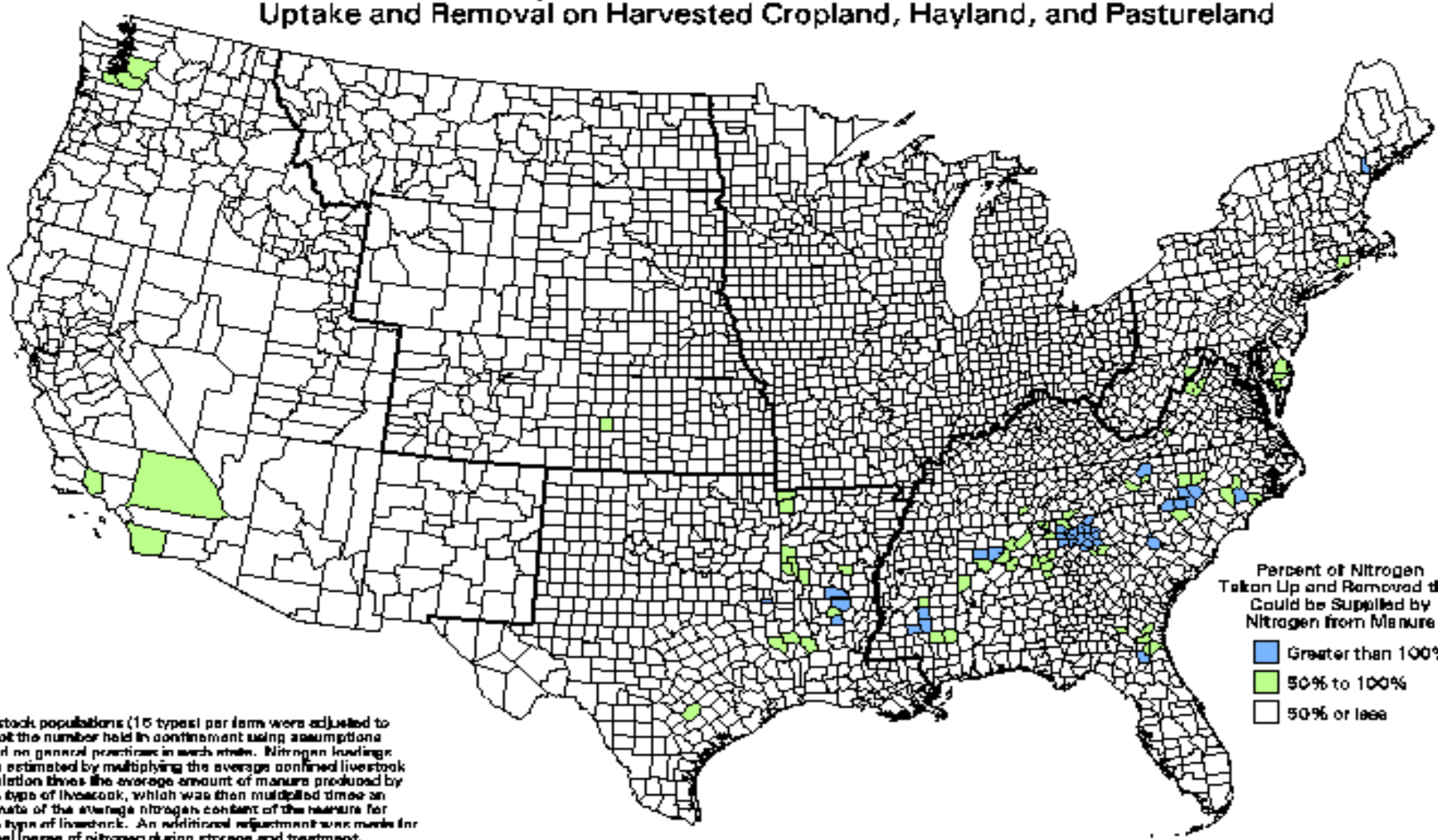
Livestock populations (18 types) per farm were adjusted to reflect the number held in confinement using assumptions based on general practices in each state. Nitrogen loadings were estimated by multiplying the average confined livestock population times the average amount of manure produced by each type of livestock, which was then multiplied times an estimate of the average nitrogen content of the manure for each type of livestock. An additional adjustment was made for typical losses of nitrogen during storage and treatment.

Data Source: Census of Agriculture, 1992. This analysis has only been run for the contiguous 48 states. Alaska, Hawaii, Puerto Rico, U.S. Virgin Islands, and Pacific Basin data were not incorporated in the study.

U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment and Strategic Planning Division
Washington D.C. November 1997 Map ID: 2420

USDA

Map 4: Potential for Nitrogen Available from Animal Manure to Meet or Exceed Plant Uptake and Removal on Harvested Cropland, Hayland, and Pastureland



Livestock populations (15 types) per farm were adjusted to reflect the number held in confinement using assumptions based on general practices in each state. Nitrogen loadings were estimated by multiplying the average confined livestock population times the average amount of manure produced by each type of livestock, which was then multiplied times an estimate of the average nitrogen content of the manure for each type of livestock. An additional adjustment was made for typical losses of nitrogen during storage and treatment. Nitrogen uptake and removal were estimated using yield data and estimates of the percent nitrogen content in the harvestable portion of the crop. The ratio of nitrogen available in manure to the amount that could be taken up and removed by crops grown in the county is shown in the map. It was assumed that all cropland, hayland, and pastureland in the county were available for manure utilization. No adjustment was made for application of commercial fertilizer.

Data Source: Census of Agriculture, 1992. This analysis has only been run for the contiguous 48 states. Alaska, Hawaii, Puerto Rico, U.S. Virgin Islands, and Pacific Basin data were not incorporated in the study. Citrus, Vegetable, and Nut Crops have been excluded from this analysis.

U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment and Strategic Planning Division
Washington D.C. November 1997 Map ID: 2411

USDA

Conservation Effects Assessment Project

USDA project

- quantify environmental effects of conservation practices/programs at the watershed scale
- integrate science into management of agricultural watersheds

National Components

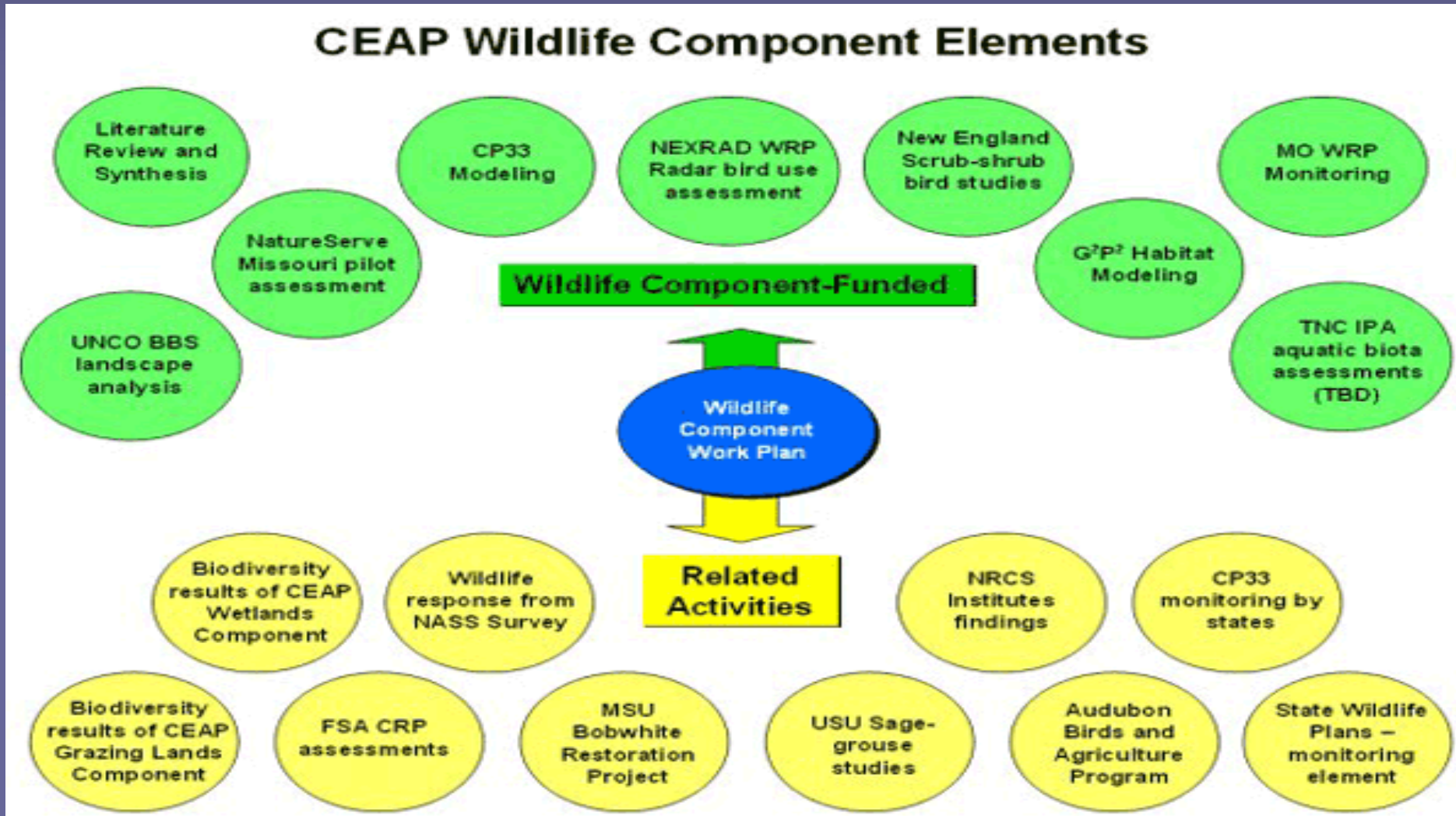
- **Cropland: water quality/quantity, soil quality**
- **Grazing Lands**
- **Wildlife Habitat**
- **Wetlands**

Cropland Component

- Sampling and modeling to estimate
  - reductions in sediment, nutrients, and pesticides from farms fields
  - increased water efficiency
  - enhanced soil quality
- Voluntary Farmer Survey
  - 20,000 farms over 4 years
- First report using 1st 2 years of surveys
  - CEAP Baseline conditions
  - Alternative scenarios

Wildlife Component

Collaborate with others on relevant assessments

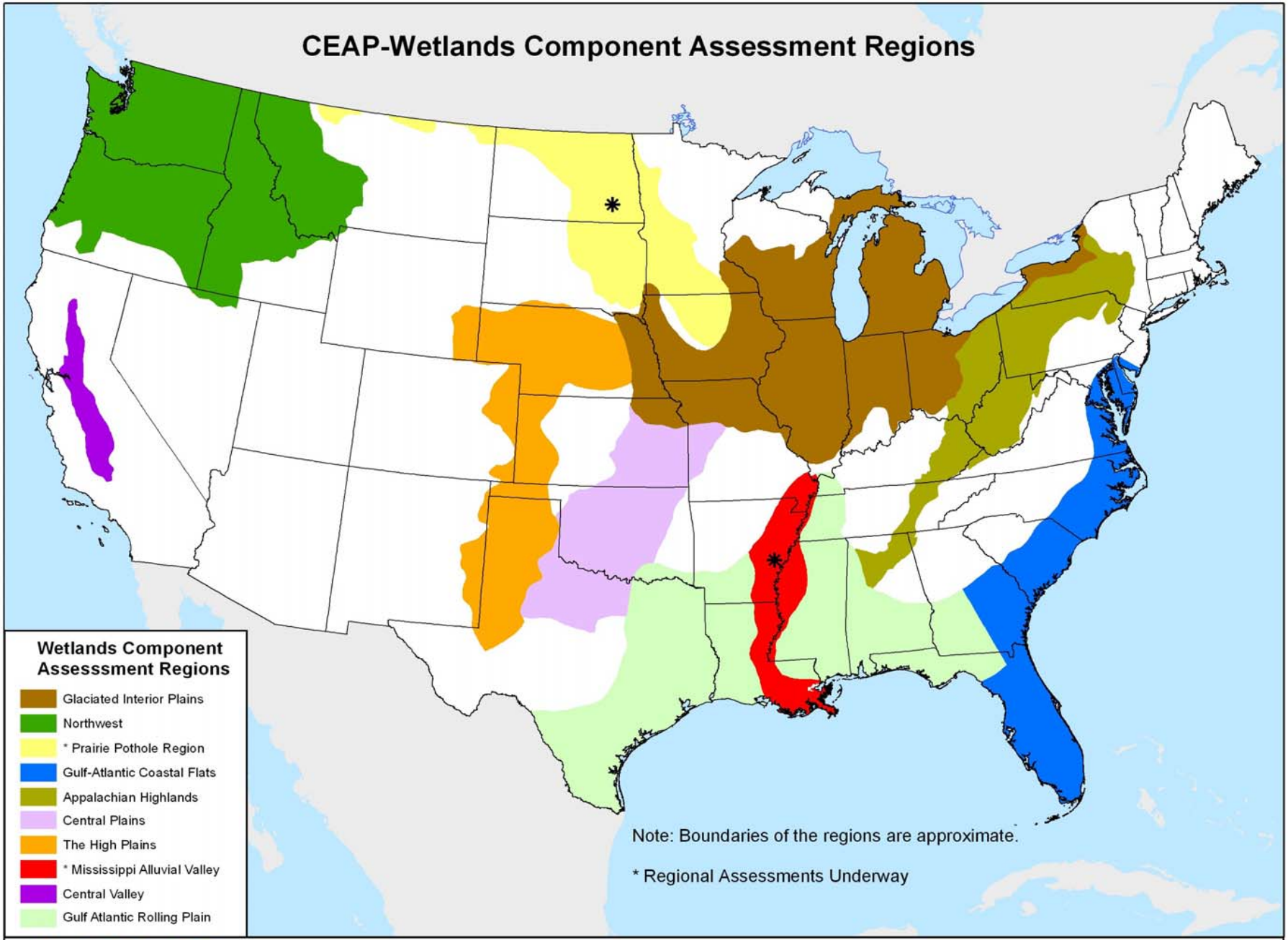


Wetlands Component

Estimating “ecosystem services” from USDA program wetlands in 10 U.S. regions.

- Prairie Pothole Regional Assessment
  - floodwater storage potential
  - wetland floristic quality
  - wetland habitat structure quality for vertebrates
- Mississippi Alluvial Valley
  - Focus on bottomland hardwood wetlands
  - Collaboration with USGS, USFWS, USDA-ARS, FSA
- 2006 --Central Valley, California; The High Plains; Gulf-Atlantic Coastal Plain

CEAP-Wetlands Component Assessment Regions



U.S. Department of Agriculture
Natural Resources Conservation Service
Resources Inventory and Assessment Division

Map ID: 9149

Source: NRCS, USGS DATA

CEAP Literature Reviews

- Bibliography—6 volumes
  - Environmental Effects
  - Barriers and Incentives
  - Environmental Credit Trading
  - Reviews and the State of the Art and Research Needs.
  - Grazing Lands
  - Wetlands in Agricultural Landscapes
- Dynamic Bibliography
  - Web-based search engine
- Cropland Literature Review
- Wildlife Literature Reviews
  - Program-Based
  - Practice-based -- Summer 2007

Watershed Assessments

ARS Benchmark Watersheds

- Data system
- Quantify effects of conservation practices at the watershed scale
- Validate models and quantify uncertainties
- Tools to optimize selection and placement of practices in a watershed

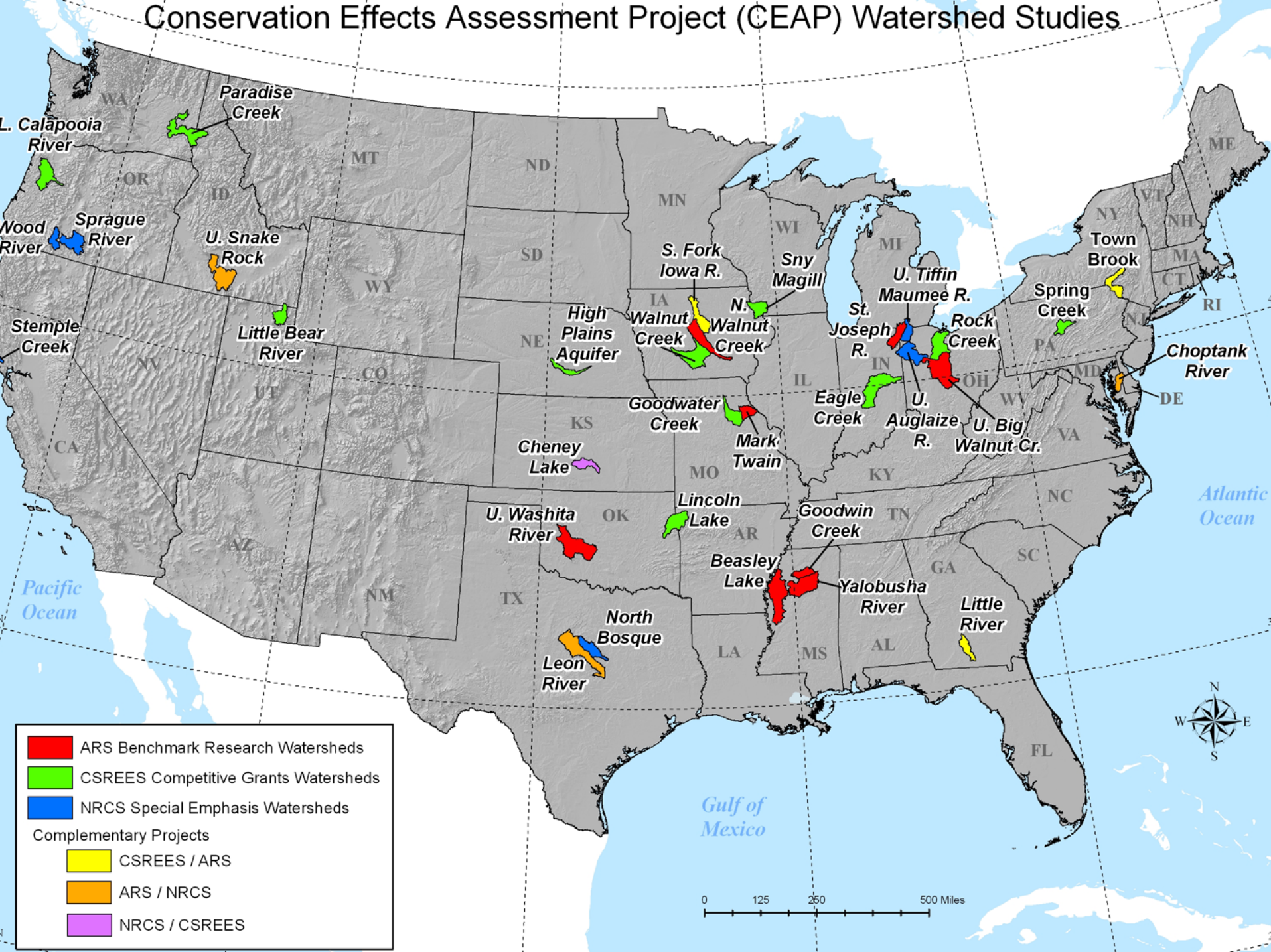
Special Emphasis

- Livestock manure and nutrient issues
- Irrigated cropland and water conservation, drainage management

CSREES Competitive Grants

- Involves university researchers in CEAP
- 3-year projects
- All projects have socio-economic and outreach components

Conservation Effects Assessment Project (CEAP) Watershed Studies



Clean Air Act

Reporting requirements

- Sources that emit over 100 lbs/day of ammonia or hydrogen sulfide.

Permit requirements

- Attainment areas: Sources that emit more that 250 tons/year of an individual air pollutant.
- Non-attainment areas: Sources that emit from 10 to 100 tons/year, depending upon the pollutant in question and the severity of the non-attainment classification.

Clean Air Act and AFOs

- Science is insufficient to estimate emissions from AFOs.
- AFO Air Emissions Monitoring Study
  - 2-year, $14.6 million study, 8 universities
  - Measure levels of hydrogen sulfide, particulate matter, ammonia, nitrous oxide, VOCs, and other gases
  - Research began last week at 24 sites in 9 states.
  - Ensure compliance with permitting and reporting requirements.
  - Develop national consensus on monitoring methodologies.
- Participating AFOs are required to
  - Pay a penalty and pay into a nationwide monitoring fund.
  - Make facilities available for monitoring.
  - Apply for all applicable air permits.
  - Report qualifying releases of ammonia and hydrogen sulfide.

Useful Websites

Concentrated Animal Feeding Operations

- http://cfpub.epa.gov/npdes/home.cfm?program_id=7

AFO Air Emissions Monitoring Study

- http://www.epa.gov/agriculture/airmonitoringstudy.html

Wadeable Streams Assessment

- http://www.epa.gov/owow/streamsurvey/

Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States

- http://www.nrcs.usda.gov/technical/land/pubs/manntr.html

Model Simulation of Soil Loss, Nutrient Loss and Soil Organic Carbon Associated with Crop Production

- http://www.nrcs.usda.gov/technical/nri/ceap/croplandreport/

Conservation Effects Assessment Project

- http://www.nrcs.usda.gov/technical/nri/ceap/