Protecting Critical Ecosystems: Current EPA Regional Activities and Future Agency Opportunities

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Office of Policy and Economic Innovation
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Region 10

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Appendices

The following three appendices contain additional resources relevant regional critical ecosystem assessments. Appendix A is an inventory of additional projects and other information that is organized by project/resource. These project, research, and tool descriptions can be used to identify data, analytical techniques, and tools that can be used to enhance future assessments of critical ecosystems by improving data, techniques, and closing gaps. Appendix B includes websites, citations, and data lists that are organized by the SAB Framework Essential Ecological Attributes to serve as sources of information for conducting analyses relevant to identifying critical ecosystems for each category of analysis. Appendix C is a condensed version of thesis project conducted by Ginevra Lewis, part of the University of Florida research team. Her research reviews methods for assessing wetlands for suitability/significance for mitigation and develops indices for prioritizing wetlands based on landscape, habitat, and other characteristics. Many of these indices could be relevant to critical ecosystem identification in other regions.

Appendix B: Guide to Research, Reports, Data, and Websites Relevant to Conducting Regional Assessments of Critical Ecosystem

1) Landscape Condition

a. Available Data

Environment Canada GeoGratis data
Landsat
RADARSAT
Atlas Vectors
Canada Land Inventory (CLI)
National Road Network (NRN)
Canadian Digital Elevation Data (CDED): 1:50,000
North American Conservation Areas Database (NCAD)
Canadian Conservation Areas Database (CCAD)
Canada Watershed Maps
Census data
Ontario Land Cover: 1:250,000
AVHRR Land Cover
The State of Canada's Ecosystems in Maps
http://geogratis.cgdi.gc.ca/clf/en

EPA Environmental Monitoring and Assessment Program (EMAP)
http://www.epa.gov/emap/index.html

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

Multi-Resolution Land Characteristics Interagency Consortium
http://www.epa.gov/mrlc/

National Wetland Inventory
http://www.nwi.fws.gov/

Natural Heritage Programs NatureServe Data
http://www.natureserve.org/explorer/

NOAA Advanced Very-High Resolution Radiometer (AVHRR) satellite images with a 1 km cell resolution
Available for each continent via ftp://edcftp.cr.usgs.gov/pub/data/glcc

NRCS Soil Survey Geographic (SSURGO) Database
1:12,000 to 1:63,360 scale soil maps
http://www.ftw.nrcs.usda.gov/status_data.html

NRCS State Soil Geographic (STATSGO) Database
1:250,000 scale soil maps
http://www.ftw.nrcs.usda.gov/statsgo.html

USDA Forest Service Forest Inventory and Analysis (FIA) data
http://fia.fs.fed.us/

U.S. Fish and Wildlife Service GIS Data Sets by States
http://www.fws.gov/data/statdata/index.html

USGS GAP Data
http://www.gap.uidaho.edu/

USGS Geographic Data
1:250k DEM
1:24k DEM
30m NED
1:2m DLG
1:100k DLG
1:24k DLG

1:250,000 and 1:100,000 Land Use Land Cover (LULC)

National Land Cover Data (NLCD)

National Hydrography Dataset (NHD)

http://edc.usgs.gov/geodata/

b. GIS Tools

Analytical Tools Interface for Landscape Assessments (ATtILA)
Donald W. Ebert
U.S. Environmental Protection Agency
National Exposure Research Laboratory
Environmental Sciences Division
Landscape Ecology Branch
P.O. Box 93478
Las Vegas, NV 89193-3478
Phone: (702) 798-2158
E-mail: ebert.donald@epa.gov

Biomapper- A GIS toolkit to model habitat suitability
http://www2.unil.ch/biomapper/

University of Massachusetts- FRAGSTATS
http://www.umass.edu/landeco/research/fragstats/fragstats.html

Canaan Valley Institute- Landscape Analyst Extension
http://www.canaanvi.org/

c. Citations

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d. Websites

American Wildlands- Science-based Conservation for the Northern Rockies
http://wildlands.org/index.html

A Practical Map-Analysis Tool for Detecting Dispersal Corridors

William W. Hargrove and Forrest M. Hoffman
Oak Ridge National Laboratory

http://research.esd.ornl.gov/~hnw/walkers/presentation3/

The Biodiversity Partnership
http://www.biodiversitypartners.org/

BioMap- Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife
http://www.mass.gov/dfwele/dfw/nhesp/nhbiomap.htm

Conservation Biology Institute
http://www.consbio.org/

Environmental Law Institute's report on state biodiversity initiatives

http://www.eli.org/

EPA Regional Vulnerability Assessment Program (REVA)
http://www.epa.gov/reva/

Geobabble!- Oak Ridge National Laboratory's Premier Geographic Research Site
http://geobabble.esd.ornl.gov/

Maryland Greenways and GreenPrint Program

http://www.dnr.state.md.us/greenways/

New Jersey Landscape and Greenways programs

http://www.state.nj.us/dep/fgw/lndscpe.htm
http://www.njconservation.org/

One/Northwest- Online Networking for the Environment

http://www.onenw.org/

Oregon Biodiversity Project

http://www.biodiversitypartners.org/state/or/orbioproject.shtml

USGS GAP Analysis program

http://www.gap.uidaho.edu/

e. Contacts

EPA EMAP Agroecosystems Data Group Contact
Program Contact:
Patricia Bradley
U.S. EPA Region3
Voice: 410-305-2744
bradley.patricia@epa.gov

EPA EMAP Estuaries Data Group Contact
Program Contact:
Kevin Summers
U.S. EPA
Voice: 850-934-9244
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EPA EMAP Landscape Characterization Data Group Contact
Program Contact:
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EPA EMAP Wetlands Data Group Contact
Program Contact:
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stoddard.john@epa.gov

2) Biotic Condition

a. Available Data

Environment Canada GeoGratis data
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Canada Watershed Maps
Census data
Ontario Land Cover: 1:250,000
AVHRR Land Cover
The State of Canada's Ecosystems in Maps
http://geogratis.cgdi.gc.ca/clf/en

EPA Environmental Monitoring and Assessment Program (EMAP)
http://www.epa.gov/emap/index.html

EPA Index of Watershed Indicators (IWI)
http://www.epa.gov/iwi/

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

Multi-Resolution Land Characteristics Interagency Consortium
http://www.epa.gov/mrlc/

National Atlas
http://www.nationalatlas.gov/

National Wetland Inventory
http://www.nwi.fws.gov/

Natural Heritage Programs NatureServe Data
http://www.natureserve.org/explorer/

NOAA Advanced Very-High Resolution Radiometer (AVHRR) satellite images with a 1 km cell resolution
Available for each continent via ftp://edcftp.cr.usgs.gov/pub/data/glcc

NRCS Soil Survey Geographic (SSURGO) Database

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USDA Forest Service Forest Inventory and Analysis (FIA) data
http://fia.fs.fed.us/

U.S. Fish and Wildlife Service GIS Data Sets by States
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USGS GAP Data
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USGS Geographic Data
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1:24k DLG

1:250,000 and 1:100,000 Land Use Land Cover (LULC)

National Land Cover Data (NLCD)

National Hydrography Dataset (NHD)

http://edc.usgs.gov/geodata/

b. GIS Tools

Biomapper- A GIS toolkit to model habitat suitability
http://www2.unil.ch/biomapper/

Environment Canada- Map Search for Species at Risk in Canada-
http://www.sis.ec.gc.ca/

c. Citations

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d. Websites

American Wildlands- Science-based Conservation for the Northern Rockies
http://wildlands.org/index.html

A Practical Map-Analysis Tool for Detecting Dispersal Corridors

William W. Hargrove and Forrest M. Hoffman
Oak Ridge National Laboratory

http://research.esd.ornl.gov/~hnw/walkers/presentation3/

The Biodiversity Partnership
http://www.biodiversitypartners.org/

BioMap- Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife

http://www.mass.gov/dfwele/dfw/nhesp/nhbiomap.htm

Conservation Biology Institute
http://www.consbio.org/

Environmental Law Institute's report on state biodiversity initiatives
http://www.eli.org/

Environment Canada, Map Search for Species at Risk in Canada
http://www.sis.ec.gc.ca/

EPA Biological Indicators of Watershed Health
http://www.epa.gov/bioindicators/

EPA Regional Vulnerability Assessment Program (REVA)
http://www.epa.gov/reva/

One/Northwest- Online Networking for the Environment
http://www.onenw.org/

Oregon Biodiversity Project
http://www.biodiversitypartners.org/state/or/orbioproject.shtml

USGS GAP Analysis program
http://www.gap.uidaho.edu/

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3) Chemical and Physical Characteristics (Water, Air, Soil, and Sediment)

a. Available Data

EPA Envirofacts Data Warehouse
http://www.epa.gov/enviro/index_java.html

EPA Index of Watershed Indicators (IWI)
http://www.epa.gov/iwi/

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

National Water Quality Assessment (NAWQA) Program data
http://water.usgs.gov/nawqa/

U.S. Fish and Wildlife Service GIS Data Sets by States
http://www.fws.gov/data/statdata/index.html

b. GIS Tools

EPA Better Assessment Science Integrating point and Nonpoint Sources (BASINS)- Software that makes it possible to quickly assess large amounts of point source and nonpoint source data.

http://www.epa.gov/waterscience/basins/

c. Citations

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Garen,D., D.Woodward, and F. Geter. 1999. A user agency's view of hydrologic, soil erosion and water quality modelling. Catena 37 (3-4): 277-289.

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d. Contacts

For more information on USEPA BASINS
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Office of Science and Technology
Office of Water
U.S. Environmental Protection Agency
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Washington, DC 20460
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BASINS email
basins@epa.gov

4) Ecological Processes

a. Available Data

EPA Index of Watershed Indicators (IWI)

http://www.epa.gov/iwi/

b. Citations

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5) Hydrology and Geomorphology

a. Available Data

Environment Canada GeoGratis data
Landsat
RADARSAT
Atlas Vectors
Canada Land Inventory (CLI)
National Road Network (NRN)
Canadian Digital Elevation Data (CDED): 1:50,000
North American Conservation Areas Database (NCAD)
Canadian Conservation Areas Database (CCAD)
Canada Watershed Maps
Census data
Ontario Land Cover: 1:250,000
AVHRR Land Cover
The State of Canada's Ecosystems in Maps
http://geogratis.cgdi.gc.ca/clf/en

EPA Envirofacts Data Warehouse
http://www.epa.gov/enviro/index_java.html

EPA Index of Watershed Indicators (IWI)
http://www.epa.gov/iwi/

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

National Atlas
http://www.nationalatlas.gov/

Streamnet - downloadable 1:100,000 river reach data for the Pacific Northwest
http://www.streamnet.org

U.S. Fish and Wildlife Service GIS Data Sets by States
http://www.fws.gov/data/statdata/index.html

USGS Geographic Data
1:250k DEM
1:24k DEM
30m NED
1:2m DLG
1:100k DLG
1:24k DLG

1:250,000 and 1:100,000 Land Use Land Cover (LULC)

National Land Cover Data (NLCD)

National Hydrography Dataset (NHD)

http://edc.usgs.gov/geodata/

USGS Hydrologic Unit Maps
1:250,000 and 1:2,000,000 scale
http://water.usgs.gov/GIS/huc.html

b. GIS Tools

EPA WebRIT WATERS
http://www.epa.gov/webrit/

NHD ArcView Toolkit - A collection of ArcView extensions provided to assist in the understanding and use of NHD data and in the development of NHD applications and tools.
http://nhd.usgs.gov/tools.html

NHD Watershed - This application employs the NHD and other supporting data layers to delineate a watershed from any point on any NHD reach.
http://nhd.usgs.gov/tools.html

NHD Watershed Characteristics - This application employs the NHD and other supporting data layers to compute characteristics of choice for watersheds delineated using NHD Watershed.
http://nhd.usgs.gov/tools.html

NOAA Coastal Services Center- Impervious Surface Analysis Tool- This tool is used to calculate the percentage of impervious surface area of user-selected geographic areas (e.g., watersheds, municipalities, subdivisions).

http://www.csc.noaa.gov/crs/cwq/isat.html

c. Citations

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Chovanec, A., P. Jäger, M. Jungwirth, V. Koller-Kreimel, O. Moog, S. Muhar, and St. Schmutz. 2000. The Austrian way of assessing the ecological integrity of running waters: a contribution to the EU Water Framework Directive. Hydrobiologia 422/423: 445–452.

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Van Rompaey, A.J.J. and G. Govers. 2002. Data quality and model complexity for regional scale soil erosion prediction. Int. J. Geographical Information Science 16(7): 663-680.

d. Contacts

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6) Natural Disturbance Regimes

a. Available Data

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

b. Citations

Baker, W.L. 1992. The landscape ecology of large disturbances in the design and management of nature reserves. Landscape Ecology 7(3): 181-194.

7) Carbon Sequestration

a. Citations

Falloon, P.D., P. Smith, J.U. Smith, J. Szabó, K. Coleman, and S. Marshall. 1998. Regional estimates of carbon sequestration potential: linking the Rothamsted Carbon Model to GIS databases. Biol Fertil Soils 27: 236–241.

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Oren, R., D.S. Ellsworth, K.H. Johnsen, N. Phillip, B.E. Ewers, C. Maier, K.V.R. Schäfer, H. McCarthy, G. Hendrey, S.G. McNulty, and G. G. Katul. 2001. Soil fertility limits carbon sequestration by forest ecosystems in a CO2-enriched atmosphere. Nature 411: 469-472.

b. Websites

Midcontinent Interactive Digital Carbon Atlas and Relational dataBase (MIDCARB)
http://www.midcarb.org/

Office of Fossil Energy, U.S. Department of Energy- Carbon Sequestration-Regional Partnerships
http://www.fe.doe.gov/programs/sequestration/partnerships/

8) Stressors (nutrient enrichment, toxic materials, alterations of natural process regimes, climate change, land use change)

a. Available Data

Environment Canada GeoGratis data
Landsat
RADARSAT
Atlas Vectors
Canada Land Inventory (CLI)
National Road Network (NRN)
Canadian Digital Elevation Data (CDED): 1:50,000
North American Conservation Areas Database (NCAD)
Canadian Conservation Areas Database (CCAD)
Canada Watershed Maps
Census data
Ontario Land Cover: 1:250,000
AVHRR Land Cover
The State of Canada's Ecosystems in Maps
http://geogratis.cgdi.gc.ca/clf/en

EPA Envirofacts Data Warehouse
http://www.epa.gov/enviro/index_java.html

NRCS United States Climate Mapping data
http://www.ncgc.nrcs.usda.gov/branch/gdb/products/climate/index.html

USGS Global Change Reasearch data- data related to global climate change
http://geochange.er.usgs.gov/pub/info/holdings.html

Inforain - numerous GIS databases available for the PNW coastal rainforest region
http://www.inforain.org/

National Atlas
http://www.nationalatlas.gov/

US Census Bureau TIGER data
http://www.census.gov/tiger

b. GIS Tools

EPA Better Assessment Science Integrating point and Nonpoint Sources (BASINS)- Software that makes it possible to quickly assess large amounts of point source and nonpoint source data.

http://www.epa.gov/waterscience/basins/

NOAA Coastal Services Center- Impervious Surface Analysis Tool- This tool is used to calculate the percentage of impervious surface area of user-selected geographic areas (e.g., watersheds, municipalities, subdivisions).

http://www.csc.noaa.gov/crs/cwq/isat.html

c. Citations

Cairns, J., Jr, 1995. Ecological integrity of aquatic systems. Regulated Rivers: Research & Management 11: 313-323.

Clench-Aas, J., A. Bartonova, T. Bøhler, K. E. Grønskei, B. Sivertsen, and S. Larssen. 1999. Air pollution exposure monitoring and estimating-Part I. Integrated air quality monitoring system. J. Environ. Monit. 1: 313–319.

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