Use and Management of Natural Economic Resources

This section of the *Catalog* examines indicators related to the use and management of Natural Economic Resources. The categories include Agriculture, Energy Use and Consumption, Environmental Economics, Freshwater Fisheries, Marine Fisheries, Shellfish Growing Areas, Forest Resources, Mineral Resources, Public Lands, and Open Spaces.

Descriptions of the Indicator Categories

Agriculture

This category consists of indicators dealing with the problems of cropland erosion and measures to improve agriculture management practices, such as conservation tillage. Indicators of farmland and farm size can assist in measuring the state of farm resources and their impacts on neighboring waterways and ecosystems.

Energy Use and Consumption

Indicators measuring the consumption and use of energy allow us to think about how resources are being used. This helps to identify the impacts to the environment caused by the increased use of resources for energy. For example, an indicator of increased vehicle miles traveled could be a surrogate measure for increased air pollution and increased resource extraction. This may lead to policy decisions providing improved access to alternative methods of transportation, such as carpooling, bike lanes, and public transportation, or an increase in the use of alternative and cleaner fuels. Indicators in this category also measure industrial energy consumption and residential energy consumption to see what type of energy source is being used (electric, coal, hydroelectric) and the environmental and social impacts caused by energy production and consumption.

Environmental Economics

Only one "indicator" has been developed in this category. It deals with the relationship between strong economic growth and sound environmental health.

Freshwater and Marine Fisheries

Indicators in these categories measure the decline of certain fish species, the amounts of commercial landings and their comparison to the stock conditions, concentrations of toxics in fish, and fish passage/salmon runs (are the fish able to get to spawning and nursery habitat or has their passage been impacted by development).

Shellfish Growing Areas

Indicators in this category deal with the loss of shellfish growing areas due mainly to habitat degradation. Until 1985, it was difficult to assess how shellfish harvest areas improved or degraded over time because the number of waters classified as shellfish-growing fluctuated.

Beginning with the 1985 National Register of Classified Estuarine Water, the National Oceanic and Atmospheric Administration began modifying the Register to address this issue along with other improvements, including delineating pollution sources. Shellfish are often contaminated by the same types of pollution affecting other aquatic species and habitats, including sewage treatment plants, industrial facilities, septic systems, and nonpoint source runoff. The largest increases in pollution of shellfish beds between the 1985 and 1990 surveys were due to urban runoff, septic systems, and boats. This increase reflects problems common to shellfish areas, such as the influence of increased tourism and vacation home development.

Forest Resources

Indicators in this category measure the conditions of our forest resources, the timber industries associated with forests, and conservation programs, such as tree planting and other forestry programs.

Mineral Resources

Indicators for mineral resources measure coal production and the impact of coal production on ecosystems, reclaimed lands, oil and gas production, and other problems associated with their extraction.

Public Lands and Open Spaces

The Public Lands and Open Spaces category contains indicators measuring the amount of acres classified as public land, new and existing development which impacts open space, areas preserved as open space, and efforts at purchasing and protecting natural habitats. In the face of development pressures, lands needed for wildlife habitat and open space are increasingly at risk to development for human uses of the land. Purchasing the lands is often considered the only effective way to protect them. Many states now have programs which target the protection of natural resources and help in protecting lands that provide the necessary functions to preserve natural systems and protect wildlife. The amount of land acquired or the funding spent by programs for preservation and/or conservation may be indicators of the efforts that have been made to protect critical natural areas and of the areas that are still threatened by the pressures of development.

Recreation

Recreation indicators include measurements of whether rivers, streams, and lakes are meeting designated recreational uses, such as for swimming and boating. Impacts of human development have also resulting in beach closures.

List of Indicators
Indicators are grouped according to the following categories:

Agriculture
Erosion
Farmland Acreage
Tillage Use
Livestock Use
Conservation/Soil

Energy Use and Consumption
Vehicle Miles Traveled/Transportation Trends
Environmental Economics

Freshwater Fisheries

Marine Fisheries
Fish
Shellfish
Overall
Landings vs. Stocks

Shellfish Growing Areas

Forest Resources

Mineral Resources
Coal
Oil and Gas

Public Lands and Open Spaces
Acres
Percentage of Land Conserved/Developed
Environmental and Conservation Spending
Recreation

Agriculture

Erosion

- **Annual Rate of Sediment Erosion From Agricultural Cropland** (PEGA 7/95) *Proposed Source: USDA Natural Resource Inventory.*
- **Average Farmland Soil Erosion Rates** (KY94) *Source: USDA, National Resource Inventory.*
- **Soil Erosion Per Acre of Cropland (in tons)** (MN92) *Source:* State Department of Agriculture, Soil Conservation Service for the National Resources Inventory.
- **State Average Soil Erosion for Agricultural Land Types in Tons/Acre/Year** (OH95) *Source:* Natural Resources Inventory. *Description:* Land types are cultivated cropland, uncultivated cropland, and pasture.
- **Percentage of Land With Allowable Soil Loss Erosion Rates (Cropland, Pasture Land, Forest Land)** (OR92) *Source*: State Department of Agriculture, based on Soil Conservation Service data. *Description:* This measures the amount of lands that are eroding at a rate that normal or healthy soils should.
- **Farmland in Need of Erosion Control Measures** (KY94) *Source:* USDA, National Resource Inventory.

  Analysis

  These indicators measure soil erosion rates and act as surrogate measures of land loss through agricultural practices and as a potential source of water pollution. The indicators will track progress in conserving soil if measured over a period of years. The indicators can be improved if measuring for success includes soil erosion program objectives.

Farmland Acreage

- **Crop and Pastureland Acreage (Farmland Not in Use, Cropland in Use, Pastureland in Use)** (KY94) *Source:* U.S. Department of Agriculture National Agriculture Statistics, Soil Conservation Service, Natural Resource Inventories.
- **Cropland and Pasture** (OH95) *Source:* Ohio State University Extension Service, 1989.
- **Number of Farms** (OH95) *Source:* Ohio State University Extension Service, 1989.
- **Change in Total Woodland on Farms from 1978 to 1987** (OH95) *Source:* State Department of Natural Resources, *Ohio Wildlife Population Status and Hunting Forecast.*
- **Prime Farmland** (KY94) *Source:* USDA, Natural Resources Inventory. *Description:* Prime farmland is flat or rolling acreage susceptible to little or no erosion. It produces the most food, feed, fiber, and forage with the least amount of fuel, fertilizer, and labor.
- **Farmland and Farm Size** (IL94) *Source:* Ecological Resources, Illinois Natural History Survey.
- **Average Size of Farms in Acres** (OH95) *Source:* State Department of Agriculture.

- **Percentage of 1970 Agricultural Land Still Preserved for Agricultural Use** (OR92) *Source:* US Department of Agriculture*. Description:* Agricultural land means acres of crop land, pasture land, and range land regardless of whether such land is being actively used for such purposes, is fallow, or is enrolled in a government set-aside program.
- **Acres of Farmland Preserved Through State Development Rights Purchased by Other Means** (CT95) *Source:* State Farmland Preservation Program*.*

  Analysis

  These indicators measure the size of farms and the retention of land for agricultural purposes. Some agricultural activities are associated with the loss of specific aquatic habitats due to sedimentation and runoff; therefore these indicators may serve as indirect measures of potential water pollution. These indicators can also be used to track progress depending on what the objective is; for example, loss of wetlands due to agricultural land use.

Tillage Use

- **Farmland Under Conservation Tillage** (DIIR95) *Source:* Agricultural Resources and Environmental Indicators, U.S. Department of Agriculture, 1994. *Description:* Conservation tillage includes any tillage or planting system that maintains a minimum of 30 percent or more residue after planting. These methods reduce soil erosion, water runoff, and the potential for surface water contamination from agricultural pollutants.
- **Conservation Tillage Use on Cropland** (KY94) *Source:* Conservation Tillage Information Center, Kentucky Division of Conservation.

  Analysis

  These indicators measure land under conservation tillage and indirectly, the reductions in soil erosion and water pollution. These indicators can be used to track progress in reducing sedimentation if combined with environmental indicators.

Livestock Use

- **Livestock Waste Management Status** (KY94) *Source:* Kentucky Conservation Districts Survey.
- **Number of Feedlot Permits and Animal Units Covered** (MPCA95) *Source:* State*. Description:* An animal unit is the waste (manure) produced by: one slaughter steer; two and a half swine; or 100 chickens. Animal wastes can become serious water pollutants.
- **Total Crop and Livestock Sales** (MA95) *Source:* State Executive Office of Environmental Affairs.

  Analysis

  These indicators measure two things: wastes generated by livestock and their potential to cause water pollution, and crop and livestock sales as an indicator of an agricultural industry's ability to provide thousands of jobs. Total crop and livestock sales could be compared to water pollution costs that are associated with agriculture. This may show the actual costs to the environment as compared to productive gains in the agriculture industry.

Conservation/Soil

- **Number of Landowners and Acres Enrolled in Agriculture District Program to Protect Farmlands** (KY94) *Source*: Kentucky Division of Conservation.
- **Average Thickness of Topsoils** (IL94) *Source*: Water Resources, Illinois State Water Survey.

Analysis

These indicators can be used to measure the conservation of farmland and track progress in soil conservation.

Energy Use and Consumption

- **Energy Consumption Per Capita** (LCI95) *Proposed*
- **Average Annual Energy Use Per Person** (MN92) *Source:* State Department of Public Service.
- **Total and Per Capita Energy Consumption by Fuel Type** (FL94) *Source*: Florida Statistical Abstract*. Description:* Figures are estimates derived from mathematical analyses.
- **Per Capita Gasoline Consumption** (KY94) *Source*: U.S. Department of Energy, EIA State Energy Data Reports.
- **Consumption of Renewable Energy by Type** (FL94) *Source*: Florida Statistical Abstract. *Limitations*: Figures are estimates derived from mathematical analyses.
- **Consumption of Petroleum for Transportation** (KY94) *Source*: US Department of Energy, EIA State Energy Data Reports.
- **Total Energy Consumption (Industrial, Residential, Commercial, and Transportation)** (KY94) *Source:* U.S. Department of Energy, EIA State Energy Data Reports.
- **Industrial Energy Consumption by Source** (KY94) *Source:* U.S. Department of Energy, EIA State Energy Data Reports.
- **Residential Energy Consumption by Source** (KY94) *Source:* U.S. Department of Energy, EIA State Energy Data Reports.
- **Per Capita Residential Energy Consumption** (KY94) *Source:* U.S. Department of Energy, EIA State Energy Data Reports.
- **Electric Energy Consumption, Coal and Hydro** (KY94) *Source:* U.S. Department of Energy, EIA State Energy Data Reports.
- **Percentage of Energy Derived from Natural Gas and Renewable Resources** (CT95) *Source:* State-Draft Comprehensive Energy Plan.

  Analysis

  These indicators measure energy consumption by use and by source. Tracking progress with these indicators will depend on what the goal is, whether reducing consumption or increasing alternative energy usage.

Vehicle Miles Traveled/Transportation Trends

- **Vehicle Miles Traveled Per Year** (CT95) (OH95) *Source:* State Department of Transportation.
- **Per Capita Vehicle Miles Traveled** (KY94 *Source:* Kentucky DOT*)*, (OR92 *Source:* State Department of Transportation*)*, (NE *Source:* USEPA/New England States*).*
- **Average Daily Vehicle Miles Traveled (VMT) on the State Highway System** (CO *Source:* not given*)* (VT94 *Source:* State Agency of Transportation) (FL94 Transportation Statistics Office, Florida Department of Transportation*) (*IL94 *Source:* Sources of Environmental Stress, ENR Office of Research and Planning Illinois*)*

- **Vehicle Miles Traveled and Energy Consumption Trends for State, and Related Socio-Economic Variables as Appropriate to State's Economy** (CCS95) *Proposed.*
- **Transportation Trends (Vehicle Miles Traveled, Fuel Use, Registered Vehicles, and Population)** (ME94) *Source:* Commission on Comprehensive Energy Planning.
- **Motor Vehicles Traveling More Miles** (MA95) *Source:* State Department of Environment Protection.
- **Number of Registered Vehicles** (KY94) *Source:* Kentucky Transportation Cabinet.
- **Modes of Transportation to Work** (KY94) *Source:* State Data Center, U.S. Census *Description:* Modes of transportation are personal vehicle, carpool, public transportation, walked, other, work at home.
- **Residents Who Use Public Transportation to Get to Work** (OH95) *Source:* Department of Transportation, 1993, *Access Ohio.*
- **Percentage of Oregon Households With Personal Computers at Home Who Send and Receive Data and Information Over Telecommunications** (OR94) *Source:* Oregon Value Study conducted for the Oregon Business Council in 1992. Also, the Oregon Population Survey conducted by telephone in 1994. *Description:* This indicator is presented in this category as a future indicator of decline in vehicle miles traveled.
- **Percentage of Oregon Households That Made Use of High Speed-Multichannel Telecommunications Line** (OR94) *Source:* Public Utilities Commission. *Description:* High speed transmission will become the highway of the information age. Oregon's use of this service will give the state a competitive edge at attracting knowledge workers and bring the productivity that such services can provide. This indicator is presented in this category as a future indicator of decline in vehicle miles traveled.

  Analysis

  These indicators measure transportation trends such as vehicle miles traveled, fuel consumption, and modes of transportation. Tracking progress with these indicators will depend on what the goal is, whether reducing vehicle miles traveled and/or increasing alternative transportation sources. Vehicle miles traveled is an effective measure used in combination with other environmental or health information, but less powerful on its own.

Environmental Economics

- **The Relationship Between Strong Economic Growth and Sound Environmental Health** (NE95) *Source:* Institute for Southern Studies. *Description:* States with the best record of environmental stewardship often have the healthiest economies.

  Analysis

  This "indicator" is a composite of social and environmental measurements including legislative action, budget expenditures and some incomplete environmental data sources. It is speculative that the measures, combined or separate, represent the relationship between economic growth and environmental health. As the only published attempt to cover this area, the composite overstates and over reaches the subject matter; a deficiency in the indicator's development.

Freshwater Fisheries

(Also see Marine Fisheries)

- **Harvest of Fish Populations** (EPA92) *Source:* EPA Chesapeake Program, Environmental Results and Forecasting Branch.
- **Freshwater Fish Decline** (EPA92) *Source:* American Fisheries Society.
- **Percentages of Catches by Species, Over Time** (IL94) *Source:* Ecological Resources, Illinois Natural History Survey.
- **Mean Numbers of Indigenous Fish Species Per Sample, by County** (IL94) *Source:* Ecological Resources, Illinois Natural History Survey.
- **Commercial Lake Trout Harvest** (IL94) *Source:* Ecological Resources, Illinois Natural History Survey.
- **Commercial Fishing Licenses Issued** (KY94) *Source*: Kentucky Department for Fish and Wildlife Resources.
- **Percentage of Key Sub-Basins in Which Wild Salmon and Steelhead Populations Are Increasing or at Target Levels** (OR92) *Source:* Northwest Electric Power and Conservation Planning Council. *Description:* This measures the change in stock in populations of wild salmon and steelhead.
- **Decline in Salmon Runs** (OR94) *Source:* Northwest Electric Power and Conservation Planning Council.
- **Adult Salmon Runs in the Sacramento River** (LCI95) *Proposed.*

  Analysis

  These indicators measure the health and population of various fish species. They are indirect indicators of overfishing and/or habitat loss associated with water withdrawal and/or pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Marine Fisheries

Fish

- **Number of Fish Caught by Recreational Anglers, by Access (Beach, Pier, Private Boat, Charter Boat)** (NC95) *Source:* State Division of Marine Fisheries.
- **Key Species Caught Per Trip (Pounds) (Bluefish, Blue Crab (Hard), Spiny Lobster, King Mackerel, Black Mullet, Spotted Seatrout, Shark) (Commercial only)** (FL94) *Source:* Survey conducted by the National Marine Fisheries Service in Washington, D.C. and reported in the annual report, Marine Recreational Fisheries Statistics Survey, Atlantic and Gulf Coasts.
- **Total Pounds of Key Species Caught (in thousands) (Bluefish, Blue Crab (Hard), Spiny Lobster, King Mackerel, Black Mullet, Spotted Seatrout, Shark) (Commercial only)** (FL94) *Source:* Survey conducted by the National Marine Fisheries Service in Washington, D.C. and reported in the annual report, Marine Recreational Fisheries Statistics Survey, Atlantic and Gulf Coasts.
- **Abundance of Groundfish and Flounder** (NE95) *Source:* National Oceanic Atmospheric Administration.
- **Total Industrial Finfish and Menhaden Landings** (NC95) *Source:* State Division of Marine Fisheries.
- **Baywide American Shad Landings, Population** (CB95) *Source:* National Marine Fisheries Service.
- **Striped Bass Commercial Landings** (CB95) *Source:* National Marine Fisheries Service.
- **Striped Bass Juvenile Index** (EPA92) *Source:* EPA Chesapeake Program.
- **Percent Female Striped Bass Spawning Stock Greater Than Age 8** (CB95) *Source:* Maryland Department of Natural Resources *Description:* Females greater than age 8 are generally 100 percent mature and contribute greatly to total egg production.
- **Baywide Striped Bass Juvenile Index (Catch Per Unit Effort, Weighted and Scaled)** (CB95) *Source:* Virginia Institute of Marine Science.

  Analysis

  These indicators measure the health and population of various fish species. They are indirect indicators of overfishing and/or habitat loss associated with water withdrawal and/or pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Shellfish

- **Annual Landings of Mollusks** (NC95) *Source:* State Division of Marine Fisheries.
- **Blue Crab Recruit Trawl Survey Data (Catch per Unit Effort)** (CB95) *Source:* Virginia Institute of Marine Science *Description:* Virginia is measuring the number of "recruits" that enter the crab population each year. Recruits are defined as crabs with a shell (carapace)

width between 1 and 4 inches. In 1980, a "tickler chain" was added to the trawl, greatly increasing catch and making a comparison between methods invalid.

- **Summer Trawl Survey** (CB95) *Source:* Maryland Department of Natural Resources *Description:* The Maryland Summer Trawl Survey monitors 37 sites per month, collecting information from May to October. By reporting in three categories-recruits, growth stages, and mature-it is possible to assess the size distribution of the populations and predict the number of large and small crabs for the following season.
- **Total U.S. Oyster Harvest** (EPA92) *Source:* National Oceanic and Atmospheric Administration.
- **Baywide Oyster Landings** (CB95) *Source:* National Marine Fisheries Service.
- **Spat per Standard Bushel** (CB95) *Source:* Maryland Department of Natural Resources and Virginia Institute of Marine Science *Description:* A spat is an immature oyster.
- **Commercial Harvest of Miscellaneous Mussel Species** (IL94 *Source*: Ecological Resources, Illinois Natural History Survey KY94 *Source*: Kentucky Department of Fish and Wildlife Resources)

  Analysis

  These indicators measure the health and population of various shellfish populations. They are indirect indicators of possible overfishing and/or habitat loss associated with water pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Overall

- **Percentage of Commercial Landings, by Category (Crustaceans, Mollusks, Edible Finfish, Industrial Finfish)** (NC95) *Source:* State Division of Marine Fisheries.
- **Annual Weight of Commercial Marine Fisheries Landings (Finfish, Invertebrates, Shrimp)** (FL94) *Source*: Florida Marine Research Institute Fisheries Information System *Limitations:* Includes only commercial landings. Commercial landings data are computerized from trip ticket information submitted by Florida wholesale and retail dealers to the Department and are compile into annual reports providing summaries for each species by coast, county, and month.
- **Annual Landings of Edible Commercial Species Harvest (Edible finfish, Crustaceans, Mollusks)** (NC95) *Source:* State Division of Marine Fisheries.

  Analysis

  These indicators measure the health and population of various aquatic species. They are indirect indicators of possible overfishing and/or habitat loss associated with water pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Landings vs. Stocks

- **Commercial Landings vs. Stock Conditions, Shrimp** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Blue Crabs** (NC95 *Source:* State Division of Marine Fisheries) (CB95 *Source:* National Marine Fisheries Services).

- **Finfish Stock Evaluations, by Status Category (Healthy, Stressed, Depressed, Unknown)** (NC95) *Source*: State Division of Marine Fisheries*. Description:* Based on age/size composition, juvenile abundance indices, reproductive success, spawning stock abundance, catch-per-unit-effort, and harvest.
- **Crustacean Stock Evaluations, by Status Category (Healthy, Stressed, Depressed, Unknown)** (NC95) *Source:* State Division of Marine Fisheries*.*
- **Mollusk Stock Evaluations, by Status Category (Healthy, Stressed, Depressed, Unknown)** (NC95) *Status:* State Division of Marine Fisheries*.*
- **Commercial Landings vs. Stock Conditions, Bluefish** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Flounder** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Oysters** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Hard Clams** (NC95) *Source*: State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Scallops** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Weakfish** (NC95) *Source:* State Division of Marine Fisheries.
- **Commercial Landings vs. Stock Conditions, Striped Bass** (NC95) *Source:* State Division of Marine Fisheries*. Description:* Considered an important individual species.

Analysis

These indicators measure the health and population of various aquatic species. They are indirect indicators of possible overfishing and/or habitat loss associated with water pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Shellfish Growing Areas

- **Status of Shellfish Beds** (DIIR95) *Source:* National Oceanic and Atmospheric Administration.
- **Acres of Shellfish Beds With Adequate Shellfish Base and Spawning Stock Under Cultivation** (CT95) *Source:* State Department of Agriculture--Shellfish Bed Licensing.
- **Trends in Classified Shellfish Waters** (EPA92) *Source:* National Oceanic and Atmospheric Administration.
- **Sources of Pollution Affecting Shellfish Areas** (EPA92) *Source:* National Oceanic and Atmospheric Administration.
- **Closed Shellfish Acreage** (NC95 *Source:* State Division of Marine Fisheries) (OW95 *Source:* National Oceanic Atmospheric Administration) (CCS95 *Proposed)*
- **Percent Total Acreage of Shellfish Growing Areas Closed** (NC95) *Source:* State Division of Marine Fisheries.

- **Acres of Shellfishing Waters by Classification (Approved, Conditionally Approved, Restricted, Conditional Restricted, Prohibited)** (FL94 *Source*: Florida Bureau of Marine Resource Regulation and Development*) (*WA *Source*: State Department of Ecology*).*
- **Percent Acres of Saltwater Shellfish Growing Areas Closed** (NC95) *Source:* State Division of Marine Fisheries*.*
- **Percent Closed Acreage of Saltwater Shellfish Growing Areas, by County** (NC95) *Source:* State Division of Marine Fisheries*.*
- **Number of Acres of Conditionally-Approved Saltwater Shellfish Growing Areas, by County** (NC95) *Source:* State Division of Marine Fisheries*. Description:* Shellfish growing areas that are normally open for harvesting but may be temporarily closed because of unacceptable fecal coliform counts after rainfall.
- **Fish and Shellfish Contamination** (OW95) *Proposed.*
- **Waters Meeting Fish and Shellfish Consumption Designated Use** (OW95) Source: National Water Quality Inventory*. Limitations:* The actual assessment of whether waters support their designated uses varies from state to state. When compiling the information for the national 305(b) report, EPA reports on whether waters support designated uses. EPA is working with states and other partners to develop assessment approaches that use comparable methods so that monitoring and assessment information is more consistent from state to state and thus, when aggregated on a national basis, provides a more accurate picture of the Nation's waters*.*
- **Percent Population Change in Coastal Counties** (NC95) *Source:* U.S. Census*. Description:* The related activities occurring in these counties (zoning, level of wastewater treatment, septic tank regulations, number of animal feedlots, etc.), that drives trends in closed acreage.

  Analysis

  These indicators measure the health and population of various shellfish species. They are indirect indicators of possible overharvesting and/or habitat loss associated with water pollution. The indicators will measure trends in population change if measured for a minimum of three years.

Forest Resources

- **Acres of Forest Land (in millions)** (MN92) *Source:* Statewide Forest Inventory and Analysis Survey.
- **Forest Land Area** (DIIR95) *Source:* Forest Resources of the United States, U.S. Forest Service, 1992.
- **Number of Acres of Forest Land in Parcels of 20 Acres or More (in thousands of acres)** (CT95) *Source:* State Division of Forestry.
- **Thousands of Acres of Forest Land in Parcels of 10 Acres or More That Are Managed in Accordance with a Plan Prepared Under the CT Forest Stewardship Program** (CT95) *Source:* State Division of Forestry.
- **Change in Woodlands Since 1750** (OH95) *Source:* State Department of Natural Resources, *Forests of Ohio*.
- **Change in Forest Since 1979** (OH95) *Source:* State Department of Natural Resources, *Forests of Ohio.*
- **Change in Wetlands and Forests** (FL94 *Source:* U.S. Forest Service Reports*) (*IL94 *Source:* Ecological Resources, Illinois Natural History Survey*).*
- **Change in Critical Habitats (Longleaf Pine and Marsh)** (FL94) *Source:* U.S. Forest Service Reports.
- **Amount and Percent of Forest Land** (OH95) *Source:* State Department of Natural Resources, *Forests of Ohio.*
- **Percent of Total State That is Forested** (MA95) *Source:* State Department of Environmental Management.
- **Forest Vegetation Conditions Associated With Air Pollution Effects** (CCS95) *Proposed with data sets from various federal sources, depending on state, including Environmental Management Assessment Program, and USDA Forest Health Monitoring Program*.
- **Average Tree Ratings for New England and Virginia (Total Trees, Dieback, Transparency, Crown Density, Trees With Symptoms)** (EPA92) *Source:* New England Forest Health Monitoring Project.
- **US Forest Insect Damage** (Cat95) *Proposed in Environmental Quality: CEQ Report.*
- **Forest Degradation as Measured by Federal and State Monitoring** (CCS95) *Proposed with possible sources being USDA, Forest Service and several agricultural services.*
- **Amount of Timber Harvested Per Year in Oregon** (OR94) *Source:* State Department of Forestry, Resource Policy Division.
- **Number of Wood Industries** (KY94) *Source:* Kentucky Division of Forestry.
- **Timber Stumpage Price Trends** (KY94) *Source:* Timber Mart-South, Stumpage Price Mart; University of Kentucky School of Forestry.
- **Timber Harvests from Selected Public Forests** (KY94) *Source:* Kentucky Division of Forestry, U.S. Forest Service.

- **Forest Harvest and Resource** (VT96) *Source:* not given. *Description:* Total harvest, mature tree harvest, total resource, and mature resource measured for percentage of annual increase from 1973 to 1993.
- **Percentage of Public and Private Forest Land in State Available for Timber Harvest** (OR94) *Source:* State Department of Forestry, Resource Policy Division.
- **Management Plans and Acres Managed on Privately Owned Forestlands** (KY94) *Source:* Kentucky Division of Forestry.
- **Forest Fire Trends** (KY94) *Source:* Kentucky Division of Forestry.
- **Tree Planting Trends** (KY94) *Source:* Kentucky Division of Forestry.
- **Urban/Community Forestry Programs** (KY94) *Source:* Kentucky Division of Forestry.
- **Percentage of Maple Trees Healthy** (VT95) *Source:* not given. *Description:* The Department of Forests, Parks and Recreation annually examines and measures trees and other vegetation on more than 145 permanent long-term study plots. Changes in forest insect populations and disease incidence are measured at more than 200 additional forest pest monitoring sites.
- **Distribution of Tree Sizes as a Measure of Sustainability** (VT96) *Source:* not given. *Description:* Young, Immature, and Mature trees measured in 1973 and 1983 against their ideal size. During the past 20 years, there has been a shift toward more mature forests as represented by tree size.
- **Percentage of 1970 Forest Land Still Preserved for Forest Use** (OR92) *Source:* State Forestry. *Description:* Forest land means acres of forested land where the dominant uses are for timber, watershed, wildlife, or recreation.
- **Percentage of Rangelands in Good or Excellent Condition** (OR92) *Source:* State Department of Agriculture, based on Soil Conservation Service data. *Description:* This measures the percentage of rangelands which meet Soil Conservation Service's condition categories of "good" and "excellent". These ratings are based on, among other criteria, plant diversity and soil condition.

Analysis

These indicators measure the size of forests, individual trees, harvests, and other issues associated with the forest industry. The indicators are mostly indirect measurements of forest condition and sustainability. These indicators can be used to track progress depending on what the objective is; for example, combating air pollutants or pests that impact forests, maintaining forestry jobs, or maintaining forest diversity.

Mineral Resources

Coal

- **Trends in Coal Production** (IL94) *Source:* Earth Resources, Illinois State Geological Survey.
- **Coal Production vs. Reclamation** (IL94 *Source*: Earth Resources, Illinois State Geological Survey*) (*KY94 *Source*: Kentucky Department of Mines and Minerals*).*
- **Coal Mining Methods** (KY94) *Source:* State Mines and Minerals*.*
- **Reclamation of Abandoned Mine Lands** (KY94) *Source:* State Dept. of Surface Mining Reclamation and Enforcement.
- **Number of Coal Mines** (KY94) *Source:* State Coal Marketing and Export Council*.*
- **Acres Permitted for Coal Mining** (KY94) *Source:* State Dept. of Surface Mining Reclamation and Enforcement.
- **Coal Mining Water Violations by Type** (KY94) *Source:* State Dept. of Surface Mining Reclamation and Enforcement; KY Division of Water.
- **Natural Resource Extraction** (OH95) *Source:* Ohio Statistical Abstract, Almanac, Abstract of the U.S., and Ohio Geology. *Description:* Includes coal, limestone, sand and gravel, oil, and gas.
- **Total Mined Acres Reclaimed (Phosphate)** (FL94) *Source:* FL Department of Environmental Protection*.*
- **Acres Mined and Reclaimed Annually (Phosphate)** (FL94) *Source:* FL Department of Environmental Protection.

  Analysis

  These indicators tell us what the trends in coal mining, mining reclamation, and mining violations are. These indicators can be used to track progress depending on what the goal is; for example, reclaiming more abandoned mining land and/or decreasing the number of violations associated with mining activities.

Oil and Gas

- **Number of New Oil and Gas Wells Drilled (Percent Change)** (OH95) *Source:* State Department of Natural Resources, Division of Oil and Gas.
- **Number of Active Oil and Gas Wells** (OH95) *Source:* State Department of Natural Resources, Division of Oil and Gas.
- **Number of Oil and Gas Wells** (KY94) *Source:* State Mines and Minerals*.*
- **Crude Oil Production** (KY94) *Source:* State Energy Data, Geological Survey, U.S. Department of Energy.
- **Natural Gas Production** (KY94) *Source:* State Energy Data, Geological Survey, U.S. Department of Energy.

  Analysis

  These indicators tell us what the trends in oil and gas production are. These indicators can be used to track progress depending on what the goal is; for example, decreasing the number of oil spills, increasing oil and gas production, or decreasing demand for

these resources in relationship to alternative energy sources.

Public Lands and Open Spaces

Acres

- **Acres of Primitive and Wilderness Public Land in Oregon (millions)** (OR92) *Source:* State Department of Parks and Recreation.
- **Acres of Community Parks, Designated Recreation Areas and Designated Open Space Per 1,000 Oregonians Living in Communities** (OR92) *Source:* State Department of Parks and Recreation.
- **Number of Well-Maintained State Outdoor Parks and Recreational Facilities** (CT95) *Source:* State Department of Environmental Protection.
- **Number of State Nature Preserves Open to the Public** (OH95) *Source:* State Department of Natural Resources, Division of Natural Areas and Preserves.
- **Acres of Public Lands Purchased/Managed for Preservation or Conservation (State Acquisition: Number of Acres by Program and Federal Preservation Lands)** (FL94) *Source: FL DEP.*
- **Land Area in Parks and Wildlife Refuges (millions of acres)** (MN92) *Source:* US General Services Administration and the State Department of Natural Resources.

Analysis

These indicators measure the amount of acres that exist in the form of public lands or open space. The indicators will track progress depending on what the goal is. For example, if the goal is to have a certain amount of acreage set aside per 1000 residents by 2005, the indicator can track annual progress.

Percentage of Land Conserved/Developed

- **Percentage of New Developments Where Occupants are Within 1/2 Mile of a Mix of Stores and Services, Transit, Parks, and Open Spaces** (OR92) *Proposed. Description:* This pattern of development provides places for people to live that are inviting, reduce the need for driving, and preserve open spaces.
- **Percentage of Existing Developments Where Occupants Are Within 1/2 Mile of a Mix of Stores and Services, Transit, Parks, and Open Spaces** (OR92) *Proposed using census, land use, and transit district data with the use of GIS.*
- **Percentage of Development in Oregon Per Year Occurring Within Urban Growth Boundaries** (OR92) *Source:* Growth Management Case Studies, Oregon Department of Land Conservation. *Description:* The aim is to fend off sprawl and preserve and protect farm and forest lands.
- **Urban Land Use** (OH95) *Source:* Ohio State University Extension Service, 1989.
- **Number of Townships With Rural Zoning** (OH95) *Source:* Ohio State University Extension Service, 1989.

- **Percentage of Total Land Within the Portland Metropolitan Area Which is Open Space** (OR92) *Source:* Portland Greenspace Inventory, METRO.
- **Percentage of Total Land Within the Portland Metropolitan Area Preserved as Open Space** (OR92) *Source:* Portland Greenspace Inventory, METRO.
- **Number of Designated State or Federal "Wilderness Areas"** (OH95) *Source:* State Division of Forestry.

Analysis

These indicators measure the percentage of land area preserved as open space, and the percentage of development near urban areas and/or open spaces. These indicators are indirect measurements of urban sprawl and the loss of open space. The indicators will track progress depending on what the goal is. For example, if the goal is to decrease urban sprawl while increasing or maintaining open space, these indicators could be used together as benchmarks.

Environmental and Conservation Spending

- **Percent Change in Statewide Public Environmental Spending From Fiscal Year 1989 to Fiscal Year 1995** (OH95) *Source:* State EPA, Office of Fiscal Analysis.
- **State Apportionment of Land and Water Conservation Fund Monies** (OH95) *Source:* State Department of Natural Resources, Division of Real Estate and Land Management.
- **Total Environmental Spending** (OH95) *Source: State EPA, Office of Fiscal Analysis.*
- **State Spending on Land Acquisition** (MA95) *Source: Massachusetts Executive Office of Environmental Affairs.*

Analysis

These indicators measure state spending on land acquisitions and the preservation of land. The indicators will track progress depending on what the goal is. For example, if the goal is to increase public lands and/or protect natural habitats, these indicators could be used as a measurement of state support.

Recreation

- **Miles of Recreational Trail (in thousands)** (MN92) *Source:* State Registry of Public Recreational Trail Mileage.
- **Miles of Bike and Hiking Trails** (OH95) *Source:* State Department of Transportation, *Ohio Statewide Bicycle Plan.*
- **Number of Public Access Sites on Lakes and Rivers** (MN92) *Source:* State Department of Natural Resources, Trails, and Waterways Unit.
- **Total Outdoor Recreation Acreage (percent of total acreage)** (OH95) *Source:* State Department of Natural Resources, *Statewide Comprehensive Outdoor Recreation Plan*.
- **Acres of Multi-Purpose Public Land Available for Recreation in Oregon (millions)** (OR92) *Source:* State Department of Parks and Recreation.
- **Acres of Oregon Parks and Protected Recreation Land Per 1,000 Oregonians** (OR92) *Source:* State Department of Parks and Recreation.

- **State-held Lands for Recreation** (OH95) *Source:* State Department of Natural Resources, *Statewide Comprehensive Outdoor Recreation Plan*.
- **Federal-held Lands for Recreation** (OH95) *Source:* State Department of Natural Resources, *Statewide Comprehensive Outdoor Recreation Plan.*
- **State and Federal Outdoor Recreation Acres Per 1,000 People** (OH95) *Source:* State Department of Natural Resources, Division of Real Estate and Land Management.
- **Dollars Spent on Outdoor-Related Recreation Per Household in 1993** (OH95) *Source:* State Department of Natural Resources, Statewide Comprehensive Outdoor Recreation Plan.
- **Percentage of River Miles and Lake Acres That Meet Fishable and Swimmable Standards** (MN92) *Source:* State Pollution Control Agency. *Description:* The percentage of lakes and streams qualifying as fishable and swimmable is an indication of the health of the state's waters.
- **Rivers/Streams/Lakes/Estuaries (miles/acres/square miles) Reported in State 305(b) Reports as Meeting Uses for Fishing, *Swimming, Boating*, Drinking Water, and Shellfishing** (CCS95) *Proposed.*
- **Percent of State Waters That Meet Designated Uses for Aquatic Life and for Recreation; Identification of Impaired/Threatened Waters and the Causes/Sources of Impairment** (EPA-POPM95) *Proposed using 305b data collection.*
- **Disease Outbreaks from Swimming** (OW95) *Proposed* Limitations: Currently, reporting by state health departments is voluntary and, presumably, only a fraction of the total number of outbreaks is reported to CDC and EPA, but the extent of underreporting is unknown. Likewise, the extent that individual cases of illness will be linked to water varies considerably among locales and is dependent upon such factors as consumer awareness, physician interest, and surveillance activities of state and local health and environmental agencies.
- **Number of Access Sites on Lakes, Rivers, and Long Island Sound Needed to Meet Fishing, Boating, and Swimming Access Demand** (CT95) *Source:* State Department of Environmental Protection.
- **Beach Closures** (LCI95) *Proposed.*
- **Beach Closures** (OW95) *Proposed*--no data consistently reported on a national level that can accurately represent the total number of and reason for beach closures.
- **Beach Closures: Miles Closed and Organism Levels** (Cat95) *Proposed in the Inventory of Indicators, May 1994.*
- **Number of State Park Beaches Closed or Posted by Local Health Departments Due to Elevated Coliform Counts** (OH95) *Source:* State Division of Parks and Recreation.
- **Waters Meeting Swimming and Secondary Contact Designated Use** (OW95) *Source:* National Water Quality Inventory. *Description:* EPA is working with states and other partners to develop assessment approaches that use comparable methods so that monitoring and assessment information is more consistent from state to state and thus, when aggregated on a national basis, provides a more accurate picture of the Nation's waters.

Analysis

These indicators measure issues concerning recreation, such as beach closures, land availability, and waters meeting designated use. The beach closure and designated use indicators are indirect measures of water pollution problems.