

Communicating Information on the Condition of Terrestrial Ecosystems

A Focused Investigation of Indicators of Terrestrial Ecosystem Health

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TERRESTRIAL ECOSYSTEM INDICATORS

Table of Contents

1.0	Introduction	1
2.0	Background and Scope	3
3.0	Approach	5
4.0	Data Sources	7
4.1	Overview	7
4.2	Data Sources Currently Available for Use	7
4.3	Promising New Data Sources	11
4.4	Other Data Sources	12
5.0	Indicators	19
5.1	Overview	19
5.2	Indicators Currently Available for Use	19
5.3	Promising New Indicators	22
5.4	Other Indicators	25
6.0	Matching Indicators to IWI Approach	37
6.1	Overall Condition of the Landscape	37
6.2	Abundance and Condition of Ecosystems	38
6.3	Abundance and Condition of Populations/Species	39
6.4	Abundance and Condition of Ecosystems or Species of Special Concern	39
6.5	Ecological Services	40
6.6	Pollution and Sedimentation	41
6.7	Human Population Pressure	41
6.8	Indirect/Other Stress	42
7.0	General Comments	47
7.1	Data Availability	47
7.2	Data Quality	47
7.3	Data Accessibility	47
7.4	Data Integration	48
7.5	Data Maintenance	48
Appendix A: Organizations Contacted		A-1
Appendix B: Data Source Descriptions		A-2
Appendix C: Indicator Descriptions		A-3

TERRESTRIAL ECOSYSTEM INDICATORS

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1.0 Introduction

The U.S. Environmental Protection Agency (EPA), in consultation with states, tribes, private organizations, and other federal agencies, has begun several initiatives aimed at providing the general public with a broad understanding of the nation's environmental conditions and trends. The intent is to examine status and trends from a broad perspective that is not tied to regulatory mandates and to gather and present the best available data from a variety of EPA and non-EPA sources.

As part of these overall initiatives, EPA's Office of Information Resources Management asked the Office of Policy, Planning and Evaluation to identify existing indicators of ecosystem health, along with associated data sources, that can be used to examine the status and trends of the nation's terrestrial ecosystems. In addition to their inherent resource value, the condition of terrestrial systems and landscapes has direct impacts on human health and welfare.

This report presents the results of a focused investigation of promising indicators and data sources rather than a comprehensive inventory of past, present, and future data gathering and reporting. Of particular interest are indicators of landscape and terrestrial ecosystem condition and supporting data sources that: (a) have been used on a broad geographic scale (e.g., nationwide), and (b) could be integrated with the framework established for EPA's *Index of Watershed Integrity* (IWI). Also of interest are indicators that could be used to support the *State of the Environment* report and related EPA initiatives and could be incorporated into existing EPA data systems for longitudinal tracking.

Examples of Recent EPA Efforts to Assess Environmental Conditions and Trends

Environmental Goals for America. This draft report, issued in December 1996, proposes long-range goals and measures of progress that will improve our personal health, economy, and quality of life.

Indicators of Watershed Integrity. This report and database, issued in September 1997, presents 18 national indicators of the "health" of water resources and provides access to these data via the Internet.

State of the Environment. This report, scheduled to be issued in March 1998, is being developed by EPA's Center for Environmental Information and Statistics.

The remainder of this report is organized as follows:

- Chapter 2 provides a brief background for this report and discusses the scope of this investigation.
- Chapter 3 presents the approach used to develop this report.
- Chapter 4 provides an overview of the data sources identified and identifies data sources that are currently available to support indicators of terrestrial ecosystem health as well as promising new data sources.

TERRESTRIAL ECOSYSTEM INDICATORS

- Chapter 5 provides an overview of the indicators identified and identifies indicators that are currently available as well as promising new indicators.
- Chapter 6 provides suggestions for integrating indicators of terrestrial ecosystem health with the IWI framework.
- Chapter 7 provides some general comments regarding data availability, quality, accessibility, integration, and maintenance.

This report also includes three Appendices:

- Appendix A provides an overview of the organizations and individuals contacted during this investigation.
- Appendix B provides a brief description of each data source identified in Chapter 4.
- Appendix C provides a brief description of each indicator identified in Chapter 5.

2.0 Background and Scope

In the early 1970s, the United States inaugurated a sustained commitment to reclaim and protect the environment to ensure that future generations of Americans will enjoy opportunities for healthy, economically secure lives. These efforts have been immensely successful in regulating and otherwise controlling the use and release of harmful substances; protecting and revitalizing rare, vulnerable, and important species and natural resources; and restoring the health of polluted or degraded environments.

Over the past quarter century, environmental protection efforts have evolved from a backward-looking emphasis on correcting past mistakes (e.g., banning the use of DDT, cleaning up polluted areas) to a more forward-looking emphasis on good stewardship practices (e.g., energy efficiency, pollution prevention). As our knowledge and understanding has progressed, we have begun to realize the benefits of replacing prescriptive regulation and control measures with an approach that couples clear, measurable environmental goals with the flexibility to develop innovative approaches for meeting those goals. This approach should promote solutions that achieve the same or better results in a cheaper, smarter manner.

The shift in emphasis from "command and control" to goal-oriented solutions requires a corresponding shift in the type of information required to demonstrate progress. In the past, progress was measured in terms such as permits issued, emissions reduced, or criteria met. A goal-oriented approach requires a clear articulation of the tangible results toward which programs are aimed and a set of objective criteria by which environmental progress will be measured. It thus is necessary to begin to develop indicators and other related criteria for assessing terrestrial ecosystem health and to monitor the status and trends in these indicators.

The federal government currently spends about \$650 million per year collecting data on our terrestrial and aquatic ecosystems. These resources are divided among a variety of federal agencies, and data are being collected for a variety of purposes. With some exceptions, these data are not synthesized within a common framework, compiled or referenced in a single source, or even readily accessible by government agencies or private citizens. This, in turn, makes it difficult for citizens to understand the current condition of terrestrial ecosystems, engage in a discussion of what environmental results we intend to achieve and the best means of achieving these results, and evaluate the effectiveness of environmental protection efforts.

This report takes a small step toward compiling and evaluating existing data sources and indicators of terrestrial ecosystem health within a common conceptual framework. It builds upon the results of several recent reports, including *A Guide to Selected National Environmental Statistics in the U.S. Government* (EPA 230-R-93-003, August 1993) and four reports produced by the State Environmental Goals and Indicators Project, a cooperative agreement between EPA and Florida State University: *Catalogue of*

This report is a focused examination of **indicators** of terrestrial landscape and ecosystem condition or health and supporting **data sources** that (1) have been used on a broad geographic scale and (2) could be incorporated into the Index of Watershed Integrity (IWI) framework. It is not a comprehensive inventory of all indicators and data sources.

TERRESTRIAL ECOSYSTEM INDICATORS

Environmental Indicators, Catalog of Data Sources, State Indicators of National Scope, and Directory of Environmental Practitioners (all published in October 1996).

Unlike previous efforts, this investigation is focused on identifying indicators that are appropriate to terrestrial landscapes and ecosystems, are currently available on a broad geographic scale (preferably nationally), are supported by existing databases, and can be incorporated into a framework of indicators established by the IWI approach. Although the primary focus is on existing, "ready-to-go" indicators, this report also attempts to identify promising new indicators and data sets that offer additional measures of terrestrial landscape/ecosystem health but require additional development. However, the no attempt is made to provide a comprehensive catalog of all indicators that have been developed or proposed for terrestrial systems. Other efforts, such as the ongoing effort to develop a National Report Card on the Nation's Ecosystems, are attempting a more comprehensive cataloging of indicators.

The evaluations and conclusions included in this draft report are based primarily on telephone conversations with persons responsible for developing or using the data sources and indicators referenced in this report and a limited review of available materials about these sources. The project staff did not obtain copies of databases or otherwise undertake a detailed review of the feasibility of implementing any indicators in the IWI framework. In addition, the evaluations and conclusions included in this draft report represent the professional judgment of the project team and are not intended to be interpreted as EPA policy or guidance.

3.0 Approach

The project team used several search strategies to identify appropriate data sources and indicators. A key starting point was a review of background materials and reports provided by the EPA Workgroup responsible for this project. A second important source of information was keyword and other directed searches of Internet home pages. Although the background materials and home pages provided general descriptions, in most cases it was necessary to identify one or more key contacts for each data source and indicator and to conduct telephone interviews with these individuals to obtain more detailed information. In addition, the project team met individually with a few key contacts (e.g., representatives from the U.S. Geological Service). Appendix A provides an overview of 143 programs, projects, and data sources identified during this investigation. From these sources, the project team identified approximately 89 data sources and 49 indicators that merited additional information gathering.

The project team used several criteria to identify data sources and indicators for additional research. These criteria were not applied in an all-or-none manner, but rather were used in a qualitative manner to identify the relative applicability of each data source and indicator to the IWI framework. The criteria used in this project are similar to those used by the IWI framework, except that the IWI includes a more rigorous evaluation of the scientific validity of indicators and technical quality of data sources (see box).

- The data source or indicator is currently or could reasonably be expanded to be national in scope. Measures specific to a particular region or state would have limited utility to the IWI, which has a national focus.
- Data are readily available and are already being collected for reasons unrelated to the IWI. Use of available data makes efficient use of federal and other resources already directed toward gathering environmental data and makes it more likely that a sufficient set of time series data will be available for trends analysis.
- The data source or indicator is currently used as an environmental management tool. Measures already used for decision-making are likely to meet reasonable data quality objectives and are likely to be meaningfully related to some environmental goal.

Criteria Used by the IWI Framework:

Indicator Criteria:

- Scientifically valid
- Cost effective
- Practical to implement
- Relevant to goal
- Suitable to programs
- Understandable

Data Source Criteria:

- Availability of data
- Appropriate temporal coverage
- Appropriate spatial coverage
- Documented quality
- Technical credibility
- Acceptable estimation error
- Acceptable cost

TERRESTRIAL ECOSYSTEM INDICATORS

- The indicator and the information it provides are relatively transparent to the public. A key goal of the IWI framework is providing the public with information they can use and understand.
- The data source or indicator can be referenced geospatially. The IWI focuses at a watershed level; watershed boundaries rarely, if ever, coincide with political boundaries. In addition, remote sensing technologies (e.g., satellites, aerial surveys) are likely to be used more intensely in future environmental data gathering efforts.

The project team gathered information on several types of attributes for each data source and indicator. This information is provided in hard copy in Appendix B (data sources) and Appendix C (indicators). In addition, all information has been included in a relational database (Microsoft Access).

- Type of indicator (e.g., screening, diagnostic, integrity/health measure).
- Entity or entities currently/formerly responsible for data collection.
- Measures or metrics used.
- Type and category of ecological/biological response represented.
- How the indicator is currently used by responsible entity.
- Readiness for use (e.g., currently available, expected soon, early stages of development).
- Data availability (e.g., time span covered, collection/reporting frequency).
- Geographic scale (e.g., regional, local, national).
- Completeness (e.g., time, space, ecosystem categories).
- Specificity (e.g., ecosystem type only, broad landscape level).
- Accessibility of data (e.g., hard copy reports, web page).
- How to access data (e.g., name of primary contact, phone/fax/email/URL address).

4.0 Data Sources

The focus of this part of the investigation was to identify available and emerging data sources that could support terrestrial ecosystem indicators. Table 4-2 (presented at the end of this chapter) provides an overview of 78 of the 89 individual data sources that merited further investigation by this project (the others are less relevant but included in Appendix A). This table includes a qualitative assessment of the overall quality of the data source (where we could ascertain this), the geographic extent of information included in the data set, and an indication of the types of state or pressure indicators that could be supported by the data source. Appendix B presents a more detailed description of each data source. Section 4.1 provides an overview of the data sources included in the database. Section 4.2 provides a brief description of data sources that appear to be currently available for use to support nationwide indicators of terrestrial ecosystem health. Section 4.3 provides a brief description of data sources that currently are under development but show promise as future sources of data for these indicators. Section 4.4 provides a listing of other data sources that are available but are limited in value based on geographical coverage, temporal coverage, or information content.

4.1 Overview

Information on 89 data sources is included in the project database (see Appendix B) [note that the database includes 10 entries that are not discussed in this chapter]. The majority of these data sources are maintained by federal agencies (Table 4-1). These data sources span a range of geographic scales; however, the vast majority provide data at the international and/or national levels. The focus of this investigation was on available data bases; nearly all are available at present and can be obtained by the public. The majority of data sources can be accessed electronically either via a disk/CD or via the Internet, although portions of some data sets are still in hard copy. In addition, some data sources are only available in hard copy.

4.2 Data Sources Currently Available for Use

Twenty four databases developed and maintained by a variety of organizations provide data in a format that can be readily incorporated into the IWI approach. In some cases, a single data source includes data to support several different types of indicators (e.g., land use, status of bird populations). Subsequent analysis will be required to determine precisely how each data set could be used to support specific indicators, particularly with regard to integrating these indicators with the IWI approach. Most of these data sources cover all 48 conterminous states; some also include data for Alaska and Hawaii.

- **Forest Inventory and Analysis Database.** This is a comprehensive inventory and analysis of forest and rangeland resources maintained by the U.S. Department of Agriculture (USDA). Data include land use, extent and condition of stands and trees, harvest information, soil texture and structure, vegetation growth rate, biomass, recruitment, disease intensity, species cover, range, and fire. Data have been collected continuously for more than 50 years and are available at the county, sample plot, and tree level.

TERRESTRIAL ECOSYSTEM INDICATORS

Table 4-1. Summary Statistics for Data Sources Investigated (n = 89)

Collecting Organization	Carbon Dioxide Information Analysis Center	8
	National Oceanic and Atmospheric Administration	11
	National Park Service	2
	Nature Conservancy	3
	National Resource Conservation Service	5
	U.S. Environmental Protection Agency	9
	U.S. Fish and Wildlife Service	5
	U.S. Forest Service	6
	U.S. Geological Survey	10
	other federal	12
	other non-federal	6
Geographic Scale	International	25
	National	54
	Regional	17
	State/local	6
Readiness	Currently available	74
	Expected soon	4
	Early development	9
Format	Disk/CD	32
	Hard copy	32
	System	13
	Web page	28
Accessibility	Publicly available	78
	Not publicly available	5

- National Resources Inventory.** This is a comprehensive inventory of soil, land cover, land use, erosion, land treatment, conservation treatment needs, vegetative conditions, and potential for conversion to cropland. Data collected by USDA for more than 50 years are available at the state, county, and 8-, 6-, 4-, and 2-digit hydrologic units. Data collection follows a statistical protocol of census area and point methods. The USDA also uses the NRI data set to report statistical trends.

Statistics from the National Resources Inventory (1982 vs. 1992):

- Federal land increased by 3.3 million acres
- Cropland decreased by 39 million acres
- Developed land increased by 14 million acres
- Rangeland decreased by 10 million acres
- Soil erosion rates declined by 1.4 tons/year
- Prime farmland decreased by 6 million acres

TERRESTRIAL ECOSYSTEM INDICATORS

- **Natural Resource Protection Act (RPA) Updates and RPA Database.** The RPA Updates are periodic reports developed from the Forest Inventory Analysis effort. The RPA Database is a web page prototype for these data.
- **Major Uses of Land in the United States.** In this database, data from the Census Bureau, USDA, public land management and conservation organizations, and other sources are synthesized to estimate acreages of 15 land use categories at the state, regional, and national levels. Although data collected since 1945 are broadly comparable, some data are not strictly comparable due to changes in sources, definitions, and methodology over time.
- **Natural Heritage Network.** This series of databases identify species, natural communities, and ecosystems in need of protection at the local, regional, national, and global levels. Data for species include distribution, population trends, habitat requirements, and ecological relationships. Data for communities include vegetation structure and composition, succession patterns, and natural disturbances.
- **Breeding Bird Census.** This database, maintained by the Cornell Laboratory of Ornithology, provides information on the total number of breeding territories occupied by each species in a series of study plots monitored nationwide. Data have been collected for more than 60 years by experienced observers using standardized methods.
- **North American Breeding Bird Survey.** This database, maintained by the USGS, provides data on the presence/absence of bird species along nearly 4,000 permanent survey routes during the breeding season. Data have been collected since 1966 by experienced observers using a roadside survey technique.
- **Audubon Christmas Bird Counts.** This database, developed and maintained by the National Audubon Society, represents early winter census data for North American bird species. Data have been collected by experienced observers since 1913 in standard census areas. No standardized survey routes are followed, but observations are limited to a 24-hour period.
- **National Climate Data.** This database, maintained by NOAA, contains data on temperature, precipitation, solar radiation, storms, wind, and floods that have been collected since the mid-19th century. These data may be important adjunct information for use in normalizing indicator data.
- **National (NATSCO) and State Soil Geographic (STATSGO) Database.** These databases, maintained by the USDA, provide GIS maps of soil characteristics linked to major land use resource area and boundaries (NATSCO) and 1:250,000 USGS topographic quadrangles (STATSGO). The GIS maps are linked to the Soil Interpretations Record attribute database, which provides proportionate data on component soils and more than 25 physical and chemical properties.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Annual Public Finances Survey.** This database, maintained by the Census Bureau, provides data on current expenditures and capital outlay for health, sanitation, environmental services (e.g., natural resources, parks, sewers, solid waste), housing and community development, and water utilities. Time series data are available in national summary form from the early 1900s and at a more detailed level for approximately 30 years.
- **Highways Statistics.** This database, maintained by the Department of Transportation, includes a variety of data on highways, including traffic volumes, miles traveled, fuel consumption rates, financing, highway mileage, pavement condition, and accidents. Data for many characteristics date to the early 1900s.
- **U.S. Postal Service Delivery Statistics.** This database provides information on the number of mail addresses by state, city, and zip code. Data are updated monthly.
- **Interagency Monitoring of Protected Visual Environments.** This is an interagency monitoring program to assess present visibility levels, identify sources of man-made impairment, and document time trends for visibility in Federal Class I areas (e.g., national parks, wildlife refuges) and the surrounding areas. Data are available for some sites since 1987; 70 sites are currently monitored.
- **National Atmospheric Deposition Program and National Trends Network (NADP/NTN) and Clean Air Status and Trends Network (CASTNet).** These are interagency, national networks of precipitation chemistry monitoring sites. Wet deposition data have been collected at some sites since 1978, and dry deposition data have been collected at some sites since 1988. More than 200 NADP and 50 CASTNet sites are currently monitored. CASTNet includes data on the chemical content of haze and aerosol composition.
- **National (NAMS) and State/Local Air Monitoring Stations (SLAMS).** These are networks of monitoring stations for criteria air pollutants, air toxics, and visibility/fine particulates. Data have been collected at some sites since 1980.
- **UV-B Radiation Monitoring Program Datasets.** This database, established in 1992 by USDA, will collect UV-B data at 6-10 research and 30-40 monitoring stations.
- **National Agricultural Pest Information System.** This database, maintained by USDA, provides survey data for plant pests in the U.S. since 1900.
- **Noxious/Invasive Database.** This database, established in 1983 by DOI, is a geospatially referenced dataset on inventory, biological control, and pesticide data.
- **Ecological Incident Information System.** This database, maintained by EPA, is the largest database of pesticide incident data. Reporting is on an incident-by-incident bases as far back as the early 1960s.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Wildlife Health Epizootiological Database.** This database, maintained by the National Wildlife Health Center, contains records of wildlife mortality and morbidity events, primarily in migratory birds. Data have been collected since 1975 and include dates, species, population numbers, total sick/dead, and mortality/morbidity information. The data system includes software to assist in data analysis.
- **Forest Insect and Disease Conditions.** This database, maintained by USDA, contains information for federal, state, and private forest lands based on aerial and ground surveys. Data include type of insect/disease, size of area affected, and dollars lost by region. Data have been collected since 1952, although archival data may be available only for about the past 20 years. Data are tabular by geographic area.

4.3 Promising New Data Sources

Several databases under development should provide data that are readily incorporated into the IWI approach. Many of these are GIS-based. However, most of these include only a limited, often pilot-level set of data, and it may be several years before enough information is available to support usable indicators. These databases include:

- **North American Landscape Characterization Data.** This database represents a cooperative effort between EPA, USGS, and NASA to use Landsat data to support pollution monitoring and a variety of analyses including changes in range cover, forage production, land use, and vegetation. Only two sample data sets are currently available.
- **Land Use History of North America.** These data, currently being compiled by USGS, will provide a history of patterns of land use over the past millennium. The database is in the early development stage and is scheduled to be completed by the year 2000.
- **Global Vegetation Index.** This database is an experimental normalized difference vegetation index based on advanced very high resolution radiometer satellite data. The data are an indication of vegetation processes such as chlorophyll production.
- **Monitoring Avian Productivity and Survivorship.** This is a cooperative effort among public agencies, private organizations, and private citizens to develop a longitudinal database on age, sex, and breeding status of North American birds using a standardized capture and release protocol. Data have been collected since 1989, and sampling stations have grown from 17 in 1989 to nearly 300 in 1994. Data are being used to assess population dynamics (e.g., age structure, recruitment) in relation to climate variables.
- **Project Feeder Watch.** This effort, managed by the Cornell Laboratory of Ornithology, is aimed at establishing a more systematic survey of winter bird populations than the Christmas Bird Count data. Data have been collected since 1987.
- **North American Amphibian Monitoring Program.** This program, established in 1996 by USGS, will establish a network of sampling sites to monitor the distribution and

TERRESTRIAL ECOSYSTEM INDICATORS

abundance of salamanders and calling frogs in relation to geographic location, land management, air quality, vegetation, and other species. Salamander populations may be an overall indicator of terrestrial ecosystem health.

- **Butterfly Monitoring Project.** This program, established in 1995 by USGS, is in the process of developing a standardized sampling protocol that will provide statistically defensible longitudinal estimates of butterfly populations.
- **North American Raptor Monitoring Program.** This program plans to develop a strategy for monitoring the population status of diurnal raptors in North America.
- **Photochemical Assessment Monitoring Stations.** EPA monitoring network for criteria air pollutants, air toxics, and meteorology designed to study the causes of ozone pollution, to devise effective remedies, and to measure environmental improvement. Data collection began in 1992.
- **Biomonitoring of Environmental Status and Trends.** This program, currently under development by USGS, will employ a national network of sites for monitoring contaminants in and effects on organisms. At the regional level, the program will determine the overall impacts contaminants are having on selected high-priority ecosystems.
- **Mercury Deposition Network.** This is a regional database, established in 1994, to monitor mercury precipitation to surface waters, forested watersheds, and other sensitive receptors. 30 sites are anticipated by 1997.
- **Exotic Species Database.** This database, established by The Nature Conservancy, assesses weed problems on preserves under Conservancy stewardship. Data were collected in 1992 and 1995.

4.4 Other Data Sources

Several other databases are currently available but are more limited in geographic, temporal, and/or relevant coverage. While some data may be useful, considerable data analysis or additional data collection would be required to integrate these data sources into the IWI approach on a national basis. These databases were developed by a variety of organizations, including EPA, the Bureau of Land Management (BLM), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Service (USGS), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and the U.S. Department of the Interior (DOI). These databases include:

- Ecological Site Inventory Data (BLM lands authorized for livestock grazing).
- Land Cover Classification (NOAA data for the Chesapeake Bay watershed).
- GIRAS Landuse/Landcover Spatial Data (USGS data collected once for the entire U.S.).
- Northern Hemisphere Biome Forest Data (EPA data for modeling global carbon cycles).
- Olson's Major World Ecosystem Complexes (EPA global vegetation map).

TERRESTRIAL ECOSYSTEM INDICATORS

- Multi-resolution Land Characteristic Grid (mosaic of Landsat data for EPA Region III).
- Land Cover Characteristics Data (USGS data on land surface attributes).
- Major Land Resource Areas (USDA data on areas delineated by common patterns of soil, climate, water resources, and land use characteristics).
- Land Use Data for Agroecosystems (EMAP data for the Mid-Atlantic Region).
- Man and the Biospheres Reserves data (UNESCO data collected at specified reserves)
- Forest service experimental forest and rangeland sites (USDA experimental sites)
- North American Conservation Assessment (one-time WWF compilation of ecoregion value and vulnerability)
- Long-term Resource Monitoring Program (USGS data for the Upper Mississippi River system)
- Bird Banding Program (USGS mark-recapture records for birds)
- July Duck Production Survey (DOI survey of breeding duck populations)
- Hawk Migration Monitoring (Autumn hawk migration counts at Hawk Mountain)
- Tree planting in the U.S. (USDA data on number of trees planted)
- Forest Service Range Management Information System (USDA data on grazing pressure in National Forests and Grasslands)
- Remote Automatic Weather Stations (USDA monitoring network on Federal lands)
- Global population distribution (Data for 1990 prepared by the Carbon Dioxide Information Analysis Center)
- Data from global climate change monitoring programs, including Atmospheric Halocarbons and Nitrous Oxide, Atmospheric Methane Mixing Ratios, and Atmospheric Carbon Monoxide Mixing Ratios.
- Atmospheric Integrated monitoring Network (NOAA network of monitoring stations designed to provide a research-based foundation for interpreting wet and dry precipitation data from NADP and CASTNet stations)
- Air Quality Monitoring Network (DOI gaseous pollutant data for national parks)
- UV-B Monitoring Data (EPA monitoring network in 14 national parks and 8 urban areas)
- Exotic Plants and Species Database (DOI data for national parks)

TERRESTRIAL ECOSYSTEM INDICATORS

Table 4-2. Overview of Data Sources Identified to Support Indicators of Terrestrial Ecosystem Health

Data Source	Overall Quality	Geographic Extent			Potential Ability to Support State Indicators										Potential Ability to Support Pressure Indicators						
					Landscape/ Land Use		Biotic Components		Abiotic Components				Ecological Services		Human Population Pressure		Chemical/Other Pollution			Indirect/ Unknown	
		I	N	R	LU	CS	CM	OR	CL	SS	NR	WR	NC	ES	HA	RD	CU	AP	OR	DP	OT
Forest Inventory and Analysis	High		●				●	●		●				●						●	●
National Resources Inventory	Variable		●		●	●	●		●		●		●	●	●	●					
Global Ecosystem Data	High	●			●	●	●			●	●										
RPA Updates/RPA Database	High		●		●	●	●														
Land Use Data for Agroecosystems in the U.S.	Unk		●		●	●					●	●					●				
Ecological Site Inventory	Unk				●	●															
Olson's Major World Ecosystem Complexes	High	●	●	●	●	●					●				●	●					
Land Use History of North America	Unk		●		●										●						
Major Uses of Land in the United States	High		●	●	●										●						
Major Land Resource Areas	High	●	●	●	●																
North American Landscape Characterization	High	●	●	●	●						●								●		
Conterminous U.S. Land Cover Characteristics	High	●	●	●	●																
Land Cover Classification	Unk			●	●																
Northern Hemisphere Biome Forest Data	Unk	●			●								●	●							
Multi-Resolution Land Characteristics Grid	High			●	●																
GIRAS Landuse/Landcover Spatial Data	High		●		●										●						
		I: international N: national R: regional			LU: land use CS: condition/ status	CM: communities OR: organisms		CL: climate SS: soil/substrate condition NR: nutrient regimes WR: water regimes				NC: nutrient/element cycles ES: economic services		HA: habitat alteration/ urban sprawl RD: resource degradation		CU: chemical use AP: air pollution/ air deposition OR: other releases			DP: disease parasites exotics OT: other		

TERRESTRIAL ECOSYSTEM INDICATORS

Data Source	Overall Quality	Geographic Extent			Potential Ability to Support State Indicators										Potential Ability to Support Pressure Indicators											
					Landscape/ Land Use		Biotic Components		Abiotic Components				Ecological Services		Human Population Pressure		Chemical/Other Pollution			Indirect/ Unknown						
		I	N	R	LU	CS	CM	OR	CL	SS	NR	WR	NC	ES	HA	RD	CU	AP	OR	DP	OT					
National Environmental Research Parks	Variable			●		●	●	●																		
Natural Heritage Network	High		●				●	●																		
Experimental Forest and Rangeland Sites	Varied		●				●	●				●							●							
Global Vegetation Index	Unk	●				●	●																			
Man and the Biosphere Reserves	Varied		●				●	●	●	●	●	●							●	●						
North American Conservation Assessment	Unk		●				●																			
Long-term Resource Monitoring Program	Unk			●			●														●					
Breeding Bird Census	Med		●						●																	
North American Breeding Bird Survey	High	●							●																	
Monitoring Avian Productivity and Survivorship	Unk		●						●																	
Bird Banding Program	Med		●						●																	
Audubon Christmas Bird Counts	Med	●							●																	
Butterfly Monitoring Project	High		●						●																	
Migration Monitoring Program	Unk		●						●																	
Project Feeder Watch	Low		●						●																	
July Duck Production Survey	Unk		●			●		●			●	●														
North American Raptor Monitoring Strategy	Unk	●						●																		
Hawk Migration Monitoring	Unk			●				●																		
		I: international N: national R: regional			LU: land use CS: condition/ status			CM: communities OR: organisms					CL: climate SS: soil/substrate condition NR: nutrient regimes WR: water regimes			NC: nutrient/element cycles ES: economic services			HA: habitat alteration/ urban sprawl RD: resource degradation				CU: chemical use AP: air pollution/ air deposition OR: other releases			DP: disease parasites exotics OT: other

TERRESTRIAL ECOSYSTEM INDICATORS

Data Source	Overall Quality	Geographic Extent			Potential Ability to Support State Indicators										Potential Ability to Support Pressure Indicators						
					Landscape/Land Use		Biotic Components		Abiotic Components				Ecological Services		Human Population Pressure		Chemical/Other Pollution			Indirect/Unknown	
		I	N	R	LU	CS	CM	OR	CL	SS	NR	WR	NC	ES	HA	RD	CU	AP	OR	DP	OT
North American Amphibian Monitoring Program	Unk		•			•	•	•											•		
Tree Planting in the United States	Unk		•			•								•							
Forest Service Range Management Info System	Unk		•			•										•					
Advanced Radiometer Derived Land Climatologies	Unk	•					•		•	•		•									
Distribution of Cloud and Cloud Top Temperatures	Unk	•							•												
National Climatic Data Center	Unk	•							•												
Defense Meteorological Satellite Data	Unk	•							•										•		
NASA Pathfinder Climate Data	Unk	•							•			•									
Remote Automatic Weather Stations	High		•						•	•		•									
STATSGO Soil Maps	Unk		•			•				•		•									
National Soil Geographic (NATSCO) Database	Unk		•							•											
National Soil Characterization Data	Unk					•				•											
Global Pattern of Carbon Dioxide from soils	Med	•								•			•								
Annual Public Finances Survey	High		•			•						•		•	•	•					
Highways Statistics	High		•		•										•	•			•		
US Postal Service Delivery Statistics	High		•												•						
Global Population Distribution	Unk	•														•					
Interagency Monitoring of Visual Environments	High		•													•			•		
		I: international N: national R: regional			LU: land use CS: condition/ status		CM: communities OR: organisms		CL: climate SS: soil/substrate condition NR: nutrient regimes WR: water regimes				NC: nutrient/element cycles ES: economic services		HA: habitat alteration/ urban sprawl RD: resource degradation		CU: chemical use AP: air pollution/ air deposition OR: other releases			DP: disease parasites exotics OT: other	

TERRESTRIAL ECOSYSTEM INDICATORS

Data Source	Overall Quality	Geographic Extent			Potential Ability to Support State Indicators										Potential Ability to Support Pressure Indicators						
					Landscape/ Land Use		Biotic Components		Abiotic Components				Ecological Services		Human Population Pressure		Chemical/Other Pollution			Indirect/ Unknown	
		I	N	R	LU	CS	CM	OR	CL	SS	NR	WR	NC	ES	HA	RD	CU	AP	OR	DP	OT
Global Carbon Isotopic Signature Estimates	High	●											●			●		●			
Atmospheric Halocarbons and Nitrous Oxide	High	●																●			
Atmospheric Methane Mixing Ratios	High	●																●			
Atmospheric Carbon Monoxide Mixing Ratios	High	●																●			
National Atmospheric Deposition Program and National Trends Network	High		●								●							●			
Photochemical Assessment Monitoring Stations	Unk			●					●									●			
Clean Air Status and Trends Network	High			●					●			●						●			
Atmospheric Integrated Monitoring Network	High		●															●			
Air Quality Monitoring Network	Unk		●															●			
National/State/Local Air Monitoring Stations	High		●	●														●			
Mercury Deposition Network	High			●														●			
Ecological Exposure Research Data	Unk			●														●			
UV-B Monitoring Data	Unk			●																●	
UV-B Radiation Monitoring Program Datasets	Med		●																	●	
Biomonitoring of Environmental Status and Trends	Unk		●				●										●				
National Agricultural Pest Information System	Unk		●																	●	
Exotic Species Database	Unk		●												●						●
Noxious/Invasive Database	Unk		●												●		●				●
		I: international N: national R: regional			LU: land use CS: condition/ status		CM: communities OR: organisms		CL: climate SS: soil/substrate condition NR: nutrient regimes WR: water regimes				NC: nutrient/element cycles ES: economic services		HA: habitat alteration/ urban sprawl RD: resource degradation		CU: chemical use AP: air pollution/ air deposition OR: other releases			DP: disease parasites exotics OT: other	

TERRESTRIAL ECOSYSTEM INDICATORS

Data Source	Overall Quality	Geographic Extent			Potential Ability to Support State Indicators										Potential Ability to Support Pressure Indicators						
					Landscape/Land Use		Biotic Components		Abiotic Components				Ecological Services		Human Population Pressure		Chemical/Other Pollution			Indirect/Unknown	
		I	N	R	LU	CS	CM	OR	CL	SS	NR	WR	NC	ES	HA	RD	CU	AP	OR	DP	OT
Exotic Map Database	Unk			●											●						●
Exotic Plants and Species Database	Unk		●												●						●
Ecological Incident Information System	High	●	●														●				
Wildlife Health Diagnostics Database	High																●		●	●	●
Wildlife Health Epizootiological Database	Med		●																	●	
Forest Insect and Disease Conditions	Unk		●											●						●	
Global Inventory of Biomass Burning	Unk	●	●																		●
Southeastern Cooperative Wildlife Disease Study	Unk			●				●												●	●
		N: national R: regional L: local			LU: land use CS: condition/status		CM: communities OR: organisms		CL: climate SS: soil/substrate condition NR: nutrient regimes WR: water regimes				NC: nutrient/element cycles ES: economic services		HA: habitat alteration/urban sprawl RD: resource degradation		CU: chemical use AP: air pollution/air deposition OR: other releases			DP: disease parasites exotics OT: other	

Other Databases of Interest:

National Classification of Ecological Communities will establish FGDC standard for classifying terrestrial communities

Globe Version 0.5 contains elevation information for 60% of the Earth's land surface

Terrain Base 1994 contains data on land elevation and ocean depth for the entire Earth

Level III Ecoregions of the Conterminous U.S. provide a standard ecoregion reference

5.0 Indicators

The focus of this part of the investigation was to identify available and emerging indicators of terrestrial ecosystem health that both have been and/or could be linked to existing data sources and could be incorporated into the IWI framework. Table 5-2 (presented at the end of the chapter) provides an overview of 49 indicators that were identified. This table provides a brief description of the indicator, its status, the geographic extent to which it currently and potentially could be applied, the data source(s) to which it is linked, and general comments such as unique features or advantages/disadvantages. Appendix C presents a more detailed description of each indicator. Section 5.1 provides an overview of the indicators included in the data base. Section 5.2 provides a brief description of indicators that are currently in use at the national level. Section 5.3 provides a brief description of indicators that currently are under development or available on a limited basis but show promise as future indicators. Section 5.4 provides a listing of other indicators that are available but are limited in value based on geographical coverage, temporal coverage, or information content.

5.1 Overview

Information on 49 indicators is included in the project database (see Table 5-1). The majority of these are screening level indicators that assess the state of terrestrial ecosystems rather than pressure on these ecosystems. Indicators are much more abundant for forest and rangeland ecosystems than for other ecosystem types (or landscapes); this reflects both the long-term data bases maintained by the U.S. Department of Agriculture (USDA) and recent USDA efforts to develop ecosystem indicators. Most of the indicators either currently are or could be used to assess both current state and change (trend). A majority of indicators measure abiotic components of ecosystems, although measures of biotic components are plentiful. Most of the indicators reviewed are applicable at the national or regional level. The majority are currently available and funding is available for their use by the responsible organizations.

5.2 Indicators Currently Available for Use

Nearly 20 indicators developed by a variety of organizations are currently in use at the national level and appear to be easily incorporated into the IWI approach. Most of these indicators are supported by data that are available for all 48 conterminous states, Alaska, and Hawaii. However, some indicators are in use for a limited portion of the nation, but are included here because they are particularly relevant to the IWI approach.

- **Percent of acreage by ecological status.** This landscape indicator reports the degree of similarity of present vegetation to the potential (climax) plant community. It is available for BLM lands in 12 western states and is supported by data from the Public Land Statistics. BLM has exclusive jurisdiction for about 12 percent of the U.S. land area.

TERRESTRIAL ECOSYSTEM INDICATORS

Table 5-1. Summary Statistics for Indicators Investigated (n = 49)

Assessment Type	State	43
	Pressure	8
Assessment Level	Screening	47
	Diagnostic	2
Specificity	Biodiversity	1
	Forest	25
	Grassland	4
	Landscape	6
	Human population pressure	1
	Rangeland	16
Use	Current state (snap shot)	46
	Change (trend)	36
Response Category	Abiotic	29
	Biotic	20
Geographic Scale	International	1
	National	27
	Regional	20
	State/local	2
Readiness	Currently available	40
	Expected soon	7
	Early development	8
Funding	Funded	48
	Not funded	1

- **Forest area by age class or successional stage.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It is an indicator of forest maturation, which leads to an increase in the diversity of forest structure but a decreased diversity of forest types. It is supported by data from the Forest Inventory and Analysis and the National Resources Inventory databases.
- **Percent composition of forests by forest type.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It can be used to identify forest types that are decreasing in area, which in turn is a measure of decreased ecosystem diversity. It is supported by data from the Forest Inventory and Analysis and the National Resources Inventory databases.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Status of forest-dependent endangered and threatened species.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It is an indicator of threat to species diversity. It is supported primarily by data from the Natural Heritage Network, with supplemental information from DOI and EPA endangered and threatened species data. Data are available at the county level, which would not always coincide with watershed boundaries. The indicator covers plant, mammal, bird, reptile, amphibian, and insect species.
- **Number of forest-dependent species in restricted ranges.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It is an indicator of threat to species diversity. It is supported by data from the Natural Heritage Network. The indicator covers mammals, birds, reptiles, and amphibians.
- **Population levels of forest-dependent bird species.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It is an measure of the increase or decline in the abundance of representative species selected as indicators of overall levels of genetic diversity for a larger group of forest species. The indicator for birds is supported at the national level by data from the North American Breeding Bird Survey. The indicator for other groups (e.g., mammals, game birds) is supported by less abundant and reliable data from certain states.
- **Extent of wildlife habitat.** This biotic indicator reports the acres of habitat for big and small game on BLM lands (including eastern states and Alaska) and is supported by data from the Public Land Statistics. BLM has exclusive jurisdiction for about 12 percent of the U.S. land area.
- **Number of big game animals on public lands.** This biotic indicator reports the number of pronghorn, barbary sheep, bear, bighorn sheep, buffalo, and caribou on BLM lands (including eastern states and Alaska) and is supported by data from the Public Land Statistics. BLM has exclusive jurisdiction for about 12 percent of the U.S. land area.
- **Total forest ecosystem biomass and carbon pool.** This abiotic indicator is among a set of sustainable forest indicators developed by USDA. It is an indicator of the regulation of atmospheric carbon by forest ecosystems. It is supported by data from the Forest Inventory and Analysis and the National Soil Geographic Database. Most parameters are calculated from available models and conversion factors, and data are limited to commercial forest lands. A related indicator, **contribution of forest ecosystems to global carbon budget**, consists of indirect flux estimates calculated by taking the differences between successive inventories.
- **Soil erosion rates.** This abiotic indicator was developed by the USDA both as a general assessment of terrestrial ecosystem health and as a part of the set of sustainable forest indicators. It is an estimate of the annual soil loss by land use type. It is supported by data from the Natural Resources Inventory.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Indicators of forest services.** These indicators of ecological services are among a set of sustainable forest indicators developed by USDA. They provide various measures of economic services provided by forest ecosystems, including **area and percent of forest land managed for protective functions, area and percent of forest land used for timber production, net volume of timber species growing stock, growing stock of tree species on forest land available for timber production, ratio of annual volume of wood products removed to sustainable levels, and ratio of annual harvest of other forest products (e.g., game, berries) to sustainable levels.** These indicators are supported by the Forest Inventory and Analysis, National Resources Inventory, Forest Service data, and state databases.
- **Forest land experiencing accumulation of persistent toxic substances.** This indicator of chemical pollution is among a set of sustainable forest indicators developed by USDA. It measures the area and percent of forests impinged by releases from NPL sites. It is supported by data from an EPA database of NPL sites in forests and a variety of EPA water databases such as the Permit Compliance System, NPDES data, and National Watershed Assessment Program data. Although data are limited to lands around NPL sites, this indicator could be linked directly to IWI indicators of pollution in surface waters.
- **Nighttime lights.** This indicator of human population pressure measures the area illuminated by human-generated visible-near infrared radiation (i.e., lights). This information can be used to define and update the spatial distribution of human settlements, although some significant outliers exist. It is supported by data from the Defense Meteorological Satellite Program.

5.3 Promising New Indicators

More than 25 indicators currently under development should provide measures of terrestrial ecosystem health that can be readily incorporated into the IWI approach. Many of these are supported by databases that cover a large portion of the nation and/or by remote sensing data. However, most of these indicators have been implemented only at an experimental or pilot-level basis, and it may be several years before enough underlying data are available to provide a sufficient basis for reporting status and trends. These indicators include:

- **Land cover composition and pattern.** This is a set of landscape indicators developed for the Mid-Atlantic pilot project. It includes **land cover dominance, land cover connectivity and degree of fragmentation, land cover shape and complexity, land cover patch size, amount of land cover in protective status, percent land cover types at different scales, and percent paddocks on slopes greater than 5%.** These indicators are critically linked to the catchment process and the sustainability of ecological processes and biological populations. The indicators are supported by remote sensing and aerial photography data, coupled with soils, geology, topography, and climate data.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Riparian extent and distribution.** This is a set of landscape indicators developed for the Mid-Atlantic pilot project. It includes various measures of the percentage and connectivity of woody vegetation along streams. These indicators are linked to soil loss, sediment movement, and contaminant movement at watershed scales and below. The indicators are supported by remote sensing and aerial photography data, coupled with soils, geology, topography, and climate data.
- **Fragmentation of forest types.** This landscape indicator is among a set of sustainable forest indicators developed by USDA. It is a measure of patch areas and distances between patches; fragmentation disrupts ecological processes and reduces available habitat. It currently is supported by some data for Oregon.
- **Number of forest dependent species.** This biotic indicator is among a set of sustainable forest indicators developed by USDA. It is an indicator of species diversity. It could be supported by a variety of databases, including the Forest Inventory and Analysis and Forest Health Monitoring data (data on 865 native tree species), and the Breeding Bird Survey, Breeding Bird Censuses, and Audubon Christmas Bird Counts data (data on 844 forest-dependent bird species). The indicator also could be extended to include other groups such as mammals, reptiles, amphibians, and insects.
- **Gap analysis.** This indicator measures vegetation types or species not adequately represented in areas managed for long-term maintenance of natural systems. It uses primarily vertebrate species and dominant vegetation types as surrogates for biodiversity. It is supported by internal databases and is currently available for some areas.
- **Terrestrial salamander populations.** This indicator is currently under development by USGS and will use population monitoring data and ecosystem measures such as air/vegetation quality to assess environmental effects on population dynamics of salamanders (and perhaps calling anurans). It will be supported by data from the North American Amphibian Monitoring Program.
- **Indicators of rangeland health.** This series of indicators is currently under development by USDA and academic collaborators and includes measures such as rangeland vegetation structure, rangeland canopy cover, normalized difference vegetation index, and percent cover of various grass species. These are supported primarily by experimental data, although they are applicable to all rangeland ecosystems.
- **Abiotic indicators of forest ecosystem health.** USDA is developing a number of additional sustainable forest indicators that address abiotic components. These include **forest soil compaction, forest soil with diminished soil organic matter or changed chemical properties, and forest land with diminished ecological components.** These indicators will be supported by data from the Long-term Soil Productivity Initiative and the National Acid Precipitation Assessment Program, but data collection has not occurred long enough to report results.

TERRESTRIAL ECOSYSTEM INDICATORS

- **Abiotic indicators of rangeland health.** This series of indicators is currently under development by USDA and academic collaborators and includes measures such as soil infiltration, soil stability, soil penetrometer resistance, soil depth, soil surface characterization, slake test for soil stability, and bare patch index. These are supported primarily by experimental data, although they are applicable to all rangeland ecosystems.
- **Erosion potential indicators.** This is a set of abiotic indicators developed for the Mid-Atlantic pilot project. It includes **percent bare soil, soil loss distribution, percent farms on erodible soils, distance of agricultural patches from streams, and percent paddocks on slopes greater than 5%.** These indicators integrate land cover, precipitation, topography, and soil data to estimate soil loss using a universal soil loss model. The indicators are supported by remote sensing and aerial photography data, coupled with soils, geology, topography, and climate data.
- **Forest land experiencing specific levels of air pollution.** This indicator of chemical pollution is among a set of sustainable forest indicators developed by USDA. It measures the area and percent of forests subject to levels of criteria air pollutants and UV-B that may cause adverse impacts; lichens are an important indicator group. It could be supported by data from a variety of sources, including the National Atmospheric Deposition Program, UV-B Radiation Monitoring Program, Mercury Deposition Network, Aerometric Monitoring, Interagency Monitoring of Protected Visual Environments, North American Maple Project, Forest Health Monitoring Datasets, and National Acid Precipitation Assessment Program. However, but data collection is not coordinated and data have not been collated and analyzed sufficiently to report results.
- **Forested affected by natural and human-induced pressures.** This set of indicators of indirect/other stresses is among a set of sustainable forest indicators developed by USDA. It includes area and percent of forests affected by native insects and diseases, exotic insects and diseases, fire, weather, flood, land clearance, salinization, and domestic animal invasion. The indicators will be supported by data from the Forest Inventory and Analysis, Forest Health Monitoring Program, National Interagency Fire Center, and Intermountain Fire Sciences Laboratory. However, not enough data are available to report results.

5.4 Other Indicators

Several indicators are currently available but are more limited in geographic, temporal, and/or relevant coverage. While some data may be useful, considerable data analysis or additional data collection would be required to support these indicators and integrate them into the IWI approach on a national basis. These indicators were developed by EPA, BLM, and USDA. These databases include:

- Degree of biophysical constraints, greenness pattern, and groundwater indicators (landscape indicators developed for Mid-Atlantic pilot project)
- Reforested lands and timber stand improvements (BLM public land statistics indicator)
- Contribution of forest products to global carbon budget (USDA sustainable forest indicator)
- Erosion control measures (BLM efforts to reduce soil erosion on federal lands)

TERRESTRIAL ECOSYSTEM INDICATORS

Table 5-2. Overview of Indicators Identified

Indicators of Landscape/Land Use

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Percent acreage by ecological status	Degree of similarity of present vegetation to the potential natural (climax) plant community, divided into four classes	Currently available	National	National	BLM Public Land Statistics	Based on BLM's ecological site inventories or soil-vegetation inventory method Available for BLM lands only
Promising	Fragmentation of forest types	Patch areas and distances between patches	Currently available	Regional	National	No national datasets; some data for Oregon	Forest fragmentation disrupts ecological processes and reduces available habitat
Promising	Degree of biophysical constraints	Set of indicators that includes farm position in catchment, subcatchment position, and catchment position, relative to biophysical constraints	Currently available	Regional	Regional National	Remote sensing data, including Advanced Very High Resolution Radiometry	Indicates the relative geographic position of a farm or subcatchment to the position of the catchment Indicators are being used in the Mid-Atlantic pilot project
Promising	Greenness pattern	Set of indicators that includes normalized difference vegetation index (NDVI) pattern and change; observed vs. expected NDVI	Currently available	Regional	Regional National?	Landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate	Used to estimate losses in productivity, increases in erosion, and loss in buffer capacity along streams Expected NDVI is based on soils, topography, vegetation, and climate Indicators are being used in the Mid-Atlantic pilot project

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
Promising	Groundwater indicators	Set of indicators that includes albedo change, topographic concavity variation, and depth to water table	Currently available	Regional	Regional National?	Landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate	Estimates the local and regional impacts of changes in recharge (i.e., water moving beyond the root zone) on catchment behavior Indicators are being used in the Mid-Atlantic pilot project
Promising	Land cover composition and pattern	Set of indicators that includes land cover dominance; land cover connectivity and degree of fragmentation; land cover shape and complexity; land cover patch size; amount of land cover in protective status; percent land cover types at different scales; percent paddocks on slopes greater than 5%	Currently available	Regional	Regional National?	Landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate	Used to determine dominance, spatial distribution, and juxtaposition of land cover elements Indicators are being used in the Mid-Atlantic pilot project
Promising	Riparian extent and distribution	Set of indicators that includes percentage of woody vegetation along stream/unit stream distance; connectivity of woody vegetation along streams/unit stream distance; percent woody vegetation along streams by width class/unit of stream distance	Currently available	Regional	Regional National?	Landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate	Size and amount of riparian buffer adjacent to streams and water courses is an important determinant of soil loss, sediment movement, and contaminant movement at the farm, subcatchment, and catchment scales Indicators are being used in the Mid-Atlantic pilot project

TERRESTRIAL ECOSYSTEM INDICATORS

Indicators of Biotic Components

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Forest area by age class or successional stage	Acreage of forest by age class and successional stage	Currently available	National	National	Forest Inventory and Analysis; National Resources Inventory	Forest maturation leads to an increase in diversity of forest structure but a decreased diversity of forest types
High	Percent composition of forests by forest type	Acreage of forest types by region	Currently available	National	National	Forest Inventory and Analysis; National Resources Inventory	Can be used to identify forest types that are decreasing in area, which in turn is a measure of decreased ecosystem diversity
High	Status of forest-dependent endangered and threatened species	Number of species by forest type (deciduous, evergreen, mixed, wetland)	Currently available	National	National	National Heritage Network; DOI and EPA threatened and endangered species databases	Considers endangered and threatened species of plant, mammal, bird, reptile, amphibian, fish, snail, clam, crustacean, and insect at risk of not maintaining a viable breeding population; species can occur in more than one forest type
High	Number of forest dependent species in restricted range	Number, population size, and distribution of interacting populations of species that occupy a small portion of their former range	Currently available	National	National	Natural Heritage Network	Population size and distribution of interacting populations are critical attributes in evaluating genetic diversity
High	Population levels of forest-dependent bird species	Population levels of representative avian species from diverse habitats monitored across their range	Currently available	National	National	North American Breeding Bird Survey	Representative species are selected as indicators of overall levels of genetic diversity for a larger group of forest species
High	Extent of wildlife habitat	Acres of habitat for big game and small game on BLM lands	Currently available	National	National	BLM Public Land Statistics	Available for BLM lands only

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Number of big game animals on public lands	Estimated number of pronghorn, barbary sheep, bear, bighorn sheep, buffalo, and caribou on BLM lands	Currently available	National	National	BLM Public Land Statistics	Could be used to assess status and trends in big game populations Available for BLM lands only
Promising	Gap analysis	Vegetation types or species not adequately represented in areas managed for long-term maintenance of natural systems	Currently available	Regional	National	Internal	Uses vertebrate species and community alliances (primarily dominant vegetation types) as surrogates for biodiversity; not intended as a nationwide inventory of biological resources
Promising	Terrestrial salamander populations	Population monitoring data and ecosystem measures (e.g., air/vegetation quality) will be combined to assess environmental effects on population dynamics	Under development	N/A	National	North American Amphibian Monitoring Program	Salamanders used as indicators of forest health
Promising	Number of forest dependent species	Species number	Currently available	National	National	Forest Inventory and Analysis	Species number used as a measure of species richness, density, and evenness
Promising	Rangeland vegetation structure	Vegetation height, length, width and ground cover	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Rangeland canopy cover	Canopy length and width	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
Promising	Normalized difference vegetation index	Changes in vegetation cover over large geographic areas	Early development	Regional	National	Very High resolution radiometer satellite imagery; project-specific datasets are available	Changes in vegetation used as an indicator of irreversible degradation of rangeland ecosystems
Promising	Percent grass cover, percent long-lived grass cover, percent cover of vegetative reproducers	Cover of specific grass types	Currently available	Regional	Regional	Project-specific datasets are available	Indicators of desertification of perennial grasslands (early ecosystem disturbance)
Other	Reforested lands and timber stand improvements	Acres of reforested lands and timber stand improvements on BLM lands	Currently available	National	National	BLM Public Land Statistics	May be used as a measure of forest ecosystem health, but may simply indicate intensity of lumber extraction Available for BLM lands only

Indicators of Abiotic Components

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Total forest ecosystem biomass and carbon pool	Total forest ecosystem biomass and carbon pool by forest type, age class, and successional stage	Currently available	Limited	National	Forest Inventory and Analysis; National Soil Geographic Database	Can be used to measure the regulation of atmospheric carbon by forest ecosystems Production rate is a measure of forest health
High	Contribution of forest ecosystems to global carbon budget	Total amount of carbon entering the earth's atmosphere contributed by forest ecosystems, including standing biomass, woody debris, peat, and soil carbon	Currently available	Limited	National	Forest Inventory and Analysis; National Soil Geographic Database	Can be used to monitor status of forest ecosystems

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Soil erosion rates	Annual erosion rates by land use category	Currently available	National	National	National Resources Inventory	Assesses erosion due to all process (both natural and man-made) Also part of USDA indicators of forest sustainability Soil erosion is an indicator of aquatic ecosystem health, recreational opportunities, potable water supplies, and the lifespan of dams, bridges, and other river infrastructure
Promising	Forest soil compaction	Area and percent of forest land with significant human-induced soil compaction	Under development	National	National	Long-term Soil Productivity Research Initiative data set Not enough data available at present	Soil compaction negatively affects nutrient and water availability and can reduce infiltration, increase runoff and erosion, reduce biomass production, and impair watershed function
Promising	Forest soil with diminished soil organic matter or changed chemical properties	Area and percent of forest land with significantly diminished soil organic matter and/or changed chemical properties	Under development	National	National	Long-term Soil Productivity Research Initiative data set Not enough data available at present	Decrease in soil organic matter is an indicator of ecosystem disturbance
Promising	Forest land with diminished ecological components	Area and percent of forest land with diminished components indicative of changes in fundamental ecological processes (e.g., soil, nutrient cycling, seed dispersion, pollination) and/or functionally important species (e.g., nematodes, epiphytes, beetles, fungi, wasps)	Under development	National	National	National Acid Precipitation Assessment Program Not enough data available at present	Used to assess whether key ecological components or processes, or ecological continuity, are changing in a negative way, suggesting a decline in sustainability

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
Promising	Rangeland soil infiltration	Rate of water movement into soil	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Rangeland soil stability	Index based on the rate at which soil fragments disintegrate in water	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Rangeland soil penetrometer resistance	Number of strikes required to drive penetrometer into ground to set depths	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Rangeland soil depth	Depth of soil cover	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Rangeland soil surface characterization	Soil cover, including organic litter, cryptograms, and bare rock	Expected soon	Regional	National	Project-specific datasets are available	Indicator can be applied to any rangeland ecosystem; part of a core series of indicators of rangeland ecosystem health
Promising	Slake test for rangeland soil surface stability	Extremely sensitive indicator of soil ecosystem degradation for rangeland soils	Currently available	Regional	National	Project-specific datasets are available	Soil stability can be determined in three strata: bare soil, grass, and scrubs. Can be used as an early warning indicator of rangeland or grassland ecosystem degradation.

TERRESTRIAL ECOSYSTEM INDICATORS

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
Promising	Bare patch index based on canopy cover	Index based on bare patches in relation to canopy cover	Currently available	Regional	Regional	Project-specific datasets are available	Indicator of precipitation- and wind-driven erosion; part of a core series of indicators of desertification of perennial grasslands (early ecosystem disturbance)
Promising	Bare patch index based on soil surface measurements	Index based on bare patches in relation to soil cover	Currently available	Regional	Regional	Project-specific datasets are available	Indicator of overland water flow-driven erosion, which is an early indicator of desertification; part of a core series of indicators of desertification of perennial grasslands (early ecosystem disturbance)
Promising	Erosion potential	Set of indicators that include percent bare soil; soil loss distribution; percent farms on erodible soils; distance of agricultural patches from streams; percent paddocks on slopes greater than 5%	Currently available	Regional	Regional National?	Landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate	Indicators integrate land cover, precipitation, topography, and soil data to estimate soil loss potential using a universal soil loss model Indicators are being used in the Mid-Atlantic pilot project
Other	Contribution of forest products to global carbon budget	Total amount of carbon entering the earth's atmosphere contributed by harvested portions of forest ecosystems	Currently available	N/A	National	Forest Inventory and Analysis, timber product surveys, special studies	Can be used to monitor status of forests being logged
Other	Erosion control measures	Acres of brush control, seeding, soil stabilization, and weed control on BLM lands	Currently available	National	National	BLM Public Land Statistics	Measure of efforts to reduce soil erosion Available for BLM lands only

TERRESTRIAL ECOSYSTEM INDICATORS

Indicators of Ecological Services

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Forest land managed for protective functions	Area and percent of forest land managed primarily for protective functions, including watersheds, flood protection, avalanche protection, and riparian zones	Currently available	National	National	Forest area data on a state-by-state basis; no national data	Could be related to human population growth pressure
High	Forest land available for timber production	Area and percent of forest land used for timber production	Currently available	National	National	Forest Inventory and Analysis; National Resources Inventory	Data are available for timberland; information for other forest types is limited
High	Growing stock of tree species on forest land available for timber production	Total growing stock of merchantable and non-merchantable tree species on forest land available for timber production	Currently available	National	National	Forest Inventory and Analysis	Provides an indicator of timber supply opportunities. Some data for non-commercial species are available from regional FIA programs, but no national data are available
High	Sustainability of wood products harvest	Ratio of annual volume of wood products removed to annual volume determined to be sustainable	Currently available	National	National	Forest Inventory and Analysis; National Resources Inventory	Provides an indicator of the ability of a forest to support a sustainable harvest of wood products
High	Net volume of timber species growing stock	Net volume of growing stock on timberland by species group and region	Currently available	Regional	National	Data sets from US Forest Service	Most complete data sets are for southern region forest plantations
High	Sustainability of non-timber forest products harvest	Ratio of annual harvest of non-timber forest products (e.g., fur bearing animals, berries, mushrooms, game animals) to levels determined to be sustainable	Currently available	Regional	National	State-by-state data on non-timber species (e.g., game animals)	Provides an indicator of the ability of a forest to support a sustainable harvest of non-timber species

TERRESTRIAL ECOSYSTEM INDICATORS

Indicators of Chemical Pollution

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Forest land experiencing accumulation of persistent toxic substances	Area and percent of forest lands experiencing accumulation of persistent toxic substances	Under development	National	National	EPA database of NPL sites in forests; EPA Permit Compliance System and NPDES data; EPA National Watershed Assessment Program	Can be used as a current indicator of toxic chemical stress on forest ecosystems Can be used as a potential indicator of long-term ecosystem health No data available for non-NPL sites
Potential	Forest land experiencing specific levels of air pollution	Area and percent of forest lands subject to levels of criteria air pollutants and UV-B that may cause adverse impacts on ecosystem health	Under development	National	National	National Atmospheric Deposition Program; UV-B Radiation Monitoring Program; Mercury Deposition Network; Aerometric Monitoring; Interagency Monitoring of Protected Visual Environments; North American Maple Project; Forest Health Monitoring Datasets; National Acid Precipitation Assessment Program	Uses lichens as indicators Used as an indicator of the effects of human induced atmospheric pollutants on forest ecosystems Not enough data to quantify at present

TERRESTRIAL ECOSYSTEM INDICATORS

Indicators of Human Population Pressure

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
High	Nighttime lights	Area illuminated by human-generated visible-near infrared radiation (i.e., lights)	Currently available	Inter-national	Inter-national	Defense Meteorological Satellite Program Operational Linescan System	<p>A satellite-based inventory of human settlements derived from nighttime lights data.</p> <p>Area illuminated is correlated with gross domestic product and electric power consumption.</p> <p>Data can be used to define and update the spatial distribution of human settlements, although some significant outliers exist</p>

Indicators of Indirect/Unknown Stresses

Priority	Name	Description	Status	Geographic Extent		Data Source(s)	Comments
				Current	Potential		
Promising	Forests affected by other natural and human-induced pressures	Area and percent of forests affected by native insects and diseases; exotic insects and diseases; fire; weather; flood; land clearance; salinization; and domestic animal invasion	Currently available	National	National	Forest Inventory and Analysis; Forest Health Monitoring Program; National Interagency Fire Center; Intermountain Fire Sciences Lab	<p>It may be difficult to parse out the mix of natural and human-induced pressures</p> <p>Not enough data available at present</p>

6.0 Matching Indicators with the IWI Approach

Table 6-1 (presented at the end of this chapter) provides a broad matching between potential indicators of terrestrial ecosystem health and indicators in the IWI suite. This matching is included to assist in stimulating a discussion of how to incorporate terrestrial measures into the IWI approach. Some preliminary suggestions as to how to make this incorporation are provided below.

6.1 Overall Condition of the Landscape

Some measure of the overall condition of the landscape comprising the watershed might be an appropriate addition to the IWI suite. In time, it seems reasonable to develop a single, comprehensive indicator of land cover composition and pattern. The indicator of that name developed for the Mid-Atlantic pilot is an appropriate starting point. In the interim, other types of landscape-level indicators could be used by IWI.

- **Percent land cover by land use category.** This indicator is already available at a summary level for hydrologic units (Natural Resources Inventory data). These data could provide information on gross land use trends within a watershed such as urbanization and cropland conversion. Additional data from promising new data sources (North American landscape characterization data, Land Use History of North America) may be available in the future. Some effort would be required to either digitize available data or merge these data with digital land use datasets. Data could be collected eventually using remote sensing technology. This indicator also could be a basis for other measures (which could be reported in relation to land use acreage).
- **Degree of similarity to potential (climax) vegetation.** This indicator is already available for some BLM lands (percent acreage by ecological status) and for some forests (USDA forest area by age class/successional stage). A similar measure is also being developed for rangelands (USDA normalized difference vegetative index). Some effort would be required to merge various approaches and datasets into a single indicator and to develop digitized map coverages. Data could be collected eventually using remote sensing technology.
- **Degree of habitat fragmentation.** This indicator is already available for watersheds covered by the Mid-Atlantic pilot (part of land cover composition and pattern) and is being developed for forests (USDA fragmentation of forest types). Some effort would be required to merge various approaches and datasets into a single indicator and develop digitized map coverages. Data could be collected eventually using remote sensing technology.
- **Riparian extent and distribution.** This indicator is already available for watersheds covered by the Mid-Atlantic pilot, and some data are available from USDA (National Resources Inventory, forest land managed for protective functions). Forestry companies may have their own data, particularly in southeast and Pacific northwest, although these

TERRESTRIAL ECOSYSTEM INDICATORS

sources have not been investigated. Some effort would be required to merge various approaches and datasets into a single indicator and to develop digitized map coverages. Data could be collected eventually using remote sensing technology.

6.2 Abundance and Condition of Ecosystems

The IWI suite contains two indicators that assess the overall condition of aquatic ecosystems within the watershed (Table 6-1). Some measures of the abundance and condition of terrestrial ecosystems within the watershed might be an appropriate addition to the IWI suite. It would seem reasonable to include a measure of ecosystem or species diversity and some indicator of soil quality/condition. It also might be possible to develop a measure of habitat quality for wildlife and other biota. Some available and promising new indicators provide at least a start in this direction. Additional indicators could be developed from available data sources.

- **Ecosystem diversity.** This indicator is available for forests (USDA percent composition of forests by forest type) and is being developed for rangelands (USDA vegetation structure, percent cover). Considerable effort would be required to develop a single diversity measure that was broadly applicable across diverse watersheds. It is uncertain whether data could be collected eventually using remote sensing technology. This indicator could be linked to measures of wetland and/or aquatic habitat diversity.
- **Species diversity.** No specific indicator of species diversity (e.g., species richness, evenness) was identified at the national level, but there appears to be sufficient census data to support such an indicator for trees, birds, and perhaps mammals. It may be possible to develop an indicator for the presence/absence of bird species using the various bird census databases (or tree species using USDA data); these might be more understandable to the general public. Such measures would probably need to be reported as a percentage of the total number of species expected. It also would be possible to develop a measure of relative native species representation by incorporating data on exotics or pests maintained by USDA, DOI, and The Nature Conservancy (as well as bird and tree census data). Present census coverage would likely vary widely among watersheds, but it might be possible to coordinate development of new census areas to fill data gaps.
- **Soil quality/condition.** This indicator is being developed for forests (USDA forest soil indicators suite) and rangelands (USDA rangeland soil indicators suite). Data on soil conditions are available nationwide via several datasets, including the National Resources Inventory, Forest Inventory Analysis, NATSCO, and STATSCO. Some effort would be required to develop a measure of soil quality or condition that would be broadly applicable across all watersheds and to merge and digitize available data.
- **Habitat quality.** A measure of habitat abundance is available for some land areas (BLM extent of wildlife habitat), but developing and implementing a rigorous habitat quality index would likely be difficult. Some useful data may be obtained from promising new data sources such as the North American landscape characterization data. It might be

TERRESTRIAL ECOSYSTEM INDICATORS

possible to develop a qualitative scale that state/local fish and game personnel could use to assess watersheds.

6.3 Abundance and Condition of Populations/Species

The IWI suite contains one indicator that assesses the overall condition of aquatic ecosystems within the watershed (Table 6-1). Some measures of the abundance and condition of terrestrial populations within the watershed might be an appropriate addition to the IWI suite. It would seem reasonable to include a measure of species abundance and some indicator of the overall condition of each species. Data to support these indicators are available for trees, birds, and perhaps mammals, and additional data may be available in the future from promising new data sources. Some available indicators provide a start in this direction.

- **Species abundance.** This indicator would reflect the relative population levels of a variety of common species within the watershed. This indicator is available for forests (USDA population levels of forest-dependent bird species) and BLM lands (number of big game animals on public lands). It would be possible to combine data from the various bird censuses and the Forest Inventory and Analysis to support this indicator. Additional data may be available in the future from a variety of promising new data sources, including project feeder watch, the North American amphibian monitoring program, the butterfly monitoring project, and the North American raptor monitoring program.
- **Species condition.** This indicator would reflect the overall condition of individuals within each population. This indicator is available for trees (USDA forest insect and disease conditions); additional data from the Forest Inventory and Analysis program are available for tree stand condition. Data from at least one promising new data source, monitoring avian productivity and survivorship program, would support this indicator.

6.4 Abundance and Condition of Ecosystems or Species of Special Concern

The IWI suite contains one indicator that assesses the condition of ecosystems of special concern within the watershed (Table 6-1). Some measures of the condition of terrestrial ecosystems or species of special concern (e.g., endangered/threatened species) within the watershed might be an appropriate addition to the IWI suite. It would seem reasonable to include a measure of the presence/absence of endangered or threatened species, unique or otherwise ecologically valuable ecosystems/habitats, or particularly vulnerable ecosystems/species. Some available and promising new indicators provide at least a start in this direction. Additional indicators could be developed from available data sources.

- **Status of endangered and threatened species.** This indicator is available for forests (USDA status of forest-dependent endangered and threatened species) and could be expanded to include a greater variety of terrestrial species. The indicator could be limited to known presence or absence or could be developed further to include some measure of

TERRESTRIAL ECOSYSTEM INDICATORS

status or condition (e.g., stable population, breeding population). Endangered/threatened species data from the Natural Heritage Network, DOI, and EPA could be used.

- **Status of unique ecosystems/habitats.** This indicator is becoming available as a promising new indicator (Gap Analysis). It could be limited to known presence or absence or could be developed further to include some measure of status or condition (e.g., present in watershed on protected vs. unprotected land). Data for this indicator are currently available through the Natural Heritage Network and may be obtained from other data sources such as the World Wildlife Fund's North American Conservation Assessment.
- **Status of vulnerable ecosystems/species.** This indicator is becoming available via two promising new indicators (Gap Analysis, terrestrial salamander populations). This indicator could be limited to known presence or absence or could be developed further to include some measure of status or condition (e.g., present in watershed on protected vs. unprotected land). The data for this indicator are currently available through the Natural Heritage Network and may be obtained from other data sources such as the World Wildlife Fund's North American Conservation Assessment.

6.5 Ecological Services

Some measures of the ecological services provided by terrestrial ecosystems within the watershed might be an appropriate addition to the IWI suite. It would seem reasonable to include a measure of ecosystem services as well as a measure of beneficial uses. It also might be possible to develop a measure of available resources. Some available indicators provide at least a start in this direction. Additional indicators could be developed from available data sources.

- **Indicator of ecosystem services.** This indicator is available as a set of indicators of timber services (USDA indicators of timber production) and a set of indicators of carbon sequestration by forests (USDA indicators of ecosystem biomass and carbon pool). These probably are not the most appealing ecosystem services to report, but this indicator might be expanded to include other services. Data from land use surveys such as the National Resources Inventory might be used to develop an index of recreational use within the watershed. One existing data source, the Annual Public Finances Survey, provides data that could be used as an inverse indicator of the status of ecosystem services (e.g., if expenditures on natural resources, parks, water, or sewers increases within a watershed, it may be due to declines in the quantity or quality of ecosystem services within the watershed). In addition, data from the Interagency Monitoring of Protected Visual Environments program might be used to develop an indicator of lost or diminished recreational services.
- **Indicator of available resources.** This indicator might be in the form of land area available for recreation, hunting etc. or as a measure of the abundance of exploitable resources (e.g., game). It is available to some degree (USDA forest land managed for protective functions, BLM number of big game animals on public lands, USDA ratio of annual harvest of other forest products to sustainable levels). Again, these may not be

the most appealing resources to report, but this indicator might be expanded to include other resources.

6.6 Pollution and Sedimentation

The IWI suite contains nine indicators that assesses pollution and sedimentation within the watershed (Table 6-1). Some measures of pollution of terrestrial ecosystems within the watershed and additional erosional indicators might be an appropriate addition to the IWI suite. It would seem reasonable to include a measure of terrestrial pollution and a measure of soil erosion. Data to support these indicators are available for forests, and additional data should be available in the future from promising new data sources. Some available indicators provide a start in this direction.

- **Pollution of terrestrial ecosystems.** This indicator already exists for forests (USDA forest land experiencing accumulation of persistent toxic substances), and additional indicators are being developed (USDA forest land experiencing specific levels of air pollution). Existing air pollution monitoring networks (e.g., NADP/NTN, CASTNet) and a variety of promising new data sources (e.g., Photochemical Assessment Monitoring Stations, Biomonitoring of Environmental Status and Trends) should provide considerable new information about pollutant loadings in terrestrial systems. Some data on air pollution can be at least inferred from traffic volume and fuel consumption data from the Department of Transportation's Highways Statistics.
- **Soil erosion.** This indicator already exists for forests (USDA soil erosion rates) and for watersheds covered by the Mid-Atlantic pilot (soil erosion potential). It also is being developed for rangelands (USDA rangeland soil stability). The USDA forest indicator is supported by data from the Natural Resources Inventory; additional data can be obtained from a variety of databases, including NATSCO and STATSCO. Some effort would be required to merge the databases and approaches into a single measure.

6.7 Human Population Pressure

The IWI suite contains one indicator that assesses human population pressure within the watershed (Table 6-1). Measures of human population pressure on terrestrial ecosystems might be an appropriate addition to the IWI suite. One existing and one promising new indicator provide a start in this direction, and existing databases provide a source of additional information to support such a measure.

- **Urban sprawl.** This indicator already exists to some extent (developed land is a land use category in the Natural Resources Inventory and reported in percent acreage by ecological status). In addition, nighttime lights could provide data that are geospatially referenced more precisely. Other data sources, such as highways statistics and U.S. Postal Service delivery statistics, may provide supplemental data. For example, watersheds in urban corridor areas may experience increased highway development unrelated to population growth within the watershed. Urban sprawl could increase without an increase in population (e.g., if people move from more densely populated parts

TERRESTRIAL ECOSYSTEM INDICATORS

of the watershed to more sparsely populated parts); this might be reflected in postal data. Ultimately, remote sensing data on land coverage could be used to establish more precise data on urban sprawl (e.g., effect on habitat fragmentation or wildlife corridors).

6.8. Indirect/Other Stress

Some measures of other stress on terrestrial ecosystems within the watershed might be a valuable addition to the IWI suite. It might be possible to include a measure of pressure from other natural and human-induced pressures. One promising new indicator provides at least a start in this direction.

- **Watersheds affected by other pressures.** This indicator is under development for forests (USDA forests affected by other natural and human-induced pressures) and could be expanded to include other terrestrial ecosystems. Stresses covered by this indicator are native and exotic insects and diseases, fire, weather, flood, land clearance, salinization, and domestic animal invasion. It is not clear how difficult it would be to expand this indicator.

TERRESTRIAL ECOSYSTEM INDICATORS

Table 6-1. Matching Potential Indicators of Terrestrial Ecosystem Health with Index of Watershed Integrity Indicators

Index of Watershed Integrity Indicators	Terrestrial Ecosystem Health Indicators
<p>Overall Condition of Landscape</p> <p>(no indicators)</p>	<p>High Priority Indicators</p> <ul style="list-style-type: none"> • Percent acreage by ecological status <p>Promising New Indicators</p> <ul style="list-style-type: none"> • Land cover composition and pattern • Fragmentation of forest types • Riparian extent and distribution • Normalized difference vegetation index
<p>Abundance and Condition of Ecosystems</p> <p>1. Assessed rivers meeting all designated uses</p> <p>14. Hydrologic modification - dams</p>	<p>High Priority Indicators</p> <ul style="list-style-type: none"> • Forest area by age class or successional stage • Percent composition of forests by forest types • Extent of wildlife habitat • Contribution of forest ecosystems to global carbon budget • Total forest ecosystem biomass and carbon pool <p>Promising New Indicators</p> <ul style="list-style-type: none"> • Rangeland vegetation structure • Rangeland canopy cover • Percent cover of various types of grasses • Forest soil compaction • Forest soil with diminished soil organic matter or changed chemical properties • Forest land with diminished ecological components • Rangeland soil indicators suite • Bare patch index based on canopy cover or soil surface measurements

TERRESTRIAL ECOSYSTEM INDICATORS

Index of Watershed Integrity Indicators	Terrestrial Ecosystem Health Indicators
<p>Abundance and Condition of Populations</p> <p>8. Aquatic/wetland species at risk</p>	<p>High Priority Indicators</p> <ul style="list-style-type: none"> • Number of forest dependent species • Number of forest dependent species in restricted ranges • Population levels of forest-dependent bird species • Number of big game animals on public lands • Forest insect and disease conditions
<p>Abundance and Condition of Ecosystems or Species of Special Concern</p> <p>7. Wetland loss index</p>	<p>High Priority Indicators</p> <ul style="list-style-type: none"> • Status of forest-dependent endangered and threatened species <p>Promising New Indicators</p> <ul style="list-style-type: none"> • Gap analysis • Terrestrial salamander populations
<p>Ecological Services</p> <p>(no indicators)</p>	<p>High Priority Indicators</p> <ul style="list-style-type: none"> • Forest land managed for protective functions • Forest land available for timber production • Growing stock of tree species on forest land available for timber production • Sustainability of wood products harvest • Net volume of timber species growing stock • Sustainability of non-timber forest products harvest • Total forest ecosystem biomass and carbon pool • Contribution of forest ecosystems to global carbon budget • Number of big game animals on public lands • Ratio of annual harvest of other forest products to sustainable levels

TERRESTRIAL ECOSYSTEM INDICATORS

Index of Watershed Integrity Indicators	Terrestrial Ecosystem Health Indicators
Pollution and Sedimentation 2. Fish and wildlife consumption advisories 3. Source water quality for drinking water systems 4. Contaminated sediments 5. Ambient water quality data - four toxic pollutants 6. Ambient water quality data - four conventional pollutants 9. Toxic pollutant loads discharged above permitted discharge limits 10. Conventional pollutant loads discharged above permitted discharge limits 11. Urban runoff potential 12. Index of agricultural runoff potential	High Priority Indicators <ul style="list-style-type: none"> • Forest land experiencing accumulation of persistent toxic substances • Soil erosion rates Promising New Indicators <ul style="list-style-type: none"> • Forest land experiencing specific levels of air pollution • Erosion potential • Rangeland soil stability
Human Population Pressure 13. Population change	High Priority Indicators <ul style="list-style-type: none"> • Percent acreage by ecological status Promising New Indicators <ul style="list-style-type: none"> • Nighttime lights
Indirect/Other Stress (no indicators)	Promising New Indicators <ul style="list-style-type: none"> • Forests affected by other natural and human-induced pressures

TERRESTRIAL ECOSYSTEM INDICATORS

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7.0 General Comments

This chapter provides brief observations regarding data availability, quality, accessibility, integration, and maintenance. These comments are based largely on the conversations with persons responsible for the data sources and indicators reviewed, the review of available materials, and the project staff's general experience with environmental data. Much more detailed investigations of individual data sources and indicators would be required to fully assess the extent to which a given indicator could be integrated into the IWI framework.

7.1 Data Availability

It is clear that considerable data are available to assess and report on the condition of terrestrial ecosystems. Data on birds have been collected for most of this century, and the federal government has conducted systematic surveys of federal and forest lands for half a century. A number of indicators and statistics have been developed for these data sets and are routinely reported and used by the federal government and other organizations. The most abundant data exists for forests, BLM lands, birds, soils, and air pollutants. Data on exotic species and epizootics are surprisingly common, although these have not always been organized and reported systematically. There are considerable data for human population pressures, but few indicators other than land cover-type measures have been developed and routinely used. Due to EMAP efforts, there are considerably more data, and indicators linked to these data, for the Mid-Atlantic region than for other parts of the country. It may be worth considering a closer look at these data sources to develop pilot approaches for the entire nation.

7.2 Data Quality

The project team was unable to perform a rigorous examination of data quality. It appears that reasonably systematic sampling protocols have been established for most of the data sources we examined, although the extent to which these protocols are followed by observers cannot be determined. For many data sources, it does not appear that sampling locations have been selected to be statistically representative of a region (or the nation as a whole); many data sources rely upon volunteers for data collection. However, some well-established inventories, particularly those performed by USDA, apparently follow a statistical sampling protocol. The investigation attempted to identify data sources and indicators that are currently used for resource management and other decision-making processes; the assumption is that data used for these purposes will have some degree of validity.

7.3 Data Accessibility

Many of the more recent data are readily available to the public in electronic formats. Accessing older data sets would be more difficult and time consuming. Most ready-to-use data are summarized by category (e.g., geographic unit such as county or state), although the Natural Resources Inventory is reported for watersheds. The most likely reason is that these data collection efforts preceded development of GIS technology by at least half a century. While these data are geospatially referenced, it may be challenging to link older data summarized at

TERRESTRIAL ECOSYSTEM INDICATORS

one geospatial level (e.g., state or county) directly to a different geospatial unit (e.g., watershed). Assuming that the promising new data sources identified in this report continue to be developed and implemented, the next generation of data will exist in multiple GIS coverages, and a substantial amount of data collection will be via satellites and other remote sensing technologies. Some high quality GIS coverages are available at the regional level (e.g., EMAP Mid-Atlantic Pilot Project) or have been collected on a one-time basis for specific regions and the entire U.S. It may be possible to incorporate some of these data, particularly as the use of remote sensing increases.

7.4 Data Integration

Some data sets and indicators could be integrated into the IWI framework with relatively little effort. For example, data from the Natural Resources Inventory is reported for 8-, 6-, 4-, and 2-digit hydrologic units, and many of the bird census data could be "tagged" to specific watersheds based on the location of sampling routes. It also might be possible to coordinate the development and expansion of some promising new data sources (e.g., the Monitoring Avian Production and Survivorship program, Biomonitoring of Environmental Status and Trends) with the IWI concept (e.g., by assisting with efforts to locate sampling stations in representative watersheds). It might be necessary to develop some normalizing approaches for some indicators (e.g., to compare number of species occurring within a watershed with expected number), but this could be accomplished with the assistance of state or local experts (e.g., members of local birdwatching clubs have a remarkable knowledge of what species do and ought to exist in their regions). In fact, an outreach program to enlist the assistance of local organizations in developing specific indicators might prove an effective means of promoting the IWI concept. It is clear, however, that considerably more effort would be required to integrate other data sets into the IWI framework. Another challenging task would be to integrate the older longitudinal data (e.g., the USDA datasets) with current and future data that are (a) geospatially referenced using GIS and (b) collected using remote sensing technology.

7.5 Data Maintenance

The data sources identified in this report have been developed and are maintained largely by organizations other than EPA (see Table 4-1). Assuming these organizations continue to collect and maintain these data (e.g., to assist in their own decision-making processes), there is no reason to expect that EPA would need to assume a significant financial burden for these data sources. In fact, a focus of this investigation was to identify indicators of terrestrial ecosystem health that would not require EPA to develop new data bases. It would be reasonable to expect a significant start-up cost associated with developing and implementing one or more indicators of terrestrial ecosystem health within the IWI framework. However, since EPA has already established the infrastructure to support the IWI framework, it is also reasonable to expect that there would be only a relatively small incremental cost for maintaining one or more indicators of terrestrial ecosystem health within the IWI framework.

Appendix A

Organizations Contacted

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Accelerate Canopy Chemistry Program (ACCP)	ORNL/DAAC NASA Bob Cook (423) 574-7319	Archived; data no longer being collected. Database is online.	Not currently pursuing
Aerometric Information Retrieval System (AIRS)	EPA/OAQPS	Current. Repository for data on national ambient air quality and air pollution.	Not currently pursuing
Aerometric Monitoring Program		Current. Consists of Federal, State, and local governments conducting ambient air monitoring of six pollutants for which exist national ambient air quality standards.	Can't locate; source unknown
Air Quality Monitoring Network	DOI/NPS Miguel Flores (303) 969-2076	Current. 1984-present. Monitoring for priority air pollutants in National Park Lands.	In database
AIRMon	NOAA/Air Resources Laboratory Jane Rothert (217) 333-7942	Current. Uses NADP and CASTNet monitoring networks. Designed to detect benefits of emissions controls mandated by CAA.	In database
Annual Surveys of Government Finances	Department of Commerce Bureau of the Census Henry Wulf 1-800-242-2184 hwulf@census.gov	Current. Surveys of state and local government finances on functions and services such as health, sanitation, natural resources, sewerage, solid waste management, etc.	In database
Audubon Christmas Bird Counts (CBC)	National Audubon Society Geoff LeBaron (212) 979-3083 glebaron@audubon.org	Current. An annual bird count survey directed by the National Audubon Society. The counts have been conducted since the early 1900's and now cover over 1500 sites throughout North America (primarily U.S. and Canada).	In database
Bioaccumulation of contaminants by indicator populations of raptors	Academic Bill Bowerman (906) 635-6236 Mark Fuller (208) 385-4115 Mark Bechard (208) 385-3530	Current. Research project - probably not useful at this time.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Biological Status and Trends Program	USGS/BRD 300 National Center 12201 Sunrise Valley Drive Reston, VA 20192 Mike Ruggiero (703) 648-4039 Mike Mac (703) 648-4073	Current. Program provides information on the status and trends of flora, fauna, and ecosystems. Working in collaboration with the Global Biodiversity Forum (GBF). Interpretation of inventory and monitoring data at the habitat, species, and genetic levels. New report, <i>The status and Trends of the Nation's Biological Resources</i> , coming 2/98.	Meeting held to discuss current initiatives
Biomonitoring of Environmental Status and Trends (BEST)	USGS/BRD Christine Bunck Science Office 6006 Schroeder Road Madison, WI 53711 (608) 271-4640	Future; in development stage. Program designed to identify and understand the effects of environmental contaminants on biological resources.	In database
Bird Banding Program	USGS John Tautin Patuxent Wildlife Research Center Bird Banding Laboratory 12100 Beech Forest Road, Suite 4039 Laurel, MD 20708-4039 (301) 497-5790	Current. A program for studying the movement, survival and behavior of birds that is administered by the U.S. DOI and the Canadian Wildlife Service. The data are maintained by the Bird Banding Laboratory at the Patuxent Wildlife Research Center.	In database
Boreal Ecosystem-Atmosphere Study (BOREAS)	ORNL/DAAC NASA Bob Cook (423) 574-7319	Current. Data will be available over the next two years.	International; second tier priority
Breeding Bird Census (BBC)	Cornell Laboratory of Ornithology Jim Lowe 159 Sapsucker Woods Road Ithaca, NY 14850 (607) 254-2413 jdl6@cornell.edu	Current. A bird census program administered by the Cornell Laboratory of Ornithology (formerly administered by the National Audubon Society). The data have been used to estimate long-term trends of species at individual plots or at selected groups of plots; however, the plots are not necessarily representative of the habitats and communities in an entire area and, therefore, the results usually cannot be generalized to larger areas.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Butterfly Monitoring Project	USGS/BRD Sam Droege Patuxent Wildlife Research Center 12100 Beech Forest Road, Suite 4039 Laurel, MD 20708-4039 (301) 497-5500	Future. A program under development by BRD that will monitor trends in populations of butterflies.	In database
Capacities and Capabilities (Taxonomists/ Systematists and Collections)	USGS/NBII Ann Frondorf (703) 648-4205	Current. Available via e-mail. Probably not useful for environmental health monitoring.	Not currently pursuing
Carbon Dioxide Information Analysis Center (CDIAC)	ORNL Robert Cushman, Director cdiac@ornl.gov	Current. Contains a wide variety of data concerning greenhouse effects and global climate change. Metadata available on the Web.	In database with subentries for each dataset
Clean Air Status and Trends Network (CASTNet)	EPA Ralph Baumgardner (919) 541-4625 baumgardner.ralph@epamail.epa.gov	Current. Data on criteria pollutants, visibility, fine particulates, toxics, precipitation and deposition for 55 sites in the US. Metadata available through the National Environmental and Monitoring Research Initiative website.	In database
CO concentrations in the Tundra	OSTI (Office of Science and Technical Information) Karen Spence 423-576-1035	Archived.	Not currently pursuing
CO indicator plants in the Tundra	OSTI Karen Spence 423-576-1035	Archived.	Not currently pursuing
Conterminous U.S. Land Cover Characteristics	USGS EROS Data Center Customer Services (605) 594-6151	Current. Land characterization dataset that incorporates a collection of land surface attributes that define 159 seasonally distinct regions of the U.S.	In database
Decennial Census of Population	Department of Commerce Bureau of the Census	Current. Demographic, social, and economic characteristics of the U.S. population. Trend data available.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Defense Meteorological Satellite Program (DMSP) Data	NOAA/National Geo-Physical Data Center (NGDC)/Solar Terrestrial Physics Ed Erwin eerwin@ngdc.noaa.gov (303) 497-6133	Current. The DM satellite collects meteorological data such as microwave frequencies, cloud distribution and temperatures, and atmospheric particulates.	In database
DELOS - international datasets			International; second tier priority
Digital Terrain Elevation Data (DTED)	USGS/National Imagery and Mapping Agency (NIMA) Information Services 1-800-455-0899	Current. Toll-free number provided two sites with current info on digital terrain data HTTP://164.214.2.59/publications/guides/df/df.html for existing products, and HTTP://164.214.2.59/geospatial/geospatial.html. Metadata available from sites is incomplete. Datasets are not publicly available.	Not currently pursuing
Ecological Exposure Research Data	EPA/National Health and Environmental Effects Research lab Bill Hogsett (541) 754-4632 hogsett.william@epamail.epa.gov	Future. The database will contain data on ecological exposures to UV-B, ozone, nitrogen deposition, and other atmospheric pollutants.	In database
Ecological Incident Information System (EIS)	EPA/Office of Pesticide Programs James Feldkel (703) 305-5828	Current. DBASEIII+ software package designed as an application tool for state and federal agencies to enter and submit incident data relating to pesticides. Includes information for location of incident, species affected, magnitude of effect, pesticides and formulation, application rate and method, and circumstances under which the incident occurred.	In database
Ecological Risk Analysis Tools and Applications	ORNL Marilyn Langston mzl@ornl.gov	Current. Ecological Screening Benchmarks Database; contains ecotox benchmarks for terrestrial plants and wildlife; widely used in ecological risk analysis. Web site: www.hsrn.ornl.gov/ecorisk/benchome.html.	Not currently pursuing
Ecological Site Inventory Data	DOI/BLM Ned Habich 303-236-0166	Current. Data and maps of habitat types on public rangelands. The focus is on plant succession and productivity. Over 90 million acres inventoried.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
EMAP Agricultural Lands Resource Group	USDA Steven Shafer (919) 515-2142 website for program is: http://www.epa.gov/ernfjulte/html/data/agroland/index/html	Current. 300 sites across the mid-Atlantic region. Develops and tests methods for monitoring the status and trends in the health of agroecosystems in the US. Metadata available through National Environmental Monitoring and Research Initiative.	In database with subentries for each dataset
EMAP Ecological Landscape Level Characteristics	Multi-Resolution Landscape Characteristic Consortium Bruce Jones 702-798-2671	Current. Several ongoing projects with geospatial data.	In database with subentries for each indicator
EMAP Rangeland Ecosystem Indicators	EPA Walt Whitford (505) 646-8032	Current. Not a part of the EMAP program anymore. Contact has a new manual and data, some which is geospatially referenced.	In database with subentries for each indicator
Endangered Ecosystems	U. of Idaho Reed Noss USGS/BRD M.J. Scott	Scientific Paper. Publication obtained on website regarding percentages of loss of endangered ecosystems in the US. Snap shot analysis, not based on ongoing monitoring.	Not currently pursuing
Endangered Species Inventory	DOI/Fish and Wildlife Service.	Current. Database of endangered and threatened species in the US.	Not currently pursuing
Environmental Monitoring and Research Network	Scott Collins (703) 306-1483	Future. Proposed system to organize independent research projects.	Not currently pursuing
EROS Data Center	USGS	Holder and distributor of many different datasets related to land surface. See individual datasets.	Reviewed web site for relevant datasets
Exotic Plants and Species Database	DOI/National Park Service Bill Comming (202) 208-4631	Current. Contains data about non-indigenous species on National Park lands.	In database
Exotic Map Database	USGS/BRD Kathryn Thomas (520) 556-7466	Current. Specific to the southwest; data is collected on land administered by USGS.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Exotic Species Database	Nature Conservancy Barry Meyers-Rice (530) 754-8891	Current. Assesses weed problems on preserves stewarded by TNC and formulated control strategies.	In database
Federal Interagency Committee for Management of Federal and Noxious Weeds (FICMNEW)	FICMNEW Gary Johnston (202) 737-5886 Gary Johnston@nps.gov USGS/BRD William Greg (703) 648-4067	Current. 15 databases of federal and noxious weeds in the US.	In database
First International Satellite Land Surface Climatology (ISLSCP) Field Experiment Project (FIFE and FIFE Follow-on)	ORNL/DAAC NASA Bob Cook (423) 574-7319	Archived; data no longer being collected. Data available on CD-ROM.	Not currently pursuing
Forest Ecosystem Health Project	USDA/Forest Service Joe Lewis (202) 205-1597 EPA Dwight Atkinson (202) 260-2771	Current. Ongoing geospatial data regarding conditions of forest ecosystems in the contiguous US. Map overlays containing ecosystem indicators for all forested areas of the US. Indicators include patterns of species endangerment, risk of insect and disease outbreaks, and forest fire risk.	More information needed
Forest Ecosystems Database	EPA Center for Biological Statistics Brand Niemann (202) 260-3726	Current. 1952-1992 and will be updated in 1997.	See RPA database
Forest Health Monitoring Program	USDA/Forest Service Ken Stolte (RTP) (919) 549-4022	Current. Some indicators are geospatially referenced. Project is currently being written up. Contains data for a wide variety of indicators, metadata available for 25 indicators.	In database with subentries for each indicator; still need to identify datasets
Forest Insect and Disease Conditions	USDA/Forest Service Dick Fowler (202) 205-1598	Current. 1952-present. Data on insect and disease conditions on forest lands (federal, state, and private). Annual reports available in hard copy.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Forest Inventory Analysis	USDA/Forest Service Brad Smith (202) 205-0841 Northeastern Experiment Station 5 Radnor Corporate Center, Suite 200 Radnor, PA (610) 975-4017	Current; 1930-present. Comprehensive inventory and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and rangelands of the U.S. Indicators measure the condition of soils, vegetation and the occurrence of fires. Implemented through five regional research stations. Metadata available through National Environmental Monitoring and Research Initiative.	In database
Forest Land Distribution Data	USDA/Forest Service Andy Hartzel (601) 324-1611	Maps have not been updated since 1993. Published by the US Forest Service with the 1993 RPA Forest Resources report.	Not currently pursuing
Forest Service Experimental Forest and Rangeland Sites	USDA/Forest Service Dick Cline (202) 205-1524	Current. Indicators measure climate water vegetation and wildlife conditions at 83 experimental forests. Metadata available through National Environmental Monitoring and Research Initiative.	In database
Forest Service Range Management Information System (FSRAMIS)	USDA/Forest Service Jim Zimmerman (202) 205-1412	Current. Collects and analyzes data on grazing in National Forests and National Grasslands.	In database
Gap Analysis Program (GAP)	USGS/BRD -- Michael Scott, Michael Jennings, or Elisabeth Brackney National GAP Office 530 S. Asbury St., Suite 1 Moscow, ID 83843 (208) 885-3555	Current. Geographic approach for assessing the current protection status of biological diversity over large geographic areas. The program is conducted as state-level projects and is coordinated by BRD.	In database
Gaseous Pollutant Monitoring Network	DOI/National Park Service	Current. Monitoring for priority air pollutants in National Park Lands.	See Air Quality Monitoring Network
Global Change Data Information System (GCDIS)	NASA Lola Olson Goddard Space Flight Center webmaster@www.gcdis.usgcrp.gov	Current. Program provides comprehensive global change related data and information. Additional metadata and data available on the Web.	More information needed about individual datasets

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Global Ecosystem Data	NGDC John Kineman (303) 497-6900	Current. Selected data on the global environment, such as ecosystems, land use, vegetation, climate, topography, and soils.	In database
Global Inventory of Biomass Burning	NOAA/National Geo-Physical Data Center (NGDC) Dave Serke dserke@ngdc.noaa.gov (303) 497-6126	Current. The dataset contains satellite imagery of wildfire data.	In database
Global Vegetation Index	NGDC David Hastings (303) 497-6729	Current. Experimental normalized difference vegetation index based on advanced very high resolution radiometer (AVHRR) of NOAA's polar orbiting environmental satellites.	In database
Hawk Migration Monitoring	Hawk Mountain Sanctuary Laurie Goodrich (610) 756-6961	Current. Each autumn, the sanctuary records counts of migratory raptors past North lookout in PA.	In database
Highway Statistics	DOT/Federal Highway Administration Mary Teets (202) 366-9211	Current. Collection, analysis, summary, and dissemination of data related to the physical characteristics of the nation's highway system. Also includes state and local highway finance.	In database
Index of Watershed Indicators	EPA Sarah Lehmann (202) 260-7021	Current. The Index is a compilation of information on the "health" of aquatic resources in the U.S. It organizes and presents aquatic resource information on a watershed basis.	Obtained report and metadata
Individual State agencies		Current. State agencies collect wildlife incident data associated with pesticide poisoning. Need to research which ones do.	Not currently pursuing
Integrated Taxonomic Information System	USGS/NBII Ann Frondorf (703) 648-4205	Current. Nomenclature standard. Available via e-mail. Probably not useful for environmental health monitoring.	Not currently pursuing
Interagency Monitoring of Protected Visual Environments (IMPROVE) Network	DOI/NPS William Malm (970) 491-8292	Current. 1987-present. Monitoring for fine particulates on National Park Lands. One of the highest quality air monitoring programs for forested areas in the US.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
International Satellite Land Surface Climatology Project	ORNL/DAAC Laura Morris and Marilyn Gentry 423-241-3952	Archived; data no longer being collected.	Not currently pursuing
Land Areas of the National Forest System	USDA/Forest Service	Current. Data on the extent and characteristics of forest, range, and related lands within the National Forest System.	Not currently pursuing
Land Cover Classification	NOAA/National Marine Fisheries Service Don Field (919) 728-8764	Current. Land cover and land use change data for the Chesapeake Bay watershed.	In database
Land Use History of North America (LUHNA)	USGS/BRD Tom Sisk (202) 482-3694 NASA Tony Janetos (202) 358-0278	Future. Goal is to develop a well-documented history of patterns of land use and environmental change. Program in development stage.	In database
Landuse/Landcover (LU/LC) GIRAS Spatial Data	USEPA Ed Partington (202) 260-3106	Current. The dataset contains land use and land cover digital data interpreted from aerial photographs by NASA and the USGS.	In database
Large-Scale Biosphere-Atmosphere (LBA) experiment in Amazonia	ORNL/DAAC NASA Bob Cook (423) 574-7319	Future. Project has been funded but not started yet. Metadata is available on the Web.	International; second tier priority
Level III Ecoregions of the Conterminous U.S.	USEPA Office of Information Resources Management David Wolf (202) 260-3075	Current. The dataset provides polygon coverage of level III ecoregions of the conterminous U.S. and is stored at EDLS (EPA Spatial Data Library).	In database
LOCALECO Ecosystem Protection Place-based Projects in the US	EPA/NSDI	Current; 1995 - present.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Long Term Ecological Monitoring and Research	Scott Collins (703) 306-1483	Metadata available through National Environmental Monitoring and Research Initiative website. See Environmental Monitoring and Research Network.	Not currently pursuing
Long Term Ecological Research (LTER) Network	Bob Waide University of New Mexico (505) 272-7316	Current. Collection of competitive grants and research programs; branch of Environmental Monitoring and Research Network. For example, one project is researching the dynamics of ecosystem state change, both the transitions among ecosystem states and succession within these states, in the Virginia Reserve. Metadata available through National Environmental Monitoring and Research Initiative website.	Not currently pursuing
Long Term Resource Monitoring Program	USGS Environmental Management Technical Center Onalaska, WI 54650 Norm Hildrum (608) 783-7550	Current. 1987 - present. Program documents system-wide ecological trends of the Upper Mississippi River System. A variety of resource monitoring data are available, including floodplain forest information.	In database
Long Term Soil Productivity (LTSP) Research Initiative	USDA Forest Service Dick Cline (202) 205-1323	Current. 1989-present. To evaluate timber management impacts on long-term soil productivity.	More information needed
Major Land Resource Areas	USGS EROS Data Center Customer Services (605) 594-6151	Current. Land resource units that are geo-areas by common patterns of soil, climate, water resources, and land use characteristics.	In database
Major Uses of Land in the United States	USDA/Economic Research Service Ken Krupa (202) 219-0853	Current. 1945-1987. Inventory of the major uses of land in the US at intervals coinciding with the Census of Agriculture. Database available.	In database
Man and the Biosphere (MAB) Reserve Program	EPA NASA Roger Soles (202) 776-8318	Current. Indicators measure conditions of climate, precipitation, soils, vegetation, water, and wildlife. Metadata available through National Environmental Monitoring and Research Initiative.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Master Environmental Library (MEL)	DoD/Defense Modeling and Simulation Office John Kent kent@nrlmry.navy.mil. (408) 656-4706 Chuck Stein stein@nrlmry.navy.mil (408) 656-4706	Excellent source of environmental geospatial data sets in the areas of meteorology, oceanography, bathymetry, topography and climatology. Contains data from around the world. Includes data from many federal mapping agencies including NIMA. Metadata descriptions are included.	Need contacts for specific databases within MEL; need more information
Mercury Deposition Network	Van Bowersox NADP Coordinator (217) 333-7873 sox@sun.sws.uiuc.edu	Current. 1994-present. A subnetwork of NADP gathering information on weekly concentrations of total mercury in precipitation and the seasonal and annual flux of total mercury in wet deposition.	In database
Migration Monitoring Program	Canadian Wildlife Service Erica Dunn (819) 994-0182	Future. A new program to count birds as they migrate north and south being developed by a group of Canadian and U.S. ornithologists.	In database
Monitoring Avian Productivity and Survivorship (MAPS) Program	Institute for Bird Population Dave DeSante (415) 663-1436 75521.271@compuserve.com	Current. A program designed to track the changes and patterns in the number of young produced and the survivorship of adults and young. The program is a cooperative effort between public agencies (e.g., USFWS, USDA, DOI/NPS, DOI/BLM, EPA, and DoD), private organizations (e.g., Institute for Bird Populations), and the bird banders of North America.	In database
Multi-Resolution Land Characteristics Consortium	EPA Pete Campbell (919) 541-2957	Current. A cooperative effort between USDA/FS, EPA, and USGS to develop national land cover databases for the U.S. Metadata available through National Environmental Monitoring and Research Initiative website. See individual datasets.	More information needed on individual datasets
Multi-Resolution Land Characteristic Grid	James Vogelmann (605) 594-6062	Current. A classified mosaic of Landsat TM data generated by the multi-resolution landscape characteristic project. Currently includes information for PA, MD, and DE with plans to expand.	In database
NASA mission to planet earth	NASA Tony Janetos (202) 358-0272		Searching for additional information

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
NASA Pathfinder Climate Data	NOAA/NGDC Ted Habermann (303) 497-6472	Current. Data on atmospheric climatology.	In database
National Acid Precipitation Assessment Program (NAPAP)	NAPAP Karen King (301) 713-2465 x202	Current. A 10-year research and assessment program to improve understanding of the causes, effects, and controls of acidic deposition. Program does not collect data; uses NADP data.	Not currently pursuing
National Agricultural Pest Information System	USDA/APHIS D. McNear (301) 734-8247	Current. Survey data for plant pests in the U.S.	In database
National Air Monitoring Stations (NAMS)/State and Local Air Monitoring Stations (SLAMS)	EPA David Lutz (919) 541-5476	Current. Nationwide database of monitoring data for criteria air pollutants, visibility/fine particulates, toxics. Metadata available through National Environmental Monitoring and Research Initiative.	In database
National Atmospheric Deposition and National Trends Network (NADP/NTN)	NADP Program Office Van Bowersox (217) 333-7873 sox@sun.sws.uiuc.edu	Current. Database contains information on the exposure of both natural and managed ecosystems to biologically important chemical deposition and other stresses resulting from changes in chemical climate. Metadata available through National Environmental Monitoring and Research Initiative.	In database
National Classification of Ecologic Communities	The Nature Conservancy Denny Grossman, Chief Ecologist (703) 841-5305 Mark Bryer (703) 841-4191	Current. The conservancy has developed and implemented a standard ecological classification approach to help manage our information and prioritize work referred to as a physiognomic/floristic approach.	In database
National Climatic Data Center (NCDC)	Department of Commerce/NOAA (704) 251-8205	Current. 1800s-present. Meteorological and climatological data from a global network of stations.	In database
National Contaminant Biomonitoring Program	DOI/Fish and Wildlife Service	Archived. Temporal and geographic trends in concentrations of certain persistent environmental contaminants in fish and wildlife. Being phased out with the implementation of the BEST Program.	Not currently pursuing; see BEST entry

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
National Environmental Monitoring and Research Initiative	EPA Laura Jackson (919) 541-2698	Mid-Atlantic Integrated Assessment Monitoring Inventory has metadata on all programs collecting ecological data in the US. Detailed information on ten programs in the mid-Atlantic regions, information on all other current programs currently in the Mid-Atlantic region will be available on-line by January; less detailed information about several national monitoring programs. Future plans are to have detailed information regarding all programs collecting ecological data in the US in this database. Web site: www.epa.gov/monitor .	All relevant metadata from web page in database
National Environmental Research Parks (NERP)	DOE Jerry Elwood (301) 903-4583	Current. Indicators measure a wide variety of terrestrial ecosystem conditions at all DOE sites. Metadata available through National Environmental Monitoring and Research Initiative.	In database
National Geo-physical Data Center (NGDC)	NOAA/NGDC Dave Serke Data Services Manager dserke@ngdc.noaa.gov (303) 497-6126	Current. Includes Solar Terrestrial Physics and Defense Meteorological Satellite Programs, Global Ecosystems Data, Global Vegetation Index, and Pathfinder climate data.	In database with separate entries for each dataset
National Land Use and Land Cover Mapping Program	DOI/USGS	Current. Land use and land cover maps and digitized data.	In database
National Plant Data Collection Center	USDA/NRCS Scott Peterson (504) 775-6280 Phil Haney (504) 775-6280	Current.	Not currently pursuing; applicability of webpage data limited
National Report Card on Nation's Ecosystems	Heinz Center Heather Blough, Bob Friedman (202) 737-6307	Future. Project not just getting started. Received reference list and distributed to workgroup. No indicators or databases selected for project.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
National Resources Inventory	USDA/NRCS Jeff Goebel (202) 720-9032	Current; 1956-present. NRI is an inventory of land cover and use, soil erosion, prime farmland, wetlands, and other natural resource characteristics on non-Federal rural land in the U.S. Inventories are conducted every five years by NRCS. Data is not geospatial. Several environmental indicators of the condition of natural resources are measured every five years at 800,000 sites in the US and Canada. Metadata available through the National Environmental Monitoring Initiative website.	In database
National Soil Characterization Data	USDA/NRCS National Soil Survey Center Steven Baird (402) 437-5363	Current. Morphological descriptions for 15,000 preondons of soil (U.S. and other countries).	In database
National Watershed Assessment Project (NWAP)	EPA Sarah Lehmann (202) 260-7021	Current. Developed from national datasets to address watershed condition and vulnerability. Name changed to Index of Watershed Indicators.	See Index of Watershed Indicators
Native Plant Conservation Initiative (NPCI)	NPCI Peggy Olwell (202) 219-8933 (301) 681-5562 (home) Olivia Quang (202) 208-4912 Denny Grossman (703) 841-5305	Do not have a native plant database due to lack of funding; searching for interagency support.	Not currently pursuing
NATSGO (National Soil Geographic Database)	USDA/NRCS National Soil Survey Center Steven Baird (402) 437-5363	Current. Estimates of soil carbon on a national basis, possibly in forest ecosystems only (i.e., not other types of ecosystems).	In database
Natural Heritage Network	Nature Conservancy Jeff Lerner (703) 841-4240	Current. Contains a variety of conservation information for all vascular plant species, all vertebrate species, selected invertebrate species, and selected non-vascular species of North America. Information includes taxonomy, nomenclature, conservation status, distribution, habitat ecology, and management as well as monitoring, and research needs.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Net Primary Production	ORNL/DAAC NASA Bob Cook (423) 574-7319	Archived; data no longer being collected. Database is online.	Not currently pursuing
Nighttime Lights	NOAA/National Geo-Physical Data Center (NGDC) Solar Terrestrial Physics Divisions Chris Elvidge (303) 497-6121	Current. A digital map of the nighttime lights of the US. Corresponds well to the distribution of population and factors like electric power consumption.	In database
North American Amphibian Monitoring Program (NAAMP)	USGS/BRD Sam Droege Patuxent Wildlife Research Center 12100 Beech Forest Road, Suite 4039 Laurel, MD 20708-4039 (301) 497-5500	Future. Terrestrial Salamander Monitoring Program will monitor changes in populations of terrestrial salamanders (indicator of forest health). Metadata available through the National Environmental Monitoring Initiative website.	In database
North American Breeding Bird Survey (BBS)	USGS/BRD Bruce Peterjohn Patuxent Wildlife Research Center 11410 American Holly Drive Laurel, MD 20708 bruce_peterjohn@nbs.gov	Current; 1966-present. A large-scale survey of North American birds administered by BRD. Metadata available through the National Environmental Monitoring Initiative website.	In database
North American Conservation Assessment	WWF (202) 293-4800	Archived; one time assessment. A comprehensive study undertaken to chart the biological wealth and distinctiveness of all ecoregions north of Mexico.	In database
North American Landscape Characterization (NALC)	USGS EROS Data Center EDC DAAC User Services (605) 594-6116	Current. Information on corrected and projected and classified satellite imagery.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
North American Maple Project (NAMP)	USDA/Forest Service Northeastern Experiment Station Radnor, PA Gerry Hertle (610) 975-4125 New Hampshire Bob Cooke (603) 868-7705	Current. Monitoring the health of the sugar maple population in the US.	More information needed
North American Raptor Monitoring Strategy	USGS/BRD Bob Lehman Snake River Field Station 970 Lusk St. Boise, ID 83706 (208) 331-5205 [also Kirk Bates at (208) 331-5215]	Future. A strategy developed by a group of raptor biologists and statisticians for monitoring raptor populations in North America by developing current raptor monitoring programs into a continent-wide population tracking system for raptors.	In database
Noxious/Invasive Database	USDA/Forest Service Rita Beard (970) 498-1715	Current. This is a geospatially referenced dataset with administrative reporting, inventory, and biological control information. It also contains pesticide information.	In database
Oregon Transect Ecosystem Research (OTTER)	ORNL/DAAC NASA Bob Cook (423) 574-7319	Archived; data no longer being collected. Data available on CD-ROM.	Not currently pursuing
Photochemical Assessment Monitoring Stations (PAMS)	EPA Gerald Nash (919) 541-5652 Gerald.Nash@epamail.epa.gov	Current. Indicators of the effects of ozone pollution. Metadata available through National Environmental Monitoring and Research Initiative.	In database
Plant Genome Data and Information Center (PGDIC)	USDA Ray Altevogt (301) 504-6613 10301 Baltimore Ave 4th floor Beltsville, MD 20705-2351	Current. Plant and animal genome mapping.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Postal Service Delivery Statistics	USPS National Customer Support Center 1-800-238-3150	Current. Records of number of addresses within postal zip codes.	In database
Production and Transport of Organic Solutes: Effects of Natural Climate Variation (PROTOS)	Terrestrial Ecosystem Research Initiative (TERI), part of the "Environment and Climate" Research Programme of the European Commission Dr. Jan Mulder Jan Mulder@Nisk.No	Current. Project to collect geospatial data in Europe.	Not currently pursuing; international; second tier priority
Project Feeder Watch	Cornell Laboratory of Ornithology Margaret Barker (607) 254-2440	Current. 1987-present. A winter survey of birds that visit backyard feeders in North America.	In database
Public Lands Statistics	DOI/BLM Eric Luse (202) 452-7743	Current. National summary of key statistics for all of the BLM lands.	In database with separate entries for each indicator
Range Site Inventory	DOI/BLM	Archived. On-the-ground assessment of rangeland administered by BLM. See Ecological Site Inventory.	Not currently pursuing
Remote Automated Weather Stations (RAWS)	USDA Kolleen Shelley (208) 476-8362	Current. Database contains national data. Indicators of climate, precipitation, soils and wind speed. Metadata available through National Environmental Monitoring and Research Initiative.	In database
Remote Sensing - geography, land cover	U of Maryland Peter Townsend		Not currently pursuing
RPA Updates/Database	USDA/Forest Service Brad Smith (202) 205-0841	Current. 1952-1992 and will be updated in 1997. Provides information about forest land area, timberland area, timber inventories, timber mortality, timber growth and harvest, and ownership. Information gathered from FIA.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Santiago Declaration: Criteria and Indicators of Temperate and Boreal Forests	USDA/Forest Service Kathy Malony (202) 205-1235	USFS first approximate report for sustainable forest management. Many indicators and datasets in this report.	Relevant indicators and datasets in database
Soil Interpretations Record Database	USDA/NRCS National Soil Survey Center Steven Baird (402) 437-5131		More information needed
Solar Terrestrial Physics Data	NOAA/National Geo-Physical Data Center (NGDC) Dave Serke dserke@ngdc.noaa.gov (303) 497-6126	Current. Many terrestrial geophysical datasets available including Global Inventory of Biomass Burning, Defense Meteorological Satellite Program (DMSP) data, and Nighttime Lights.	See individual entries for these datasets
Southeastern Cooperative Wildlife Disease Study (SCWDS)	University of Georgia College of Veterinary Medicine John Fischer (706) 542-1741	Current. Database containing information regarding wildlife mortalities in AL, AR, FL, GA, KY, LA, MD, MO, MS, NC, SC, TN, VA, WV) and Puerto Rico. Information includes clinical history, location and extent of mortality, species involved most mortem findings in specimens, and results of tests for toxins and microbes.	In database
State Energy Data Reports	DOE/Energy Information Administration	Current. 1960-present. Estimates of annual energy consumption at the state and national levels by major economic sector and by principal energy type.	Not currently pursuing
STATSGO	USDA/NRCS Soil Survey Division Craig Palmer (702) 895-1797 palmerc@nevada.edu	Current. Estimates on soil carbon on a state-by-state basis, possibly in forest ecosystems only (i.e., not other types of ecosystems).	In database
Superfund National Priority List Site Boundaries for the US	EPA website access to NPL US map is: www.epa.gov/superfund/oerr/impn/products/nplsites/usmap/htm website for ecologically related info: www.epa.gov/docs/ord/ecorisk.html	Current; 1992-present. US map of NPL sites, geospatially and state referenced. Metadata on web is limited; does not appear to indicate terrestrial ecosystems at risk.	Not currently pursuing

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
Superior National Forest	ORNL/DAAC NASA Bob Cook (423) 574-7319	Archived; data no longer being collected. Data available on CD-ROM.	Not currently pursuing
Sustainable Development Indicators Project	President's Council on Environmental Quality David Berry (Need Phone #) EPA Tim Stewart		Not currently pursuing - received forest indicators from Ken Stolte
TEMS Database (Terrestrial Ecosystems Monitoring Sites)	United Nations, Global Environmental Monitoring System Program Activity Center Dr. John Innes German address	Current. Metadata for terrestrial ecosystem monitoring sites on a global scale. Metadata available on the Web.	International; second tier priority
Tree Planting in the U.S.	USDA/Forest Service Robert Moulton (919) 549-4032	Current. National summary of tree planting in the US.	In database
U.S. Fish and Wildlife Service Lands	DOI/Fish and Wildlife Service	Current. 1945-present. Inventory of U.S. Fish and Wildlife Service lands.	Not currently pursuing
University of Georgia and Environmental Protection Agency Ultraviolet Monitoring Network			More info and contact needed
UV-B Monitoring Data	EPA/National Health and Environmental Effects Research Lab Bill Hogsett (541) 754-4632 hogsett.william@epamail.epa.gov	Current. The dataset contains UV-B monitoring data for 14 rural areas (located in 14 national parks) and 8 urban areas.	In database

TERRESTRIAL ECOSYSTEM INDICATORS

Name of Project	Contact	Timescale of Data/Description	Status
UV-B Radiation Monitoring Program	USDA Dr. James H. Gibson, Program Director Natural Resource Ecology Laboratory Colorado State University Fort Collins, CO 80523 (970) 491-3611 jimg@nrel.colostate.edu	Current. Assessment of the potential for damage that increased UV-B radiation might have on agricultural crops, forests and natural ecosystems. Measurement of radiation with broadband UV-B-1 pyranometers began in 1994, recognizing that information derived from these instruments would be of limited value to both the biological effects and atmospheric science communities. Plans call for an expansion of the network to at least 26 sites during the current year. Data from each site are posted on the World Wide Web Home Page each day and specific data files are made available to the user community along with instrument calibration information upon request.	In database
Visibility Monitoring Network	DOI/National Park Service	Current. Monitoring for fine particulates on National Park Lands.	See IMPROVE
Waterfowl and Gamebird Monitoring	US Fish and Wildlife Service Graham Smith (301) 497-5860	Current. Extensive monitoring program, including several breeding and wintering surveys for waterfowl and gamebirds that range from the arctic islands down into northern Mexico.	In database with subentries for each dataset
Wildland Fire Statistics	USDA/Forest Service	Current. Data on wildland fires on public and private lands throughout the US. Includes info from Boise Interagency Fire Center.	More info and contact needed
Wildlife Health Epizootiological Database EPIZOO	NBS/National Wildlife Health Center (NWHC) Kathryn Converse (608) 264-5411	Current; 1975 - present. Metadata available on the Web.	In database
Wildlife Health Diagnostics Database (DIAGDATA)	NBS/National Wildlife Health Center (NWHC) Kate Cleary (608) 264-5411	Current; 1975 - present. Metadata available on the Web.	In database
Wildlife Incident Investigation Scheme (WIIS)	United Kingdom Ministry of Agriculture, Fisheries and Food (MAFF) Mark Fletcher M.fletcher@csl.gov.uk Database Maintenance e.barnett@csl.gov.uk	Current; 1964 - present. Agency has been recording incident data related to vertebrate mortality since 1964. Uncertain whether info is in the form of a database reporting status and trends.	Not currently pursuing

Appendix B

Data Source Descriptions

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0001

Dataset Name: North American Breeding Bird Survey (BBS)

Collecting Organization: USGS/BRD

Geographic Scale: international

Readiness: currently available

Quality: high

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1966 to present

Data Gaps: unknown

Format: disk/CD/web page

URL Address: www.mbr.nbs.gov/bbs/bbs.html

Accessibility: publicly available

Narrative Description: BBS is a large-scale survey of North American birds administered by BRD. BBS monitors the status and trends of all species of birds breeding in North America, to monitor changes, and provide current trend estimates to promote our knowledge of the overall health of regional wildlife communities and the ecosystems they inhabit. Over 3,500 routes are surveyed each June by experienced birders using a roadside survey technique. The objective of the survey has been the estimation of population changes for songbirds; however, the data have many potential uses. BBS also measures climate (meteorology) and animals (species, range, populations).

Indicator Association(s): I-0024

Population Levels of Forest-dependent Bird Species

Contact Name: Bruce Peterjohn

Organization: USGS/BRD

Phone: (301) 497-5841

Fax:

E-mail: bruce_peterjohn@nbs.gov

Address: Patuxent Wildlife Research Center

11410 American Holly Drive

Laurel, MD 20708

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0002

Dataset Name: North American Amphibian Monitoring Program (NAAMP)

Collecting Organization: USGS/BRD

Geographic Scale: national

Readiness: currently available/expected soon

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1996 to present

Data Gaps: unknown

Format: unknown

URL Address: NA

Accessibility: publicly available

Narrative Description: The North American Amphibian Monitoring Program provides a statistically defensible program to monitor the distributions and relative abundance of amphibians in North America, with applicability at the state, provincial, ecoregional, and continental scales. It includes the Terrestrial Salamander Monitoring Program and the Calling Surveys and Herpetological Atlases for Frogs and Toads. The Terrestrial Salamander Monitoring Program, which is currently being developed, will establish a network of sites in North America that will collect trend information on terrestrial salamander populations. The program is in the stages of recruiting monitoring sites and local coordinators. The results of salamander population monitoring combined with other ecosystem measures (e.g., geographic location, land management, air quality, vegetation, and other animal species) will permit the investigation of the effects of ecosystem attributes on their population dynamics. Researchers hypothesize that salamander population trends may be an indicator of forest health. The Calling Surveys and Herpetological Atlases for Frogs and Toads started in 1996 and is conducted three times a year.

Indicator Association(s): I-0002

Terrestrial Salamander Populations

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0002

Dataset Name: North American Amphibian Monitoring Program (NAAMP)

Contact Name: Sam Droege

Organization: USGS/BRD

Phone: (301) 497-5500

Fax:

E-mail: frog@nbs.gov

Address: Patuxent Wildlife Research Center

12100 Beech Forest Road, Suite 4039

Laurel, MD 207084039

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0003

Dataset Name: Ecological Incident Information System

Collecting Organization: USEPA/Office of Pesticide Programs

Geographic Scale: national/international

Readiness: currently available

Quality: high

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1960s to present

Data Gaps: unknown

Format: hard copy reports/system

URL Address: NA

Accessibility: not publicly available

Narrative Description: This dataset is the largest database of pesticide incident information. Reporting is on an incident-by-incident basis, and contains data incidents occurring as far back as the 1960's.

Indicator Association(s):

Contact Name: James Feldkel

Organization: EPA/OPP

Phone: (703) 305-5828

Fax: (703) 305-6309

E-mail: felkel.james@epamail.epa.gov

Address: USEPA

Mailcode: 7507C

Washington, DC 20460

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0004

Dataset Name: Land Use Data for Agroecosystems in the US

Collecting Organization: EMAP Agricultural Lands Resource Group

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1992 to 1997

Data Gaps: unknown

Format: hard copy reports/disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset contains information on the characteristics and maintenance of agricultural lands such as ancillary features, extent and management information, chemical application, irrigation, and tillage.

Indicator Association(s):

Contact Name: Steven Shafer

Organization: USDA/Agricultural Research Service

Phone: (919) 515-2142

Fax:

E-mail: stevenshafer@ncsu.edu

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0005

Dataset Name: Land Cover Data for Agroecosystems in the US

Collecting Organization: EMAP Agricultural Lands Resource Group

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1992 to present

Data Gaps: unknown

Format: hard copy reports/disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset includes types of land cover such as vegetative descriptions and disturbance history .

Indicator Association(s):

Contact Name: Steven Shafer

Organization: USDA/Agricultural Research Service

Phone: (919) 515-2142

Fax:

E-mail: stevenshafer@ncsu.edu

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0006

Dataset Name: Land Form Data for Agroecosystems in the US

Collecting Organization: EMAP Agricultural Lands Resource Group

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1992 to present

Data Gaps: unknown

Format: hard copy reports/disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset includes information on soil characteristics for agricultural lands including fertility and nutrients, in-field and lab analyses, texture, toxicity, pH, microbial biomass, and water infiltration.

Indicator Association(s):

Contact Name: Steven Shafer

Organization: USDA/Agricultural Research Service

Phone: (919) 515-2142

Fax:

E-mail: stevenshafer@ncsu.edu

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0008

Dataset Name: Photochemical Assessment Monitoring Stations (PAMS)

Collecting Organization: USEPA

Geographic Scale: regional

Readiness: early development

Quality: unknown

Collection Frequency: hourly for 3 months or every 3 hours every sixth day

Reporting Frequency: every 3 months for ozone & 6 months for hydrocarbons

Collection Years: 1992 to present

Data Gaps: data for 1992 and 1993 is not complete for all stations

Format: hard copy reports/disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: These stations collect data that is used to study the causes of ozone pollution, to devise effective remedies, and to measure environmental improvement. PAMS measures criteria air pollutants and air toxics as well as climate (meteorology).

Indicator Association(s):

Contact Name: Nash Gerald

Organization: USEPA

Phone: (919) 541-5652

Fax: (919) 541-1903

E-mail: gerald.nash@epamail.epa.gov

Address: USEPA

OAQPS Maildrop 14

RTP, NC 27711

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0009

Dataset Name: National Atmospheric Deposition Program & National Trends Network (NADP/NTN)

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: weekly

Reporting Frequency: weekly

Collection Years: 1978 to present

Data Gaps: varies for each station

Format: web page

URL Address: <http://nadp.nrel.colostate.edu/NADP/sitelist.html>

Accessibility: publicly available

Narrative Description: The NADP/NTN is a nationwide network of precipitation monitoring sites. The network is a cooperative effort between many different groups, including the State Agricultural Experiment Stations, USGS, USDA, and other governmental and private entities. The NADP/NTN has grown from 22 stations at the end of 1978 to over 200 sites spanning the continental U.S., Alaska, and Puerto Rico. The purpose of the network is to collect data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends. The precipitation at each station is collected weekly according to strict clean-handling procedures. It is then sent to the Central Analytical Laboratory where it is analyzed for hydrogen (acidity as pH), sulfate, nitrate, ammonia, chloride, and base cations (such as calcium, magnesium, potassium, and sodium). It provides the scientific community, resource managers, and policy makers with information on the exposure of both natural and managed ecosystems to biologically important chemical deposition and other stresses resulting from changes in chemical climate.

Indicator Association(s): I-0022

Forest Land Subject to Specific Levels of Air Pollutants

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0009

Dataset Name: National Atmospheric Deposition Program & National Trends Network (NADP/NTN)

Contact Name: Van Bowersox

Organization: NADP

Phone: (217) 333-7873

Fax: (217) 244-0220

E-mail: sox@sun.sws.uiuc.edu

Address: NADP Program Office, Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61028

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0013

Dataset Name: Clean Air Status and Trends Network (CASTNet)

Collecting Organization: QST Environmental (USEPA contractor in Florida)

Geographic Scale: regional

Readiness: currently available

Quality: extremely high

Collection Frequency: weekly, but continuous for ozone & meteorological data

Reporting Frequency: quarterly

Collection Years: 1988 to present

Data Gaps: September 1995 to July 1996, except for 15 sites

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: CASTNet is a USEPA-sponsored network of rural sites designed to evaluate patterns and trends of atmospheric concentration, wet and dry deposition and related variables across the U.S. The sites measure criteria air pollutants, visibility/fine particulates, air toxics as well as precipitation (wet deposition and dry deposition). Each site is equipped with a temperature-controlled shelter, ozone analyzer, meteorological sensors, a filter pack sampling system and a datalogger. By the beginning of 1991 the network had grown to 50 sites, most of them in rural locations in the eastern states, with 48 of those sites operating year-round. The network was originally established to monitor dry deposition and other meteorological parameters. However, at 16 of these sites, all further than 50 kilometers away from the nearest NADP/NTN station, weekly precipitation chemistry samples are collected using NADP/NTN sampling protocols and site selection criteria. Since 1989, ten dry deposition stations have been closed. As special study sites, CASTNet has three high elevation sites in New York, SW Virginia and Tennessee. The study started in 1994 and lasted three cloud seasons (May to September in 1994, 1995, and 1996). Cloud water chemistry includes major ionic species collected by impaction. Filter packs are also used for visibility. CASTNet includes data on the chemical content of haze and aerosol composition.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0013

Dataset Name: Clean Air Status and Trends Network (CASTNet)

Contact Name: Ralph Baumgardner

Organization: USEPA

Phone: (919) 541-4625

Fax: (919) 541-1486

E-mail: baumgardner.ralph@epamail.epa.gov

Address: USEPA

Maildrop 56

Research Triangle Park, NC 27711

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0015

Dataset Name: Forest Inventory and Analysis (FIA)

Collecting Organization: USDA/Forest Service

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: annual (7-12 year cycle for entire nation)

Reporting Frequency: unknown

Collection Years: 1930 to present

Data Gaps: unknown

Format: system/data tape

URL Address: NA

Accessibility: publicly available

Narrative Description: The FIA is a comprehensive inventory and analysis of the renewable forest and rangeland resources of the United States. Initial inventory efforts began in the West in 1930. By the 1960's, inventories were completed for all of the 48 conterminous states, and many of the important forested states had been re-inventoried. The inventory data and analysis provide trend information on the extent, condition, ownership, and composition of the nation's forests as well as information about wildlife habitat, forage production, and other resource characteristics needed for resource planning. FIA measures soil texture and structure, vegetation growth rate, above-ground biomass, recruitment, disease intensity, species, cover, range, and fire. This dataset includes individual project databases of county level, sample plot level, and tree level statistics; seven databases are maintained by individual inventory projects. Much of the FIA data is available through the RPA database (D-0045) and RPA updates.

Indicator Association(s):	I-0021	Forests Affected by Other Natural and Human-Induced Pressures
	I-0005	Total Forest Ecosystem Biomass and Carbon Pool
	I-0019	Sustainability of Wood Products Harvest
	I-0018	Total Growing Stock of Both Merchantable and Non-Merchantable
	I-0017	Area of Forest Land and Net Area Forest Land Available for Timber
	I-0014	Number of Forest Dependent Species
	I-0012	Extent of Area by Forest Type Relative to Total Forest Area
	I-0011	Extent of Area by Forest Type and Age Class or Successional Stage
	I-0003	Contribution of Forest Products to the Global Carbon Budget

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0015

Dataset Name: Forest Inventory and Analysis (FIA)

Contact Name: Brad Smith

Organization: USDA

Phone: (202) 205-0841

Fax: (202) 205-1087

E-mail:

Address: Auditor's Building

14th & Independence, SW

Washington, DC

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0016

Dataset Name: National Air Monitoring Stations (NAMS)/State & Local Air Monitoring Stations (SLAMS)

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: hourly - Pb & PM10 variable

Reporting Frequency: hourly or variable

Collection Years: 1980 to present

Data Gaps: none

Format: web page

URL Address: <http://www.epa.gov/airs/aexec.html>

Accessibility: publicly available

Narrative Description: The national air monitoring stations (NAMS) are run by EPA, and the state and local air monitoring stations are run by state and local governments. NAMS/SLAMS measure criteria pollutants, visibility/fine particulates, and toxics in air.

Indicator Association(s):

Contact Name: David Lutz

Organization: USEPA

Phone: (919) 541-5476

Fax: (919) 541-1903

E-mail: unknown

Address: USEPA

Maildrop 14

Research Triangle Park, NC 27711

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0017

Dataset Name: National Resources Inventory (NRI)

Collecting Organization: USDA/Natural Resources Conservation Service (NRCS)

Geographic Scale: national

Readiness: currently available

Quality: variable

Collection Frequency: every 5 years

Reporting Frequency: variable

Collection Years: 1956 to present

Data Gaps: data currently available only until 1992

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: NRI is an inventory of land cover and use, soil erosion, prime farmland, wetlands, and other natural resource characteristics on non-Federal rural land in the U.S. The many types of data collected by the NRI process are organized into eight general categories: soil characteristics and interpretations (including agricultural land capability); land cover; land use (including irrigated and non-irrigated cropland, grazed and ungrazed forest land, prime farmland, etc.); erosion (e.g., sheet and rill, wind, and ephemeral gullies); land treatment (e.g., irrigation, tillage, and windbreaks); conservation treatment needs; vegetative conditions (e.g., wetlands, rangeland condition and species, and pasture management); and potential for conversion to cropland. The database contains 1982, 1987 and 1992 NRI datasets.

Indicator Association(s):	I-0019	Sustainability of Wood Products Harvest
	I-0017	Area of Forest Land and Net Area Forest Land Available for Timber
	I-0012	Extent of Area by Forest Type Relative to Total Forest Area
	I-0011	Extent of Area by Forest Type and Age Class or Successional Stage
	I-0010	Forest Land with Significant Soil Erosion

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0017**Dataset Name:** National Resources Inventory (NRI)

Contact Name: Jeff Goebel

Organization: USDA/NRCS

Phone: (202) 720-9032

Fax: (202) 690-3266

E-mail: goebel@usda.gov

Address: USDA/NRCS

P.O. Box 2890, S. Agricultural Building, Room 6175

Washington, DC 20013

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0018

Dataset Name: Remote Automatic Weather Stations (RAWS)

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: high quality during fire season

Collection Frequency: varies for each station

Reporting Frequency: varies for each station

Collection Years: late 1970s/early 1980s to present

Data Gaps: varies for each station

Format: web pages/hard copy reports

URL Address: <http://wrcc.sage.dri.edu>

Accessibility: publicly available

Narrative Description: The stations measure climate (meteorology and solar radiation), precipitation/deposition (wet and dry deposition), soils (chemistry and climate), and other variables such as fuel temperature, maximum gust and wind speed direction. Stations are located only on public lands.

Indicator Association(s):

Contact Name: Kolleen Shelley

Organization: USDA

Phone: (208) 476-8362

Fax: (208) 476-8329

E-mail: shelley_kolleen/r1_clearwater@fs.fed.us

Address:

12730 Highway 12

Orofino, ID 83544

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0020

Dataset Name: National Environmental Research Parks

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: varies for each park

Collection Frequency: variable

Reporting Frequency: variable

Collection Years: 1972 to present

Data Gaps: varies for each park

Format: disk/CD/hard copy reports/web pages

URL Address: unknown

Accessibility: publicly available

Narrative Description: National Environmental Research Parks collect a variety of ecological data.

Indicator Association(s):

Contact Name: Jerry Elwood

Organization: DOE

Phone: (301) 903-4583

Fax: (301) 903-8519

E-mail: jerry.elwood@oer.doe.gov

Address: DOE

ER-74, 1909 Germantown Road

Germantown, MD 20874

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0021

Dataset Name: Mercury Deposition Network

Collecting Organization: Frontier Geosciences, Inc., Seattle, WA

Geographic Scale: regional

Readiness: currently available for staff only

Quality: high

Collection Frequency: weekly

Reporting Frequency: weekly

Collection Years: 1994 to present

Data Gaps: some stations closed in 1995 or 1996

Format: NA

URL Address: NA

Accessibility: not publicly available

Narrative Description: The Mercury Deposition Network is developing a regional database on the weekly concentrations of total mercury deposition in precipitation and the seasonal and annual flux of total mercury in wet deposition. The data will be used to develop an information database on spatial and seasonal trends in mercury deposited to surface waters, forested watersheds, and other sensitive receptors. MDN began a transition network of 13 sites in 1994 and 30 sites are anticipated by 1997. The MDN is anticipated to operate for a minimum of five years and will be managed at the NADP Coordination Office.

Indicator Association(s): I-0022

Forest Land Subject to Specific Levels of Air Pollutants

Contact Name: Van Bowersox

Organization: NADP

Phone: (217) 333-7873

Fax: (217) 244-0220

E-mail: sox@sun.sws.uiuc.edu

Address: NADP Program Office, Illinois State Water Survey

2204 Griffith Drive

Champaign, IL 61828

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0022

Dataset Name: Wildlife Health Diagnostics Database (DIAGDATA)

Collecting Organization: National Wildlife Health Center

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: continuous

Reporting Frequency: continuous

Collection Years: 1975 to present

Data Gaps: no major data gaps

Format: disk/CD/hard copy reports

URL Address: NA

Accessibility: not publicly available

Narrative Description: The diagnostics database is a computerized record of specimens (from serum samples to carcasses) sent to the National Wildlife Health Center for processing and diagnostic workup. The datafile includes five 80-character lines of coded data for each specimen. Data include history and recordkeeping information (identifier numbers, species, sex, submitter information, etc.); types of tests run (virology, bacteriology, parasitology, chemistry, etc.) and some test results for heavy metals, particularly lead; and diagnostic results. The diagnostic coding system is based on SNOMED terminology, with certain modifications and additions to fit Center needs. SNOMED, the Systematized Nomenclature of Medicine, is a structured nomenclature and classification of the terminology used in human and veterinary medicine. Terms are assigned in any or all of the following six categories for each diagnostic: topography (detailed anatomic term for the site of interest), morphology (information on the pathogenic change or process associated with the topography), etiology (cause or causal agent of the disease or dysfunction), disease (disease, disease entity or syndrome), and link (qualifier to link on diagnosis to another).

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0022

Dataset Name: Wildlife Health Diagnostics Database (DIAGDATA)

Contact Name: Kate Cleary

Organization: National Wildlife Health Center

Phone: (608) 264-5411

Fax: (608) 264-5431

E-mail: kate_cleary@nbs.gov

Address: National Wildlife Health Center

6006 Schroeder Road

Madison, WI 537116223

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0023

Dataset Name: Wildlife Health Epizootiological Database (EPIZOO)

Collecting Organization: National Wildlife Health Center

Geographic Scale: national

Readiness: currently available

Quality: medium

Collection Frequency: variable

Reporting Frequency: variable

Collection Years: 1975 to present

Data Gaps: variable for each case

Format: disk/CD/hard copy report

URL Address: NA

Accessibility: publicly available

Narrative Description: EPIZOO is a computerized record of wildlife mortality and morbidity events (epizootics), summarizing information gathered by personnel at the National Wildlife Health Center (NWHC). EPIZOO tracks events throughout the U.S. and territories, primarily in migratory birds. Data include incident, dates, species involved, history, population numbers, total sick/dead, and morbidity and mortality information. The EPIZOO computer software package has been developed specifically for analysis of information on animal health and diseases, including those transmissible to man. The software package includes indicators to analyse data on morbidity and mortality, geographical distribution, animal populations characteristics, and dynamics of epizootics. It helps to prepare for investigations of animal population health and disease, to analysed diagnosis and consequences of illness, to design animal health programmes, to estimate costs and evaluate programmes. It also includes some sampling and other simple and practical statistical techniques.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0023

Dataset Name: Wildlife Health Epizootiological Database (EPIZOO)

Contact Name: Kathryn Converse

Organization: National Wildlife Health Center

Phone: (608) 264-5411

Fax: (608) 264-5431

E-mail: kathy_converse@nbs.gov

Address: National Wildlife Health Center

6006 Schroeder Road

Madison, WI 537116223

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0031

Dataset Name: Atmospheric Halocarbons & Nitrous Oxide

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: good

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1978 to present

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/ftp/ale OR [/gage](http://cdiac.esd.ornl.gov/ftp/gage) OR [/agage](http://cdiac.esd.ornl.gov/ftp/agage)

Accessibility: publicly available

Narrative Description: In the Atmospheric Halocarbons and Nitrous Oxide from the ALE/GAGE/AGAGE global network program, continuous high frequency gas chromatographic measurements of two biogenic/anthropogenic gases (methane, CH₄; nitrous oxide, N₂O) and five anthropogenic gases (chlorofluorocarbons, CFC13, CF₂CL₂, and CF₂CICFCI₂; methyl chloroform, CH₃CCl₃; carbon tetrachloride, CCl₄) are carried out at globally distributed sites. The program, which began in 1978, is conveniently divided into three parts associated with three changes in instrumentation: the Atmospheric Lifetime Experiment (ALE), which utilized Hewlett Packard HP5840 gas chromatographs; the Global Atmospheric Gases Experiment (GAGE), which utilizes HP5880 gas chromatographs; and the recently initiated Advanced GAGE (AGAGE). AGAGE uses a new fully automated system from the Scripps Institution of Oceanography containing a custom-designed sample module and HP5890 and Carle Instruments gas chromatographic components.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0031

Dataset Name: Atmospheric Halocarbons & Nitrous Oxide

Contact Name: Tom Boden

Organization: Carbon Dioxide Information Analysis Center

Phone: (423) 241-4842

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0032

Dataset Name: Atmospheric Methane Mixing Ratios

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: good

Collection Frequency: < annual

Reporting Frequency: annual

Collection Years: 1983 to 1993

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/ftp/db1008

Accessibility: publicly available

Narrative Description: This database presents atmospheric methane (CH₄) mixing ratios from flask air samples collected over the period 1983-1993 by the National Oceanic and Atmospheric Administration, Climate Monitoring and Diagnostics Laboratory's (NOAA/CMDL's) global cooperative air sampling network. Air samples were collected approximately once per week at 44 fixed sites (37 of which were still active at the end of 1993). Samples were also collected at 5 degree latitude intervals along shipboard cruise tracks in the Pacific Ocean between North America and New Zealand (or Australia) and at 3 degree latitude intervals along cruise tracks in the South China Sea between Singapore and Hong Kong. The shipboard measurements were made approximately every 3 weeks per latitude zone by each of two ships in the Pacific Ocean and approximately once every week per latitude zone in the South China Sea. All samples were analyzed for CH₄ at the NOAA/CMDL laboratory in Boulder, Colorado, USA, by gas chromatography with flame ionization detection, and each aliquot was referenced to the NOAA/CMDL methane standard scale.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0032

Dataset Name: Atmospheric Methane Mixing Ratios

Contact Name: Tom Boden

Organization: Carbon Dioxide Information Analysis Center

Phone: (423) 241-4842

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0033

Dataset Name: Atmospheric Carbon Monoxide Mixing Ratios

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: good

Collection Frequency: < annual

Reporting Frequency: annual

Collection Years: 1988 to 1993

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/ftp/db1011

Accessibility: publicly available

Narrative Description: Individual site files provide carbon monoxide mixing ratios in parts per billion based on measurements from the NOAA/CDML Cooperative Air Sampling Network beginning 1988. Data are provided through June 1993 for stations at which the first sample was collected before July 1991.

Indicator Association(s):

Contact Name: Paul Novelli

Organization: NOAA

Phone: (303) 497-6974

Fax:

E-mail: pnovelli@cmdl.noaa.gov

Address: NOAA

325 Broadway

Boulder, CO 80303

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0034

Dataset Name: Global & Latitudinal Estimates of $\delta^{13}\text{C}$ from Fossil-Fuel Consumption and Cement Manufacture

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: good

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1860 to 1992

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/ftp/db1013

Accessibility: publicly available

Narrative Description: The Global and Latitudinal Estimates of $\delta^{13}\text{C}$ from Fossil-Fuel Consumption and Cement Manufacture database contains estimates of the annual mean value of $\delta^{13}\text{C}$ of CO_2 emissions from fossil-fuel consumption and cement manufacture for 1860-1992. It also contains estimates of the value of $\delta^{13}\text{C}$ for one degree bands for the years 1950, 1960, 1970, 1980, 1990, 1991, and 1992. These estimates of the carbon isotopic signature account for the changing mix of coal, petroleum, and natural gas being consumed and for the changing mix of petroleum from various producing areas with characteristic isotopic signatures. This time series of fossil-fuel $\delta^{13}\text{C}$ signature provides an additional constraint for balancing the sources and sinks of the global carbon cycle and complements the atmospheric $\delta^{13}\text{C}$ measurements that are used to partition the uptake of fossil carbon emissions among the ocean, atmosphere, and terrestrial biosphere reservoirs.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0034

Dataset Name: Global & Latitudinal Estimates of $\delta^{13}\text{C}$ from Fossil-Fuel
Consumption and Cement Manufacture

Contact Name: Robert Andres

Organization: Institute of Northern Engineering

Phone:

Fax:

E-mail:

Address: Institute of Northern Engineering

Univ. of Alaska-Fairbanks

Fairbanks, AL 997755900

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0035

Dataset Name: Global Patterns of Carbon Dioxide Emissions from Soils

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: medium

Collection Frequency: variable

Reporting Frequency: variable

Collection Years: 1964 to present

Data Gaps: uses predictions for sites with no data

Format: web page

URL Address: cdiac.esd.ornl.gov/cdiac/newsletr/spring97/datas97

Accessibility: publicly available

Narrative Description: The Global Patterns of Carbon Dioxide Emissions from Soils on a 0.5 Degree Grid Cell Basis database contains global, spatially explicit (0.5 degree grid cells) and temporally explicit (monthly and annual) model output of soil CO₂ emissions. The calculated emissions include the respiration of both soil organisms and plant roots. A map of the soil emissions is available as a soil.ps and a soil.gif file. It uses published data and runs it through a model to produce an annual report.

Indicator Association(s):

Contact Name: James Raich

Organization: Iowa State University

Phone: (515) 294-5073

Fax: (515) 294-1337

E-mail: jraich@iastate.edu

Address: Department of Botany

Iowa State University

Ames, IA 50011

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0036

Dataset Name: Global Population Distribution (1990), Terrestrial Area and Country Name Information

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: 1990 to 1990

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/cdiac/newsletr/spring97/datas97

Accessibility: publicly available

Narrative Description: The Global Population Distribution (1990), Terrestrial Area and Country Name Information on a One by One Degree Grid Cell Basis database contains gridded (one degree by one degree) information on the world-wide distribution of the population for 1990 and country-specific information on the percentage of the country's population present in each grid cell (Li, 1996a). Secondly, the database contains the percentage of a country's total area in a grid cell and the country's percentage of the grid cell that is terrestrial (Li, 1996b). Li (1996b) also developed an indicator signifying how many countries are represented in a grid cell and if a grid cell is part of the sea; this indicator is only relevant for the land, countries, and sea-partitioning information of the grid cell. Thirdly, the database includes the latitude and longitude coordinates of each grid cell; a grid code number, which is a translation of the latitude/longitude value and is used in the Global Emission Inventory Activity (GEIA) databases; the country or region's name; and the United Nations three-digit country code that represents that name.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0036

Dataset Name: Global Population Distribution (1990), Terrestrial Area and Country Name Information

Contact Name: A.L. Brenkert

Organization: Carbon Dioxide Information Analysis Center

Phone:

Fax:

E-mail: azt@ornl.gov

Address: Carbon Dioxide Information Analysis Center

Oak Ridge National Lab

Oak Ridge, TN 378306335

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0037

Dataset Name: Northern Hemisphere Biome- and Process-Specific Changes
in Forest Area and Gross Merchantable Volume

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: Northern hemisphere

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: unknown

Collection Years: 1890 to 1990

Data Gaps: unknown

Format: web page

URL Address: cdiac.esd.ornl.gov/cdiac/newsletr/spring97/datas97

Accessibility: publicly available

Narrative Description: The Northern Hemisphere Biome- and Process-Specific Changes in Forest Area and Gross Merchantable Volumes: 1890-1990 consists of annual values of the areal extent (Ha) and gross merchantable (wood) volume (GMV in m3) of depletion and accrual processes in Northern Hemisphere boreal and temperate forests. The data files cover six geographic regions: Alaska, Canada, Europe, Former Soviet Union, Non-Soviet Temperate Asia, and the contiguous United States. Forest depletions (source terms for atmospheric CO₂) are identified as forest pests, forest diebacks, forest fires, forest harvests, and land-use changes. Forests accruals (sink terms for atmospheric CO₂) are identified as forest fire exclusion, forest fire suppression, and afforestation/crop abandonment. Both the areal extent (Ha) and GMV (m3) are listed as total area and volume of the depletion or accrual processes, and are calculated separately for each of the following biomes: forest tundra, boreal forest (boreal softwood), mixed wood (mixed hardwood), temperate softwoods, and temperate hardwoods.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0037

Dataset Name: Northern Hemisphere Biome- and Process-Specific Changes
in Forest Area and Gross Merchantable Volume

Contact Name: A.N.D. Auclair

Organization: Science & Policy Associates, Inc.

Phone: (202) 789-1201

Fax:

E-mail: scipol@access.digex.net

Address: Science & Policy Associates, Inc.

1333 H Street, NW, W400

Washington, DC

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0038

Dataset Name: Multi-resolution Land Characteristic Grid

Collecting Organization: USEPA

Geographic Scale: regional

Readiness: currently available

Quality: FGDC format

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1986 to 1994

Data Gaps: unknown

Format: unknown

URL Address: NA

Accessibility: publicly available

Narrative Description: A classified mosaic of Landsat TM data generated by the multi-resolution landscape characteristic project. It includes information on Pennsylvania, Maryland, and Delaware. Source TM scenes range from March 1986 through September 1994 with the majority of imagery produced in the 1991 - 1994 time frame. Main objective was to generate a generalized and consistent (i.e., seamless) land cover data for EPA Region III.

Indicator Association(s):

Contact Name: James Vogelmann

Organization: USGS EROS Data Center

Phone: (605) 594-6062

Fax:

E-mail: vogel@edcwww.cr.usgs.gov

Address: USGS EROS Data Center

Souix Falls, SD

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0039

Dataset Name: Landuse/Landcover (LU/LV) GIRAS Spatial Data

Collecting Organization: USGS/USEPA/National GIS Program

Geographic Scale: national

Readiness: currently available

Quality: FGDC format, ARC/INFO

Collection Frequency: one time only

Reporting Frequency: one time only

Collection Years: 1977 to early 1980's

Data Gaps: not current

Format: disk/CD/system (ARC/INFO)

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset contains land use and land cover digital data interpreted from aerial photographs by NASA and the USGS. It was compiled into 1:250,000-scale USGS base maps and converted to ARC/INFO by the EPA. It is useful for environmental assessment of land use patterns with respect to water quality analysis, growth management, and other types of environmental impact assessment. Land use is a good measure of urban growth, which may be useful in determining terrestrial health.

Indicator Association(s):

Contact Name: Edward Partington

Organization: USEPA

Phone: (202) 260-3106

Fax: (202) 401-8390

E-mail: partington.ed@epamail.epa.gov

Address: 401 M St., SW

Mailcode 3908

Washington, DC 20460

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0041

Dataset Name: Long-Term Resource Monitoring Program

Collecting Organization: USGS/BRD

Geographic Scale: regional

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1987 to present

Data Gaps: unknown

Format: unknown

URL Address: NA

Accessibility: publicly available

Narrative Description: The mission of the Long Term Resource Monitoring Program is to provide decision makers with the information needed to maintain the Upper Mississippi River System as a viable multiple-use large river ecosystem. The long-term goals include understanding the system, determining resource trends and impacts, and developing management alternatives. This dataset includes data for floodplain forests in selected reaches along the Upper Mississippi and Illinois Rivers. A survey was conducted to estimate tree mortality induced by the Flood of 1993.

Indicator Association(s):

Contact Name: Norm Hildrum

Organization: USGS/BRD

Phone: (608) 783-7550

Fax:

E-mail:

Address: Environmental Management Technical Center

575 Lester Avenue

Onalaska, WI 54650

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0042

Dataset Name: National Soil Geographic Database (NATSGO)

Collecting Organization: USDA/NRCS/National Soil Survey Center

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1987 to unknown

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: The area boundaries NATSGO are formed from major land use resource area (MLRA) and land resource region (LRR) boundaries. Digitizing is done by line segment (vector) format. The base map used is a 1970 census and county digital database. NATSGO is linked to a soil interpretation record (SIR) attribute database. NATSGO is available in the USGS (DLG-3) Optional Distribution format.

Indicator Association(s): I-0005

Total Forest Ecosystem Biomass and Carbon Pool

Contact Name: Steven L. Baird

Organization: NRCS National Soil Survey Center, Soil Survey Lab

Phone: (402) 437-5363

Fax:

E-mail:

Address: Federal Building, Room 152, MS 41

100 Centennial Mall North

Lincoln, NE 685083866

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0043

Dataset Name: National Soil Characterization Data

Collecting Organization: USDA/NRCS/National Soil Survey Center (and Lab)

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1945 to present

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset provides current analytical data for more than 20,000 pendons of U.S. soil and about 1,100 pendons from other countries. Morphological pendon descriptions are available for about 15,000 of these pendons.

Indicator Association(s):

Contact Name: Steven L. Baird

Organization: NRCS National Soil Survey Center, Soil Survey Lab

Phone: (402) 437-5363

Fax:

E-mail:

Address: Federal Building, Room 152, MS 41

100 Centennial Mall North

Lincoln, NE 685083866

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0044

Dataset Name: Level III Ecoregions of the Conterminous US (USECO)

Collecting Organization: USEPA/Office of Information Resource Management

Geographic Scale: national

Readiness: currently available

Quality: FGDC format

Collection Frequency: < annual

Reporting Frequency: as needed

Collection Years: 1986 to 1994

Data Gaps: unknown

Format: disk/CD/system

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset provides polygon coverage of Level III ecoregions of the conterminous U.S. and is stored at ESDLS (EPA Spatial Data Library). Ecoregions are derived from ecoregions of the conterminous U.S. and from refinements of Omernik's framework that have been made for other projects. These projects conducted in collaboration with the USEPA regional offices and with state resource management agencies involve refining ecoregions defining subregions, and locating set of reference sites. The dataset also provides valuable data layers for ARC/INFO GIS applications.

Indicator Association(s):

Contact Name: David Wolf

Organization: USEPA/Office of Information Resources Management (O

Phone: (202) 260-3075

Fax:

E-mail: NSDI@epamail.epa.gov

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0045

Dataset Name: RPA Updates/RPA Database

Collecting Organization: USDA/Forest Service

Geographic Scale: national

Readiness: currently available

Quality: FGDC format

Collection Frequency: annual

Reporting Frequency: every 5 years

Collection Years: 1952 to 1992

Data Gaps: unknown

Format: hard copy reportsweb page

URL Address: unknown

Accessibility: publicly available

Narrative Description: The RPA Updates are reports that provide a comprehensive inventory of the extent, condition, and character of the forest ecosystems of the U.S based on data collected through FIA (D-0015). The reports provide summary forest area classification volume and species data for over 100,000 permanent field data plots providing measures of the forest that allow an assessment of forest land use trends. They also provide information on productivity, biodiversity and ecosystem distribution, condition, and structure. The reports are published in hard copy every five years. The RPA database is a web page prototype that is updated as new information becomes available. Currently, the database does not have national coverage.

Indicator Association(s):

Contact Name: Brad Smith

Organization: USDA

Phone: (202) 205-0841

Fax: (202) 205-1087

E-mail:

Address: Auditor's Building

14th & Independence, SW

Washington, DC

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0046

Dataset Name: National Climatic Data Center

Collecting Organization: NOAA & National Environmental Satellite & Data Inf

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: varies

Reporting Frequency: varies

Collection Years: mid-19th century to present

Data Gaps: unknown

Format: disk/CD/hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The National Climatic Data Center (NCDC) collects, processes, and archives meteorological and climatological data from a global network of stations. Climatic variables (e.g., temperature, precipitation, solar radiation, storms, wind, and floods) are summarized for both short-term and long-term periods of record. Derived values relating to growing season and heating and cooling degree days are also produced. Special statistical summaries of actual and derived values of meteorological elements over the world's oceans as well as summaries used in the study of air pollution are available.

Indicator Association(s):

Contact Name: National Climatic Data Center

Organization: NOAA/NESDIS/NCDC

Phone: (704) 251-8205

Fax:

E-mail:

Address: National Climatic Data Center

Federal Building

Asheville, NC 28801

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0047

Dataset Name: Highways Statistics

Collecting Organization: Federal Highway Administration (DoT)

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1920s to present

Data Gaps: no

Format: web page

URL Address: <http://cti1.volpe.dot.gov/ohim>

Accessibility: publicly available

Narrative Description: The program includes the collection, analysis, summary, and dissemination of a broad range of data related to the physical characteristics of the nation's highway system, as well as the traffic/travel and related performance activity which occurs on those systems. Data include characteristics such as: traffic volumes; travel estimates (for example, miles traveled and fuel consumption per vehicle and per capita); vehicle speeds; distribution of vehicle types and weights by highway category; vehicle fuel efficiency ratings and motor fuel consumption; vehicle registrations and driver licensing (including revenues related to latter variables); state and local highway finance; Federal Highway Trust Fund status; highway mileage; pavement condition; and accidents. Data also include personal travel characteristics collected as part of the Nationwide Personal Transportation Study (NPTS). Trend data for many of the characteristics date back to the early 1900s. The Highway Statistics Information Retrieval System (HSIRS) database contains "Highway Statistics Summary to 1985" and "Highway Statistics" for years 1986-1991.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0047

Dataset Name: Highways Statistics

Contact Name: Mary Teets

Organization: Federal Highway Administration

Phone: (202) 366-9211

Fax: (202) 366-7742

E-mail: mary.teets@fhwa.dot.gov

Address: Federal Highway Administration, HPM-40

400 7th Street, SW

Washington, DC 20590

Dataset Description*Monday, February 16, 1998***Dataset ID:** D-0049**Dataset Name:** Forest Service Experimental Forest and Rangeland Sites

Collecting Organization: USDA/Forest Service**Geographic Scale:** national**Readiness:** currently available**Quality:** varies for each unit**Collection Frequency:** varies for each unit**Reporting Frequency:** varies for each unit**Collection Years:** 1934 to present**Data Gaps:** varies for each unit**Format:** varies for each unit**URL Address:** NA**Accessibility:** publicly available

Narrative Description: The Forest Service Experimental Forest and Rangeland Sites collect data on: climate (meteorology), water (discharge, sediment load, organic contaminants, inorganic chemistry), vegetation (species/cover/range), and animals (species/range/population). This is not a centralized data collection effort; each unit performs a local operation. The data are not limited to experimental forests sites.

Indicator Association(s):

Contact Name: Dick Cline**Organization:** USDA/Forest Service**Phone:** (202) 205-1524**Fax:** (202) 205-1530**E-mail:** dcline/wo@fs.fed.us**Address:**

P.O. Box 96090

Washington, DC 200906090

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0050

Dataset Name: Man & the Biosphere Reserves

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: varies for each reserve

Collection Frequency: varies for each reserve

Reporting Frequency: varies for each reserve

Collection Years: 1976 to present

Data Gaps: unknown

Format: varies for each reserve

URL Address: NA

Accessibility: publicly available

Narrative Description: The United States Man and the Biosphere Program (USMAB) is a cooperative effort of government agencies, other organizations and the research community to help achieve the goal of a sustainable society early in the 21st century. USMAB contributes to this goal, domestically and internationally, through interagency and public-private partnerships that promote and sponsor interdisciplinary research, experimentation, education and information exchange. USMAB's activities build on biosphere reserves that are nominated by the U.S. and designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which coordinates the intergovernmental MAB Program. USMAB includes data on: climate (meteorology, snow, solar radiation); air (criteria pollutants, toxics, visibility/fine particulates); precipitation/deposition (wet deposition, dry deposition); water (discharge, sediment load, organic contaminants, aquatic biota, inorganic chemistry, sediment chemistry, trace metals, habitat); marine/coastal (salinity/freshwater flux, chlorophyll/zooplankton, submerged/coastal habitats, nutrients/contaminants, animals, sediment); soils (texture, chemistry, toxicity, mineralogy, climate, structure, strength, faunal biomass, erodability); vegetation (growth rate/above-ground biomass, recruitment, species/cover/range, disease intensity, nutrient availability); and animals (food source/quality, recruitment, species/range/population, disease intensity, toxicology). The USMAB program is part of the MAB International Program, which is a world-wide MAB effort.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0050**Dataset Name:** Man & the Biosphere Reserves

Contact Name: Roger Soles

Organization: State Department

Phone: (202) 776-8318

Fax: (202) 776-8367

E-mail: mabres@aol.com

Address: US MAB Secretariat, US Dept. of State, OES/ETC/MAB

SA-44C, Room 107

Washington, DC 205224401

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0051

Dataset Name: Tree Planting in the United States

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1928 to present

Data Gaps: 1941 to 1945

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset is a national summary of tree planting in the U.S. The Forest Service compiles data on the following: the number of tree seedlings planted or seeded; acres of tree planting (including acres seeded and acres of windbarriers planted); acres of timber stand improvement; and production of tree planting stock (including seedlings produced for windbarrier stock). Data are categorized by state and by ownership categories (federal, state, other public, industrial, or non-industrial private). The data are presented in the Forest Planting Report. Tabular data are available upon request. Currently preparing a database.

Indicator Association(s):

Contact Name: Robert Moulton

Organization: Forestry Science Lab

Phone: (919) 549-4032

Fax: (919) 549-4047

E-mail: rmoulton@rtpmail.emapshm.gov

Address: Forestry Science Lab

P.O. Box 12254

Research Triangle Park, NC 27709

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0052

Dataset Name: Hawk Migration Monitoring

Collecting Organization: Hawk Mountain Sanctuary

Geographic Scale: state/local

Readiness: currently available

Quality: unknown

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1934 to present

Data Gaps: unknown

Format: web page/disk/hard copy

URL Address: www.hawkmountain.org/hawkcount.html

Accessibility: publicly available

Narrative Description: The Sanctuary's annual autumn hawk counts represent the longest and most detailed record of raptor migration in the world. Each autumn, the Sanctuary records counts of migratory raptors past North Lookout in Pennsylvania. The official count begins August 15 and extends through December 15. Data found on the web site is for present year only. Historical data are found on hard copies or disks.

Indicator Association(s):

Contact Name: Laurie Goodrich

Organization: Hawk Mountain Sanctuary

Phone: (610) 756-6961

Fax: (610) 756-4468

E-mail:

Address: 1700 Hawk Mountain Rd.

Kempton, PA 195299449

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0053

Dataset Name: UV-B Radiation Monitoring Program Datasets

Collecting Organization: USDA/Cooperative State Research, Education and Extension Service

Geographic Scale: national

Readiness: currently available

Quality: good, but depends on calibration

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1992 to present

Data Gaps: unknown

Format: web page

URL Address: http://uvb.nrel.colostate.edu/UVB/uvb_data.html

Accessibility: publicly available

Narrative Description: The program provides information on the geographical distribution and temporal trends of UV-B (ultraviolet-B) radiation in the United States. This information is critical to the assessment of the potential impacts of increasing ultraviolet radiation levels on agricultural crops and forests. Specifically the monitoring program: provides information to the agricultural community and others about the climatological and geographical distribution of UV-B irradiance; provides the basic information necessary to support evaluations of the potential damage effects of UV-B to agricultural crops and forests; provides ground truth for satellite measurements and basic information for radiation transfer model calculations; and provides long-term records of UV-B irradiance necessary to assess trends. Datasets available include latest UV and visible shadowband data and latest UV-B broadband data.

Indicator Association(s): I-0022

Forest Land Subject to Specific Levels of Air Pollutants

Contact Name: James Gibson

Organization: Colorado State University

Phone: (970) 491-3611

Fax: (970) 491-3601

E-mail: jimg@nrel.colostate.edu

Address: Natural Resource Ecology Laboratory

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0053

Dataset Name: UV-B Radiation Monitoring Program Datasets

Colorado State University

Fort Collins, CO 80523

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0054

Dataset Name: Natural Heritage Network

Collecting Organization: Nature Conservancy

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1974 to present

Data Gaps: unknown

Format: hard copy reports/system

URL Address: NA

Accessibility: publicly available

Narrative Description: The Network maintains a continually updated computerized database of information on rare and threatened species and natural communities and also tracks the locations of these species and communities. The databases identify species, natural communities, and ecosystems in need of protection at the local, regional, national, and global levels. For species, the network tracks the scientific name, distribution and population trends, habitat requirements, and ecological relationships. For natural communities, databases contain information on vegetation structure and composition, succession patterns, natural disturbances, and the distribution and rarity of specific community types throughout their geographic range. In addition, the network tracks the quality and condition of each occurrence of a community and can also develop statewide distribution patterns and the actual areas on that landscape that are conservation significant because they are inhabited by these species.

Indicator Association(s): I-0016	Number of Forest Dependent Species in Restricted Range
I-0015	Status of Threatened & Endangered Species

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0054

Dataset Name: Natural Heritage Network

Contact Name: Jeffrey Lerner

Organization: The Nature Conservancy

Phone: (703) 841-4240

Fax: (703) 525-8024

E-mail: jlerner@tnc.org

Address: International Headquarters

1815 North Lynn St.

Arlington, VA 22209

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0055

Dataset Name: Forest Service Range Management Information System
(FSRAMIS)

Collecting Organization: USDA/Forest Service

Geographic Scale: national

Readiness: in transition - new computer system in 1998

Quality: unknown

Collection Frequency: cycles ranging from annual to once every 3-5 years

Reporting Frequency: unknown

Collection Years: unknown to present

Data Gaps: only contains grazing stats for National Forests & Grasslands

Format: system

URL Address: NA

Accessibility: publicly available

Narrative Description: FSRAMIS provides grazing use statistical data on the number of grazing animals (cattle, horses and burros, sheep and goats), animal unit month, and number of permittees at the national level and for each type of Forest Service land (National Forests, National Grasslands), region, and state. Other variables measured include: allotment condition; improvement inventory and activity; grazing capacity; actual use; authorized use; and unauthorized use. Data are analyzed for trends in ecological potential. Data may be broken down by State, Forest Service region, and forest/district level.

Indicator Association(s):

Contact Name: Jim Zimmerman

Organization: USDA/Forest Service

Phone: (202) 205-1412

Fax:

E-mail: jzimmerm/wo@fs.fed.us

Address: USDA/Forest Service

P.O. Box 96090

Washington, DC 200906090

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0056

Dataset Name: Major Uses of Land in the United States

Collecting Organization: USDA/Economic Research Service

Geographic Scale: regional/state/local/national

Readiness: currently available

Quality: high

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1945 to 1992

Data Gaps: some categories had no data to base an estimate

Format: web page/disk/CD

URL Address: www.mannlib.cornell.edu/data-sets/land/89003/

Accessibility: publicly available

Narrative Description: This dataset provides acreage estimates of major land uses by region and State for each census of Agriculture year from 1945 to 1992. Land use classes include cropland, grassland pasture and range, forest-use land, urban areas, rural areas, defense and industrial areas, farm areas, and other land uses. The changes in land use acreage over the years may show an increase in developed land and a decrease in forested land -- which may be a surrogate for terrestrial ecosystem health.

Indicator Association(s):

Contact Name: Ken Krupa

Organization: USDA/Economic Research Service

Phone: (202) 219-0853

Fax: (202) 219-0473

E-mail:

Address: Natural Resource Conservation and Management

1301 New York Avenue, NW

Washington, DC 200054788

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0058

Dataset Name: Olson's Major World Ecosystem Complexes

Collecting Organization: Carbon Dioxide Information Analysis Center

Geographic Scale: regional/state/local/national/international

Readiness: currently available

Quality: high; depends on data set

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1970's - 1980's to 1990

Data Gaps: unknown

Format: disk/CD/ftp

URL Address: NA

Accessibility: publicly available

Narrative Description: This package contains a computerized database used to generate a global vegetation map of 44 different land ecosystem complexes comprising seven broad groups. The database and accompanying map provides a basis for making improved estimates of vegetation areas and carbon quantities, of natural biological exchanges of CO₂, and, eventually, of the net historic shifts of carbon between the biosphere and the atmosphere. The map is derived from patterns of preagricultural vegetation, modern areal surveys, and intensive biomass data from research sites.

Indicator Association(s):

Contact Name: Linda Allison

Organization: Oak Ridge National Laboratory

Phone: (615) 576-8449

Fax:

E-mail:

Address: Oak Ridge National Laboratory

Oak Ridge, TN 37831

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0059

Dataset Name: Major Land Resource Areas

Collecting Organization: USDA/NRCS

Geographic Scale: regional/state/local/national/international

Readiness: currently available

Quality: high; depends on data set

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1970's - 1980's to 1990

Data Gaps: unknown

Format: web page/disk/CD

URL Address: edcwww.cr.usgs.gov/eros-home.html

Accessibility: publicly available

Narrative Description: The dataset contains land resource units that are geo-areas delineated by common patterns of soil, climate, water resources, and land use characteristics. This dataset is available in both raster and vector formats on the Conterminous U.S. AVHRR Companion Disk.

Indicator Association(s):

Contact Name: EROS Data Center

Organization: USGS EROS Data Center

Phone: (605) 594-6151

Fax: (605) 594-6589

E-mail: custserv@edcmail.cr.usgs.gov

Address: Customer Services

USGS, EROS Data Center

Sioux Falls, SD 57198

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0060

Dataset Name: Conterminous U.S. Land Cover Characteristics Data

Collecting Organization: EROS Data Center

Geographic Scale: regional/state/local/national/international

Readiness: currently available

Quality: high; depends on data set

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1970's - 1980's to 1990

Data Gaps:

Format: hard copy reports/web page/disk/CD

URL Address: edcwww.cr.usgs.gov/doc/edchome/ndcdb/ndcdb.html

Accessibility: publicly available

Narrative Description: This land characterization dataset incorporates a collection of land surface attributes that define 159 seasonally distinct regions of the U.S. at 1-km resolution. The dataset contains composite data from the image analysis of eight bands of AVHRR 28-day maximum normalized difference vegetation index (NDVI).

Indicator Association(s):

Contact Name: EROS Data Center

Organization: USGS EROS Data Center

Phone: (605) 594-6151

Fax: (605) 594-6589

E-mail: custserv@edcmail.cr.usgs.gov

Address: Customer Services

USGS, EROS Data Center

Sioux Falls, SD 57198

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0061

Dataset Name: North American Landscape Characterization (NALC)

Collecting Organization: USEPA/USGS/NASA

Geographic Scale: regional/state/local/national/international

Readiness: currently available/not complete for entire US yet

Quality: high

Collection Frequency: every decade

Reporting Frequency: every decade

Collection Years: 1973 to 1991

Data Gaps: only two samples available

Format: unknown

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset provides information on corrected and projected and classified satellite imagery for the 1970's through the 1990's. Digital elevation models have also been created to correspond with the images. Also a biomass indicator layer has been created.

Indicator Association(s):

Contact Name: EDC DAAC User Services

Organization: USGS EROS Data Center

Phone: (605) 594-6116

Fax: (605) 594-6963

E-mail: edc@eos.nasa.gov

Address: USGS EROS Data Center

Sioux Falls, SD 57198

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0062

Dataset Name: National Agricultural Pest Information System

Collecting Organization: USDA/APHIS

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: 1900 to present

Data Gaps: unknown

Format: hard copy reports/web page

URL Address: unknown

Accessibility: publicly available

Narrative Description: This system provides survey data for plant pests in the United States.

Indicator Association(s):

Contact Name: D. McNear

Organization: USDA/APHIS

Phone: (301) 734-8247

Fax:

E-mail: dmcnear@aphis.usda.gov

Address: USDA/APHIS/PPQ

4700 River Road Unit 134

Riverdale, MD 20737

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0063

Dataset Name: Exotic Species Database

Collecting Organization: Nature Conservancy

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1992, 1995 to present

Data Gaps: unknown

Format: digital system

URL Address: NA

Accessibility: not publicly available

Narrative Description: The data was first collected in 1992, then in 1995. This dataset assesses weed problems on preserves stewarded by TNC and formulated control strategies. A website is currently under development.

Indicator Association(s):

Contact Name: Barry Meyers-Rice

Organization: TNC

Phone: (530) 754-8891

Fax:

E-mail: bazza@ucdavis.edu

Address: The Nature Conservancy

Wildland Weeds Mgmt & Research, Univ. of CA

Davis, CA 95616

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0064

Dataset Name: Noxious/Invasive Database

Collecting Organization: USDA/Forest Service

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: 1983 to present

Data Gaps: unknown

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: This is a geospatially referenced dataset that graphically displays data on administrative reporting, inventory, and biological control information. It also contains pesticide information.

Indicator Association(s):

Contact Name: Rita Beard

Organization: USFS

Phone: (970) 498-1715

Fax:

E-mail: unknown

Address: USFS

3825 E. Mulberry

Fort Collins, CO 80525

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0065

Dataset Name: Exotic Map Database

Collecting Organization: USGS/BRD

Geographic Scale: regional

Readiness: expected soon

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: 1996 to present

Data Gaps: unknown

Format: web page

URL Address: <http://pc19.nbs.nau.edu>

Accessibility: publicly available

Narrative Description: The Exotic Map Database uses internet mapserver technology to help managers integrate exotic plant management in the arid southwest. Data is collected on land administered by the USGS.

Indicator Association(s):

Contact Name: Kathryn Thomas

Organization: USGS/BRD

Phone: (520) 556-7466

Fax:

E-mail: kat@nbs.nau.edu

Address: Colorado Plateau Field Station

P.O. Box 5614

Flagstaff, AR 86011

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0066

Dataset Name: Exotic Plants and Species Database

Collecting Organization: DOI/National Park Service

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1993, 1996 to present

Data Gaps: unknown

Format: digital system

URL Address: NA

Accessibility: publicly available

Narrative Description: The database contains most comprehensive data available about non-indigenous species for the National Park Service on national park land.

Indicator Association(s):

Contact Name: Bill Comming

Organization: National Park Service

Phone: (202) 208-4631

Fax:

E-mail: billcomming@nps.gov

Address: 1201 Oak Ridge Drive

Suite 350

Fort Collins, CO 80525

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0067

Dataset Name: Advanced Very High Resolution Radiometer Derived Land
Climatologies

Collecting Organization: NGDC

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1985 to 1994

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: The CD includes climatological information such as normalized difference vegetation index, precipitable water index, reflectances, temperatures (including statistics for these parameters), and ancillary environmental data (such as soils, vegetation, ecosystems, topography and climate) from NGDC's global ecosystems database and terrainbase.

Indicator Association(s):

Contact Name: David Hastings

Organization: NGDC, Remote Sensing & Data Integration

Phone: (303) 497-6729

Fax: (303) 497-6513

E-mail: unknown

Address: unknown

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0068

Dataset Name: Global Vegetation Index

Collecting Organization: unknown

Geographic Scale: international

Readiness: currently available

Quality: experimental

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1985 to 1992

Data Gaps: unknown

Format: disk/CD/web page

URL Address: www.ngdc.gov/seg/fliers/se-2008.html

Accessibility: publicly available

Narrative Description: This dataset is an experimental normalized difference vegetation index based on advanced very high resolution radiometer (AVHRR) of NOAA's polar orbiting environmental satellites. NDVI data are an indication of vegetative processes such as chlorophyll production.

Indicator Association(s):

Contact Name: David Hastings

Organization: NGDC, Remote Sensing & Data Integration

Phone: (303) 497-6729

Fax: (303) 497-6513

E-mail: unknown

Address: unknown

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0069

Dataset Name: NASA Pathfinder Climate Data

Collecting Organization: NOAA/NASA

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: unknown to present

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This collection contains subsets of data concerning atmospheric climatology. Three datasets (TOVA, TOVC1, TOVC2) are included, which were collected using the TOVS (Tiros Operational Vertical Sounder) for determining geophysical parameters including atmospheric temperatures, longwave radiation, cloud pressure, total precipitable water and ocean precipitation. It also contains data collected by SSM/I team regarding precipitation. It also contains data produced by the Advanced Very High Resolution Radiometer on Vegetation.

Indicator Association(s):

Contact Name: Ted Habermann

Organization: NGDC

Phone: (303) 497-6472

Fax:

E-mail: haber@ngdc.noaa.gov

Address: unknown

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0070

Dataset Name: Global Ecosystem Data

Collecting Organization: NGDC and USEPA

Geographic Scale: international

Readiness: currently available

Quality: raster gridded map layers

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: unknown to 1992

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset includes selected data on the global environment, such as ecosystems, land use, wetlands, vegetation (including satellite-derived vegetation index), climate, topography, and soils.

Indicator Association(s):

Contact Name: John Kineman

Organization: NGDC

Phone: (303) 497-6900

Fax:

E-mail: jjk@ngdc.noaa.gov

Address: unknown

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0071

Dataset Name: Land Cover Classification

Collecting Organization: NOAA/National Marine Fisheries Service

Geographic Scale: regional

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: 1984 to 1989

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: unknown

Narrative Description: This dataset includes the Land Cover and Land Cover Change Data for the Chesapeake Bay. It contains descriptions of types of land cover in the Chesapeake Bay watershed and describes landscape level changes that occurred in the land cover during the period 1984-1989. Trends in 15 different types of land cover are included.

Indicator Association(s):

Contact Name: Don Field

Organization: NOAA/National Marine Fisheries Service

Phone: (919) 728-8764

Fax:

E-mail: unknown

Address: NOAA/National Marine Fisheries Service

101 Pivers Road

Beaufort, NC 285169722

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0072

Dataset Name: GLOBE Version 0.5

Collecting Organization: National Imagery & Mapping Agency

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1997 to present

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: Global Digital Elevation Model on a Nominal 1-km grid. The goal of GLOBE is to represent elevation information for the Earth's entire land surface globe covers 60% of the Earth's land surface, using a 30 arc-second latitude/longitude grid. The source of the data is DTED (Digital Terrain Elevation Data).

Indicator Association(s):

Contact Name: Paula Dunbar

Organization: NGDC

Phone: (303) 497-6084

Fax:

E-mail: pdunbar@ngdc.noaa.gov

Address: unknown

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0073

Dataset Name: Terrain Base 1994

Collecting Organization: NGDC

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: unknown to 1994

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: The Terrainbase Global Digital Terrain Model contains a complete matrix of land elevation and ocean depth values for the entire world gridded at 5-minute intervals.

Indicator Association(s):

Contact Name: Lee W. Row III

Organization: NGDC

Phone: (303) 497-6764

Fax: (303) 497-6513

E-mail: internetlwr@mail.ngdc.noaa.gov

Address: National Geophysical Data Center

325 Broadway, E/GCI

Boulder, CO 80303

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0074

Dataset Name: Fleet Numeric Oceanographic Center (FNOC)

Collecting Organization: National Center for Atmospheric Research

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1960 to 1984

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset contains Terrain Elevation Data, which is precursor data to Terrainbase.

Indicator Association(s):

Contact Name: J. Joseph

Organization: National Center for Atmospheric Research

Phone:

Fax:

E-mail:

Address: National Center for Atmospheric Research

Data Support Section

Boulder, CO 80303

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0075

Dataset Name: Biomonitoring of Environmental Status and Trends (BEST)

Collecting Organization: USGS/BRD

Geographic Scale: national

Readiness: early development

Quality: NA

Collection Frequency: NA

Reporting Frequency: NA

Collection Years: NA to NA

Data Gaps: NA

Format: NA

URL Address: NA

Accessibility: NA

Narrative Description: The BEST Program is designed to identify and understand the effects of environmental contaminants on biological resources, particularly those under the stewardship of DOI. At the national level, BEST will deploy a network of sites for monitoring contaminants and effects on organisms. At the regional level, BEST will focus on selected high-priority ecosystems to determine overall impacts contaminants are having on them. At the local level, BEST will provide a site-specific contaminant assessment process designed to focus on lands managed by DOI.

Indicator Association(s):

Contact Name: Christine Bunck

Organization: USGS/BRD

Phone: (608) 270-2407

Fax: (608) 270-2415

E-mail:

Address: USGS/BRD, Science Office

6006 Schroeder Rd.

Madison, WI 53711

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0076

Dataset Name: Interagency Monitoring of Protected Visual Environments
(IMPROVE)

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1987 to present

Data Gaps: unknown

Format: system

URL Address: NA

Accessibility: publicly available

Narrative Description: IMPROVE is an interagency monitoring program (NPS, EPA, FWS, USFS, and others) that monitors and studies visibility in Federal Class I areas and the land surrounding them (i.e., national parks, wildlife refuges, etc). The three primary objectives are (1) to establish present visibility levels, (2) to identify sources of existing man-made impairment, and (3) to document long-term trends to track progress towards meeting the long-term goal of no man-made impairment of protected areas. IMPROVE has been collecting data at 20 sites since 1987; 70 sites are under study today.

Indicator Association(s): I-0022

Forest Land Subject to Specific Levels of Air Pollutants

Contact Name: William Malm

Organization: National Park Service

Phone: (970) 491-8292

Fax: (970) 491-8598

E-mail:

Address: National Survey Park Service-AIR

Foothills Campus, Colorado State University

Fort Collins, CO 80523

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0077

Dataset Name: Air Quality Monitoring Network

Collecting Organization: DOI/National Park Service

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1984 to present

Data Gaps: unknown

Format: system

URL Address: NA

Accessibility: not publicly available

Narrative Description: The dataset is a collection of gaseous pollutant data for national parks, especially those designated as Class I areas. Measurements are made for ozone, sulfur dioxide, and meteorological conditions. These data are added to the Aerometric Information Retrieval System (AIRS) maintained by EPA/OAQPS.

Indicator Association(s):

Contact Name: Miguel Flores

Organization: National Park Service

Phone: (303) 969-2076

Fax:

E-mail:

Address: Monitoring and Data Analysis Branch, NPS - AIR

P.O. Box 25287

Denver, CO 80225

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0078

Dataset Name: Breeding Bird Census (BBC)

Collecting Organization: Cornell Laboratory of Ornithology

Geographic Scale: national

Readiness: Portions of the BBC are currently available

Quality: medium

Collection Frequency: variable

Reporting Frequency: annual

Collection Years: 1937 to present

Data Gaps: little data for 1984 to 1988

Format: hard copy reports/web page (some data)

URL Address: <http://www.im.nbs.gov/birds/bbc.html>

Accessibility: publicly available

Narrative Description: The BBC program is based on individual study plots established within a single habitat type. Standardized methods are followed to collect data on the avian and vegetative communities. Over a period of years, these data provide insight into the changes occurring in the breeding avifaunas within these communities. The BBC results are provided as the total number of territories for each species present in each plot during each year. Only some portions of the BBC database have been computerized and can be accessed from the web page.

Indicator Association(s):

Contact Name: James D. Lowe

Organization: Cornell Lab of Ornithology

Phone: (607) 254-2413

Fax: (607) 254-2415

E-mail: JDL6@cornell.edu

Address: Cornell Lab of Ornithology

159 Sapsucker Woods Road

Ithaca, NY 14850

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0079

Dataset Name: Monitoring Avian Productivity and Survivorship (MAPS)

Collecting Organization: cooperative effort

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: continuous

Reporting Frequency: annual

Collection Years: 1989 to present

Data Gaps:

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The MAPS program is a cooperative effort among public agencies, private organizations and the bird banders of North America to develop long-term data on the productivity, survivorship and population dynamics (e.g., age structure, recruitment,) of target landbird species through constant-effort mist netting, banding and point counts during the breeding season. By providing demographic information on landbirds, and by relating these to climate data, the MAPS program can play a major role in aiding efforts to conserve avian diversity in North America. It is expected that the MAPS program will fit into a proposed integrated continent-wide population monitoring scheme that will include several other long-term, large-scale monitoring programs, such as the Breeding Bird Survey, that are already in operation on this continent.

Indicator Association(s):

Contact Name: Dave DeSante

Organization: Institute for Bird Population

Phone: (415) 663-1436

Fax: (415) 663-9482

E-mail: 75521.271@compusenc.com

Address: Institute for Bird Population

P.O. Box 1346

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0079

Dataset Name: Monitoring Avian Productivity and Survivorship (MAPS)

Point Reyes Station, CA 94956

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0080

Dataset Name: Bird Banding Program

Collecting Organization: USGS/Bird Banding Laboratory

Geographic Scale: national

Readiness: currently available

Quality: medium

Collection Frequency: continuous

Reporting Frequency: continuous

Collection Years: 1920 to present

Data Gaps: none

Format: disk/CD/hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The North American Bird Banding Program is jointly administered by the U.S. Dept. of the Interior and the Canadian Wildlife Service. The Bird Banding Laboratory issues permits and bands, supplies forms, instructional materials and technical advice, coordinates the use of auxiliary markers such as colored leg bands and radio transmitters, serves as the repository for banding data, serves as the clearinghouse for reports of banded birds, disseminates banding data to researchers and managers, and assists in the development and coordination of banding projects. BBL data files contain records of 56 million bandings and 3 million recoveries of banded birds.

Indicator Association(s):

Contact Name: John Tautin

Organization: USGS/Bird Banding Laboratory

Phone: (301) 497-5790

Fax: (301) 497-5717

E-mail: John_Tautin@usgs.gov

Address: Patuxent Wildlife Research Center

12100 Beech Forest Road, Suite 4037

Laurel, MD 207084037

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0081

Dataset Name: Audubon Christmas Bird Counts (CBC)

Collecting Organization: National Audubon Society

Geographic Scale: international

Readiness: currently available

Quality: medium

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: early 1900s to present

Data Gaps: 1913-1958 & 1961-1987 data not computerized

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The Audubon Christmas Bird Count is an annual hemispheric early-winter bird census. Volunteers count every individual bird and bird species over one calendar day (from midnight to midnight), within well-defined geographic areas. Each bird count is a circle 15 miles in diameter -- approximately 177 square miles. Bird counters try to cover as much of the circle area as possible within a 24-hour calendar day, counting each individual bird and species they see or hear in their designated sector of the circle. Over 45,000 people from all 50 states, every Canadian province, the Caribbean, Central and South America and the Pacific Islands (all areas where the breeding birds of North America spend their winter) participate in about 1,700 counts held during a two and one-half week period. Data is available in the following published reports: "Field Notes" and "American Notes."

Indicator Association(s):

Contact Name: Geoff LeBaron

Organization: National Audubon Society

Phone: (212) 979-3083

Fax: (212) 353-0321

E-mail: glebaron@audubon.org

Address: National Audubon Society Headquarters

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0081

Dataset Name: Audubon Christmas Bird Counts (CBC)

700 Broadway

New York, NY 10003

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0082

Dataset Name: Butterfly Monitoring Project (BMP)

Collecting Organization: USGS/BRD

Geographic Scale: national

Readiness: early development

Quality: NA

Collection Frequency: NA

Reporting Frequency: NA

Collection Years: NA to NA

Data Gaps: NA

Format: NA

URL Address: NA

Accessibility: NA

Narrative Description: In the summer of 1995, USGS and a number of volunteers collected information that will better enable them to evaluate the statistical properties of various counting techniques for butterflies. Their plans are to evaluate all these numbers over the winter and work with other groups currently monitoring butterflies, such as the Fourth of July Butterfly Count, to create a system that will yield statistically defensible estimates of butterfly trends for North America.

Indicator Association(s):

Contact Name: Sam Droege

Organization: USGS/BRD

Phone: (301) 497-5500

Fax:

E-mail: frog@nbs.gov

Address: Patuxent Wildlife Research Center

12100 Beech Forest Road, Suite 4039

Laurel, MD 207084039

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0083

Dataset Name: Atmospheric Integrated Monitoring Network (AIRMon)

Collecting Organization: NOAA/Air Resources Laboratory

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1992 to present

Data Gaps: NA

Format: web page

URL Address: http://nadp.nrel.colostate.edu/nadp-map/map.html/get_data.html

Accessibility: publicly available

Narrative Description: The Atmospheric Integrated Research Monitoring Network is an array of stations designed to provide a research-based foundation for the routine operations of the nation's deposition monitoring networks -- the National Atmospheric Deposition Program (NADP) for wet deposition, and the Clean Air Status and Trends Network (CASTNet) for dry. The techniques of AIRMoN are designed to quantify the extent to which changes in emissions affect air quality and deposition at selected locations. Currently, the AIRMoN subnetwork comprises nine sites where precipitation samples are collected daily or on an event basis. The overall design target for AIRMoN is to detect, with 95% confidence, the atmospheric concentration and deposition consequences of a 5% reduction in emissions, over a two-year period. The specific goals of the AIRMoN rapid detection monitoring program are to provide regular, timely reports on the atmospheric environment consequences of emission reductions, as imposed under the Clean Air Act Amendments; to extend these observations to wet and dry deposition rates that affect sensitive ecosystems; and to provide a direct linkage between the monitoring and modeling communities that are involved.

Indicator Association(s):

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0083

Dataset Name: Atmospheric Integrated Monitoring Network (AIRMon)

Contact Name: Jane Rothert

Organization: NOAA/Air Resources Laboratory

Phone: (217) 333-7942

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0084

Dataset Name: Land Use History of North America (LUHNA)

Collecting Organization: USGS/BRD

Geographic Scale: national

Readiness: early development

Quality: NA

Collection Frequency: NA

Reporting Frequency: NA

Collection Years: NA to NA

Data Gaps: NA

Format: NA

URL Address: NA

Accessibility: NA

Narrative Description: The purpose of LUHNA is to produce a well-documented history of patterns of land use and environmental change by the year 2000; to demonstrate the educational value of a Land Use History; to convey the utility of such a history in guiding future resource management decisions; to generate interest and participation from public and private research organization, educational institutions, grant makers, and the public; to provide a conceptual foundation for such an undertaking; to identify essential components of LUHNA, such as a grounding in quantitative methods that will permit comparisons between locations and identification of trends through time; and to identify the major areas of new research needed to integrate approaches taken by different disciplines, such as anthropology, environmental history, ecology, and remote sensing.

Indicator Association(s):

Contact Name: Tony Janetos

Organization: NASA

Phone: (202) 358-0278

Fax: (202) 358-2771

E-mail: tjanetos@mtpe.hg.nasa.gov

Address: NASA HQ, Code YSE
300 E Street, SW

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0084

Dataset Name: Land Use History of North America (LUHNA)

Washington, DC 20546

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0085

Dataset Name: Migration Monitoring Program

Collecting Organization: NA

Geographic Scale: national

Readiness: early development

Quality: NA

Collection Frequency: NA

Reporting Frequency: NA

Collection Years: NA to NA

Data Gaps: NA

Format: NA

URL Address: NA

Accessibility: NA

Narrative Description: A group of Canadian and US ornithologists have joined together to design and implement monitoring systems for birds during migration. Counts taken during migration suffer high variability in counts and captures. However, for boreal zone migrants, such as Gray-cheeked Thrush, Cape May Warbler, and Bay-breasted Warblers, counts during migration are the only real opportunity to track population changes. The program has initiated a new program to count birds as they migrate north and south. The program consists of a network of migration monitoring stations (e.g., bird observatories, migration banding stations, and daily migrant counts) and a more extensive program to collect daily field checklists from birders. The scientific report on recommendations for checklist programs is now finished and approved by the Migration Monitoring Council.

Indicator Association(s):

Contact Name: Erica Dunn

Organization: Canadian Wildlife Service

Phone: (819) 994-0182

Fax: (819) 953-6612

E-mail: Erica.Dunn@ec.gc.ca

Address: National Wildlife Research Centre

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0085

Dataset Name: Migration Monitoring Program

100 Gamelin Boulevard
Hull, Quebec, Canada,

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0086

Dataset Name: Annual Public Finances Survey

Collecting Organization: Department of Commerce/US Census Bureau

Geographic Scale: national

Readiness: currently available

Quality: high

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1952 to present

Data Gaps: NA

Format: hard copy/disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: The Survey provides current estimates of state and local government financial activity. The United States Code Title 13, authorizes this survey and provides for voluntary responses. Data are obtained for revenue, expenditures, debt, and financial assets. Revenue data include taxes, charges, interest, and other earnings. Expenditures data include totals by function (such as education and police protection) and by accounting category (such as current operations and capital outlays). Debt data include issuance, retirement, and cumulative totals. This dataset is compiled of data from 3 sources: an enumeration of all 50 state governments, a survey of 13,000 selected local governments, and data from Federal agencies. Collection methods vary by state and type of government.

Indicator Association(s):

Contact Name: Henry Wulf

Organization: Department of Commerce/US Census Bureau

Phone: (800) 242-2184

Fax:

E-mail: hwulf@census.gov

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0087

Dataset Name: Project Feeder Watch

Collecting Organization: Cornell Laboratory of Ornithology

Geographic Scale: national

Readiness: currently available

Quality: low

Collection Frequency: annual

Reporting Frequency: unknown

Collection Years: 1987 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: Project Feeder Watch began as a winter survey of the birds that visit backyard feeders in North America. The information collected each year helps ornithologists track changes in the abundance and distribution of bird species that use feeders in the winter. The goals of the program are to: gather long-term data on winter bird populations throughout North America; detect significant population declines or expansions, track the dynamic movements of nomadic and irruptive species during the winter months, identify habitat features, involve bird watchers in serious ornithological study, and provide direct feedback to project participants and the general public regarding bird population trends.

Indicator Association(s):

Contact Name: Margaret Barker

Organization: Cornell Lab of Ornithology/PFW

Phone: (607) 254-2440

Fax:

E-mail: feederwatch@cornell.edu

Address: 159 Sapsucker Woods Road

Ithaca, NY 148501999

Dataset Description*Monday, February 16, 1998***Dataset ID:** D-0088**Dataset Name:** July Duck Production Survey

Collecting Organization: USFWS/Office of Migratory Bird Management**Geographic Scale:** national**Readiness:** currently available**Quality:** NA**Collection Frequency:** annual**Reporting Frequency:** annual**Collection Years:** 1961 to present**Data Gaps:** NA**Format:** hard copy reports**URL Address:** NA**Accessibility:** publicly available

Narrative Description: In July a portion of the lines surveyed in May during the Breeding Waterfowl Survey are surveyed to obtain information on duck production. These counts yield measures of duck production and give an idea of the timing of nesting chronology for the year, assess water body abundance, and result in a qualitative assessment of July habitat conditions. The July brood counts are not adjusted for visibility bias and thus provide only a relative index rather than a direct estimate. The July Duck Production Survey is helpful in predicting the number of ducks to be expected during the Fall hunting season.

Indicator Association(s):

Contact Name: Graham Smith**Organization:** USFWS/Office of Migratory Bird Management**Phone:** (301) 497-5860**Fax:****E-mail:****Address:**

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0089

Dataset Name: May Breeding Waterfowl and Habitat Survey

Collecting Organization: USFWS/Office of Migratory Bird Management

Geographic Scale: regional/north-central US/Canada/Alaska

Readiness: currently available

Quality: NA

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1955 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: Each May and June, the Canadian Wildlife Service and the U.S. Fish and Wildlife Service survey breeding waterfowl from the north-central U.S. throughout Canada and Alaska. Survey biologists estimate numbers and species from airplanes flown along transects. A portion of the transects are then surveyed from the ground by biologists who census all waterfowl. The ground census corrects for birds not counted by the aerial team. This survey is the most extensive wildlife survey in the world, and its results are a major factor used in setting annual duck-hunting regulations. Excellent survey data exist in the form of graphs for mallards, gadwall, American wigeon, green-winged teal, blue-winged teal, northern shoveler, northern pintail, redhead, canvasback, and scaup.

Indicator Association(s):

Contact Name: Graham Smith

Organization: USFWS/Office of Migratory Bird Management

Phone: (301) 497-5860

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0090

Dataset Name: Winter Surveys

Collecting Organization: USFWS/Office of Migratory Bird Management

Geographic Scale: national

Readiness: currently available

Quality: NA

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1950 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: Many geese and ducks can't be counted in the spring and summer on breeding areas because they either can't be surveyed using airplanes or they nest in remote and inaccessible Arctic areas. Abundance indices for these species are obtained from surveys on wintering areas. Most of these surveys are targeted at specific species or populations. A nationwide effort to survey all waterfowl is conducted annually in January. This, the Midwinter Survey, provides information on population trends for some species, distribution on the wintering grounds, and habitat use.

Indicator Association(s):

Contact Name: Jerry Serie

Organization: USFWS/Office of Migratory Bird Management

Phone: (301) 497-5851

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0091

Dataset Name: Mourning Dove Call-Count Survey

Collecting Organization: USFWS/Office of Migratory Bird Management

Geographic Scale: national

Readiness: currently available

Quality: NA

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1966 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The Mourning Dove Call-Count Survey was developed to provide an index to population size and to detect annual changes in mourning dove breeding populations in the U.D. The survey consists of numerous routes throughout the U.S., which are surveyed in late May and early June. The resulting estimates of relative abundance and population trends comprise the principal information used in the annual setting of mourning dove hunting seasons.

Indicator Association(s):

Contact Name: Graham Smith

Organization: USFWS/Office of Migratory Bird Management

Phone: (301) 497-5860

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0092

Dataset Name: Woodcock Singing-Ground Survey

Collecting Organization: USFWS/Office of Migratory Bird Management

Geographic Scale: regional/eastern US and Canada

Readiness: currently available

Quality: NA

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1968 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The Woodcock Singing-Ground Survey exploits the conspicuous courtship display of the male woodcock. The survey consists of numerous routes in the eastern half of the U.S. and Canada, which are surveyed in the spring. Counts of singing male woodcock along the routes provide an index to woodcock abundance, and are used to estimate woodcock population trends for states, provinces, management regions, and the continent. The survey is the major source of information considered in the annual setting of woodcock hunting seasons.

Indicator Association(s):

Contact Name: Graham Smith

Organization: USFWS/Office of Migratory Bird Management

Phone: (301) 497-5860

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0093

Dataset Name: Forest Insect and Disease Conditions

Collecting Organization: USDA/Forest Service

Geographic Scale: national

Readiness: currently available

Quality: NA

Collection Frequency: annual

Reporting Frequency: annual

Collection Years: 1952 to present

Data Gaps: nearly two year lag in reporting; most recent report is 1996 report (summarizing 1995 data)

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: Data are collected on federal, state, and private forest lands in the United States via aerial and ground surveys. Data are analyzed for type of insect/disease damage (e.g., pine beetle, gypsy moth, spruce budworm, dwarf mistletoe, root diseases, etc.), size of area affected, and dollars lost by region. Trend data are available.

Indicator Association(s):

Contact Name: Dick Fowler

Organization: U.S. Forest Service

Phone: (202) 205-1598

Fax:

E-mail:

Address: USDA Forest Service (FHP, AB, 2S)

P.O. Box 96090

Washington, DC 200906090

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0094

Dataset Name: Southeastern Cooperative Wildlife Disease Study

Collecting Organization: University of Georgia

Geographic Scale: regional

Readiness: currently available

Quality: NA

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1957 to present

Data Gaps: NA

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The Southeastern Cooperative Wildlife Disease Study (SCWDS) is a leader in in wildlife health research, service, and teaching. SCWDS's objectives are: to detect causes of sickness and death in wildlife; to define the impact of diseases and parasites upon wildlife populations; to delineate disease interrelationships between wildlife and domestic animals; to determine the role of wildlife in transmission of human diseases; and to develop methods of disease prevention and control in wildlife populations.

Indicator Association(s):

Contact Name: John Fischer

Organization: Southeastern Cooperative Wildlife Disease Study

Phone: (706) 542-1741

Fax: (706) 542-5865

E-mail:

Address: College of Veterinary Medicine

(Building 6)

Athens, GA 306027393

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0096

Dataset Name: North American Conservation Assessment

Collecting Organization: WWF

Geographic Scale: North America/Canada

Readiness: currently available

Quality: unknown

Collection Frequency: one time only

Reporting Frequency: one time only

Collection Years: NA to NA

Data Gaps: unknown

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: WWF's North American Conservation Assessment (also referred to as the referred to as the North American Status Assessment) is a comprehensive study undertaken to chart the biological wealth and distinctiveness of all ecoregions north of Mexico. In all, North America was divided into over 100 ecoregions. These regions were then scaled for biological distinctiveness qualities (like species richness and mammal richness) and conservation status. These evaluations were combined to gauge the relative biological importance of ecoregions and were then scaled according to recommended conservation actions.

Indicator Association(s):

Contact Name: World Wildlife Fund

Organization: World Wildlife Fund

Phone: (202) 293-4800

Fax: (202) 293-9211

E-mail:

Address: 1250 24th Street, NW

Washington, DC 200371175

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0097

Dataset Name: North American Raptor Monitoring Strategy

Collecting Organization: NA

Geographic Scale: international

Readiness: early development

Quality: NA

Collection Frequency: NA

Reporting Frequency: NA

Collection Years: NA to NA

Data Gaps: NA

Format: NA

URL Address: NA

Accessibility: NA

Narrative Description: A program for developing a comprehensive North American strategy for monitoring the population status of diurnal raptors. The goal of the strategy will be to monitor the status and trends in continental and regional populations of Nearctic diurnal raptors in Canada, Mexico, and the U.S.

Indicator Association(s):

Contact Name: Bob Lehman

Organization: USGS/BRD

Phone: (208) 331-5205

Fax:

E-mail:

Address: Snake River Field Station

970 Lusk St.

Boise, ID 83706

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0098

Dataset Name: STATSGO

Collecting Organization: USDA/NRCS/Soil Survey Division

Geographic Scale: national

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: unknown to unknown

Data Gaps: unknown

Format: web page/CD

URL Address: www.ncg.nrcs.usda.gov/stat_data.html

Accessibility: publicly available

Narrative Description: Soil maps for the State Soil Geographic (STATSGO) data base are made by generalizing the detailed soil survey data. The mapping scale for STATSGO map is 1:250,000 (with the exception of Alaska, which is 1:1,000,000). The level of mapping is designed to be used for broad planning and management uses covering state, regional, and multi-state areas.

Indicator Association(s):

Contact Name: Craig Palmer

Organization:

Phone: (702) 895-1797

Fax:

E-mail:

Address:

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0099

Dataset Name: US Postal Service Delivery Statistics

Collecting Organization: US Postal Service

Geographic Scale: national

Readiness: currently available

Quality: very good

Collection Frequency: continuous

Reporting Frequency: updated monthly

Collection Years: unknown to present

Data Gaps: unknown

Format: disk/CD

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset provides detailed information about addresses in the United States. Data can be retrieved at a variety of levels (e.g., city/state, 5-digit zip, or zip+4 level). Data would need to be manipulated to count addresses or to evaluate trends in where addresses occur.

Indicator Association(s):

Contact Name: U.S. Postal Service

Organization: U.S. Postal Service

Phone: (800) 238-3150

Fax: (901) 681-4252

E-mail:

Address: National Customer Support Center

6080 Primacy parkway, Suite 201

Memphis, TN 381880001

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0100

Dataset Name: Ecological Site Inventory

Collecting Organization: DOI/BLM

Geographic Scale: BLM lands only

Readiness: currently available

Quality: unknown

Collection Frequency: unknown

Reporting Frequency: unknown

Collection Years: unknown to unknown

Data Gaps: unknown

Format: system

URL Address: NA

Accessibility: publicly available

Narrative Description: The Ecological Site Inventory produces data and maps of habitat types on public lands. The data can be used to indicate production capability, suitability for grazing, wildlife, recreation, natural beauty, watershed management, and open space.

Indicator Association(s):

Contact Name: Ned Habich

Organization: Bureau of Land Management

Phone: (303) 236-0166

Fax:

E-mail:

Address:

Denver, CO

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0101

Dataset Name: National Classification of Ecologic Communities

Collecting Organization: Nature Conservancy

Geographic Scale: national

Readiness: expected soon

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1997 to present

Data Gaps: unknown

Format: hard copy reports

URL Address: NA

Accessibility: publicly available

Narrative Description: The dataset is a national classification of terrestrial communities. The classification, which is hierarchial and is based on both the structure and floristics of existing vegetation, was recently adopted by the FGDC as the standard classification and mapping to be used across all federal facilities. 4200 communities currently exist in the database. The two-volume set will be published in spring 1998.

Indicator Association(s):

Contact Name: Mark Bryer

Organization: The Nature Conservancy

Phone: (703) 841-4191

Fax: (703) 525-8024

E-mail: mbryer@tnc.org

Address: The Nature Conservancy

1815 North Lynn Street

Arlington, VA 22209

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0102

Dataset Name: Defense Meteorological Satellite Data

Collecting Organization: NOAA/NGDC/Defense Meteorological Satellite Program

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1972 to present

Data Gaps: unknown

Format: web page

URL Address: dmsp@ngdc.noaa.gov

Accessibility: publicly available

Narrative Description: The DM satellite has meteorological sensors attached to it, each collecting different types of data (e.g., microwave frequencies, cloud distribution and temperatures, and atmospheric particulates).

Indicator Association(s):

Contact Name: Ed Erwin

Organization: National Geospatial Data Center

Phone: (303) 497-6133

Fax:

E-mail: eerwin@ngdc.noaa.gov

Address: NGDC

325 Broadway

Boulder, CO 803033328

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0103

Dataset Name: Ecological Exposure Research Data

Collecting Organization: USEPA/National Health and Environmental Research Lab

Geographic Scale: regional

Readiness: expected soon

Quality: unknown

Collection Frequency: < annual

Reporting Frequency: < annual

Collection Years: 1997 to present

Data Gaps: unknown

Format: web page

URL Address: expected soon

Accessibility: publicly available

Narrative Description: The database will contain data on ecological exposures to UV-B, ozone, nitrogen deposition, and other atmospheric pollutants. Research projects to collect data will be funded in Spring 1998.

Indicator Association(s):

Contact Name: Bill Hogsett

Organization: EPA/National Health and Environmental Effects Research

Phone: (541) 754-4632

Fax:

E-mail: hogsett.william@epamail.epa.gov

Address: National Health and Environmental Effects Research Lab

200 SW 35th Street

Corvallis, OR 97333

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0104

Dataset Name: UV-B Monitoring Data

Collecting Organization: DIS Pro Demonstration Intensive Site Projects

Geographic Scale: regional

Readiness: expected soon

Quality: unknown

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1996 to present

Data Gaps: none

Format: web page

URL Address: expected January 1998

Accessibility: publicly available

Narrative Description: This dataset contains UV-B monitoring data for 14 rural areas (located in 14 national parks) and 8 urban areas. The urban areas were selected in cities with cancer registries.

Indicator Association(s):

Contact Name: Bill Hogsett

Organization: EPA/National Health and Environmental Effects Research

Phone: (541) 754-4632

Fax:

E-mail: hogsett.william@epamail.epa.gov

Address: National Health and Environmental Effects Research Lab

200 SW 35th Street

Corvallis, OR 97333

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0105

Dataset Name: Global Inventory of Biomass Burning

Collecting Organization: NOAA/NGDC/Solar Terrestrial Physics

Geographic Scale: national/international

Readiness: currently available

Quality: unknown

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1992 to present

Data Gaps: unknown

Format: system

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset contains satellite imagery of wildfire data. A month's worth of burning products are available for Indonesia and Brazil and are posted on the Web (dmsp@ngdc.noaa.gov).

Indicator Association(s):

Contact Name: Dave Serke

Organization: NOAA/Defense Meteorological Satellite Program

Phone: (303) 497-6126

Fax:

E-mail: dserke@ngdc.noaa.gov

Address: 3100 Marine Street

room 109

Boulder, CO 80303

Dataset Description

Monday, February 16, 1998

Dataset ID: D-0106

Dataset Name: Distribution of Clouds and Cloud Top Temperatures

Collecting Organization: NOAA/Defense Meteorological Satellite Program

Geographic Scale: international

Readiness: currently available

Quality: unknown

Collection Frequency: > annual

Reporting Frequency: > annual

Collection Years: 1972 to present

Data Gaps: unknown

Format: system

URL Address: NA

Accessibility: publicly available

Narrative Description: This dataset contains infrared and visible imagery from DMSP Operational Linescan System (OLS) instruments. The data are used to monitor the global distribution of cloud cover and cloud top temperatures.

Indicator Association(s):

Contact Name: Ed Erwin

Organization: National Geospatial Data Center

Phone: (303) 497-6133

Fax:

E-mail: eerwin@ngdc.noaa.gov

Address: NGDC

325 Broadway

Boulder, CO 803033328

Appendix C

Indicator Descriptions

Indicator Description

Monday, February 16, 1998

Indicator ID: I-0001

Indicator Name: Gap Analysis

Assessment Type: state

Assessment Level: diagnostic

Specificity: biodiversity

Use: current state (snap shot)

Response Category: biotic

Measures: maps of U.S. land cover and vertebrate species distribution

Geographic Scale: state with potential for national aggregation

Readiness: currently available

Funding: funded

Narrative Description: Gap analysis is a geographic approach for assessing the current protection status of biological diversity over large geographic areas. The program is conducted as state-level projects and is coordinated by BRD. The goal is to provide regional assessments of the conservation status of native vertebrate species and natural land cover types. Vegetation is mapped from satellite imagery and other records using the National Vegetation Classification System. Native animal species ranges are mapped by using: museum and agency specimen collection records; known general ranges; and known affiliations between animals and vegetation types.

Dataset Association(s):

Contact Name: Michael Jennings

Organization: USGS/BRD

Phone: (208) 885-3555

Fax:

E-mail: unknown

Address: National GAP Office

530 S. Asbury St., Suite 1

Moscow, ID 83843

Indicator Description*Monday, February 16, 1998***Indicator ID:** I-0002**Indicator Name:** Terrestrial Salamander Populations

Assessment Type: state**Assessment Level:** diagnostic**Specificity:** forest**Use:** change (trend)**Response Category:** biotic**Measures:** changes in populations of terrestrial salamanders**Geographic Scale:** national**Readiness:** early development**Funding:** not funded

Narrative Description: The Terrestrial Salamander Monitoring Program, which is currently being developed, will establish a network of sites in North America that will collect trend information on terrestrial The program is in the stages of recruiting monitoring sites and local coordinators. The results of salamander population monitoring combined with other ecosystem measures (e.g., geographic location, land management, air quality, vegetation, and other animal species) will permit the investigation of the effects of ecosystem attributes on their population dynamics. Researchers hypothesize that salamander population trends may be an indicator of forest health.

Dataset Association(s): D-0002 North American Amphibian Monitoring Program (NAAM)

Contact Name: Sam Droege**Organization:** USGS/BRD**Phone:** (301) 497-5500**Fax:****E-mail:** frog@nbs.gov**Address:** Patuxent Wildlife Research Center

12100 Beech Forest Road, Suite 4039

Laurel, MD 207084039

Indicator Description

Monday, February 16, 1998

Indicator ID: I-0003

Indicator Name: Contribution of Forest Products to the Global Carbon Budget

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: forest contibution to global carbon cycles

Geographic Scale: national

Readiness: currently available/early develop

Funding: funded

Narrative Description: USDA/NRCS is now testing protocols for measuring total carbon in forest ecosystems. This indicator uses the FIA data set. It indicates total amount of carbon entgering the world's atmosphere contributed from forest ecosystems. The indicator can be used to monitor ecological and sustainable management of production forests and the long lasting use of forest products.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)

Contact Name: Ken Stolte

Organization: USFS Forest Health Monitoring Program

Phone: (919) 549-4022

Fax:

E-mail: kstolte@rtpmail.emapfhn.gov

Address:

Indicator Description

Monday, February 16, 1998

Indicator ID: I-0004

Indicator Name: Contribution of Forest Ecosystems to Total Global Budget

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: forest contibution to global carbon cycles

Geographic Scale: national

Readiness: currently available/early develop

Funding: funded

Narrative Description: This indicator measures contribution of forest ecosystems to total global carbon budget. The dataset used for indication is from 1992 for the conterminous U.S. and 1987 for Alaska. In addition to the contribution of forest ecosystems to total global budget, the indicator also looks at the absorption and release of carbon in standing biomass, coarse woody debris, peat, and soil carbon. USDA/NRSC is testing protocols for measuring total carbon in forest ecosystems.

Dataset Asssociation(s):

Contact Name: Ken Stolte

Organization: USFS Forest Health Monitoring Program

Phone: (919) 549-4022

Fax:

E-mail: kstolte@rtpmail.emapfhm.gov

Address:

Indicator Description

Monday, February 16, 1998

Indicator ID: I-0005

Indicator Name: Total Forest Ecosystem Biomass and Carbon Pool

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: Forest contribution to global carbon cycles

Geographic Scale: national

Readiness: currently available/early develop

Funding: funded

Narrative Description: This indicator considers the total forest ecosystem biomass and carbon pool, and if appropriate, it distinguishes it by forest type, age class, and successional stage. This indicator measures the regulation of atmospheric carbon in forest ecosystems as a function of the accumulation of biomass as vegetation, debris, peat, and soil function. The production rate of biomass is a measure of forest health and vitality. USDA/NRCS is testing protocols for measuring total carbon in forest ecosystems. Data sets used by this indicator include FIA, NATSGO (National Soil Carbon Database), and STATSGO (State Soil Carbon Database).

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)
D-0042 National Soil Geographic Database (NATSGO)

Contact Name: Ken Stolte

Organization: USFS Forest Health Monitoring Program

Phone: (919) 549-4022

Fax:

E-mail: kstolte@rtpmail.emapfhn.gov

Address:

Indicator Description

Monday, February 16, 1998

Indicator ID: I-0006

Indicator Name: Forest Land Experiencing an Accumulation of Persistent Toxic Substances

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: current state (snap shot)

Response Category: abiotic

Measures: maintenance and conservation of soil resources

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator considers the area and percent of forest land experiencing an accumulation of persistent toxic substances. It is an indicator of current ecosystem health and a potential indicator of long-term ecosystem health. There is no national data available for sites of smaller magnitude or lower toxicities than Superfund sites. It uses the following data sets: EPA database of Superfund sites in forests, (database does not include non-Superfund waste sites); EPA Permit Compliance System (PCS) and NPDES data; and EPA's National Watershed Assessment Program (NWAP).

Dataset Association(s):

Contact Name: Ken Stolte

Organization: USFS Forest Health Monitoring Program

Phone: (919) 549-4022

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0007

Indicator Name: Forest Land with Significant Compaction of Changes in Soil Physical Properties

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: change (trend)

Response Category: abiotic

Measures: conservation and maintenance of soil resources

Geographic Scale: national

Readiness: currently available/early develop

Funding: funded

Narrative Description: This indicator considers the area and percent of forest land with significant compaction of changes in soil physical properties resulting from human activities. This indicator shows that increases in soil compaction negatively effects nutrient and water availability to forest vegetation. Subsurface hydrology can also be affected by soil compaction. Compaction of surface soil reduces soil infiltration resulting in more runoff, increased erosion, reduction in biomass production and impaired watershed function. It uses the USDA Forest Service Long-Term Soil Productivity Research Initiative (LTSP) data set.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0008

Indicator Name: Forest Land with Significantly Diminished Soil Organic Matter and/or Changes in Other Soil Chemical Properties

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: conservation and maintenance of soil resources

Geographic Scale: national

Readiness: currently available/early develop

Funding: funded

Narrative Description: This indicator considers the area and percent of forest land with significantly diminished soil organic matter and/or changes in other soil chemical properties. Decrease in soil organic matter is an indicator of ecosystem disturbance. It uses the USDA Forest Service Long-Term Soil Productivity Research Initiative (LTSP) data set.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0009

Indicator Name: Forest Land Managed Primarily for Protective Functions

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: current state (snap shot)

Response Category: abiotic

Measures: conservation of soil resources

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator provides a measure of forest land managed for protective functions such as watersheds, flood protection, avalanche protection and riparian zones. This indicator considers the area and percent of forest land with managed primarily for protection functions (e.g., watersheds, flood protection, avalanche protection, and riparian zones). Specifically, it is a measure of forest land allocated primarily for the protection of valuable environmental amenities associated with clean air, water, soil, food, and avalanche protection (i.e., public health and safety). It uses forest area data set aside for protective functions available on a state-by-state basis, however there is no national data.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0010

Indicator Name: Forest Land with Significant Soil Erosion

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: current state (snap shot)

Response Category: abiotic

Measures: conservation and maintenance of soil resources

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: Soil erosion is an important indicator of potential effects on aquatic ecosystems associated with forests, recreational opportunities, potable water supplies and the lifespan of river infrastructure (i.e., dams, bridges). This indicator considers the area and percent of forest land with significant soil erosion. It assesses primarily forest roads and wild fires. It uses the NRI data set.

Dataset Association(s): D-0017 National Resources Inventory (NRI)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0011

Indicator Name: Extent of Area by Forest Type and Age Class or
Successional Stage

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: ecosystem diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures acreage of specific forest type and age class or successional stage. Forest maturation leads to an increase in diversity of forest structure, but a decreased diversity of forest types. This indicator uses the NRI and FIA data sets.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)
D-0017 National Resources Inventory (NRI)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0012

Indicator Name: Extent of Area by Forest Type Relative to Total Forest Area

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: amount of acreage of forest type relative to total forest area; ecosystem diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures amount of specific forest types by region in the contiguous U.S. It is an important indicator of forest types that are decreasing in area, in turn decreasing ecosystem diversity. This indicator uses the NRI and FIA data sets.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)
D-0017 National Resources Inventory (NRI)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0013

Indicator Name: Fragmentation of Forest Types

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: ecosystem diversity

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures patch areas and distances between patches of forests. The fragmentation of a forest disrupts ecological processes and reduces the available habitat. There are no national datasets that currently exist. Models include fragmentation data for cascade range of Oregon.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0014

Indicator Name: Number of Forest Dependent Species

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: species diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: For this indicator, species number is the most fundamental element of species diversity. This indicator is also a measure of species richness, species density, and species evenness. This indicator uses the FIA and FHM data sets.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0015

Indicator Name: Status of Threatened & Endangered Species

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: current state (snap shot)

Response Category: biotic

Measures: species diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator considers threatened and endangered species of forest-dependent species at risk of not maintaining variable breeding populations. It indicates the number of threatened and endangered species by forest land type category. Forest categories include deciduous, evergreen, mixed and wetland. Threatened and endangered species are categorized as plant, mammal, bird, reptile, amphibian, fish, snail, clam, crustacean, and insect. Species can occur in more than one land type category. It uses the following data sets: Biological and Conservation database (TNC), USDI, and Threatened and Endangered Species databases (USEPA).

Dataset Association(s): D-0054 Natural Heritage Network

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0016

Indicator Name: Number of Forest Dependent Species in Restricted Range

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: genetic diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator analyzes the number of forest-dependent species that occupy a small portion of their former range. It measures population size and the distribution of interacting populations, which are critical attributes in evaluating genetic diversity. It uses the Natural Heritage Central Databases.

Dataset Association(s): D-0054 Natural Heritage Network

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0017

Indicator Name: Area of Forest Land and Net Area Forest Land Available
for Timber Production

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: productive capacity of forest ecosystem

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures areas of forest used for timber production relative to total area of forest. Data is available for timberland, but information regarding the productive capacity for other forest lands is limited. This indicator uses the NRI and FIA data sets.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)
D-0017 National Resources Inventory (NRI)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0018

Indicator Name: Total Growing Stock of Both Merchantable and Non-Merchantable Tree Species on Forest Land Available for Timber Production

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: productive capacity of forest ecosystems (timber supply opportunities)

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator provides an indication of timber supply opportunities. Some information for non-commercial species is available from the regional FIA programs, but no national data is available. This indicator uses the FIA data set.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0019

Indicator Name: Sustainability of Wood Products Harvest

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: productive capacity of forest ecosystems

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures forest's availability to provide a continuing supply of forest products and economic and forest management opportunities. This indicator uses the FIA and NRI data sets.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)
D-0017 National Resources Inventory (NRI)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0020

Indicator Name: Sustainability of Non-timber Forest Products Harvest

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: productive capacity of forest ecosystems

Geographic Scale: regional

Readiness: currently available/early develop

Funding: funded

Narrative Description: This indicator considers the annual removal of non-timber forest products (e.g., fur bearing animals, berries, mushrooms, game) and compares it to the level determined to be sustainable. It indicates the forest's ability to provide a continuing supply of forest products, and economic and forest management opportunities. It uses state-by-state data on game species, however no national data for other non-timber products is available. There is no complete national scale data.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0021

Indicator Name: Forests Affected by Other Natural and Human-Induced Pressures

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: forest ecosystem health and vitality

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator considers the area and percent of forest affected by natural and human-induced pressures on ecosystems. Pressures are categorized by native insects and diseases, exotic insects and diseases, exotic plants and diseases, fire, weather, flood, land clearance, salinization, and domestic animal invasion. It uses the following data sets: FIA; Intermountain Fire Sciences Lab (for fire data); National Interagency Fire Center, Boise, Idaho; and Forest Health Monitoring Program.

Dataset Association(s): D-0015 Forest Inventory and Analysis (FIA)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0022

Indicator Name: Forest Land Subject to Specific Levels of Air Pollutants

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: forest ecosystem health

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator considers the area and percent of forest land subject to specific levels of air pollutants (e.g., sulfates, nitrates, ozone) or ultraviolet B that may cause negative impacts on the forest ecosystem. It is an indicator of the effects of atmospheric pollutants resulting from anthropogenic activities. It includes use of lichens as bioindicators of forest health. It uses the following data sets: National Acid Deposition Program Data (NADP); University of Georgia and USEPA Ultraviolet Monitoring Network; USDA UV-B Radiation Monitoring Program; Mercury Deposition Network; National Atmospheric Deposition Program/National Trends Network; Aerometric Monitoring; Interagency Monitoring of Protected Visual Environments (IMPROVE); North American Maple Project (NAMP); Forest Health Monitoring Datasets; and National Acid Precipitation Assessment program (NAPAP).

Dataset Association(s):	D-0009	National Atmospheric Deposition Program & National Tr
	D-0021	Mercury Deposition Network
	D-0053	UV-B Radiation Monitoring Program Datasets
	D-0076	Interagency Monitoring of Protected Visual Environments

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0023

Indicator Name: Forest Land with Diminished Ecological Components

Assessment Type: pressure

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: forest ecosystem health

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator shows whether key ecological components, processes of ecological continuity are begin negatively affected, suggesting a decline in forest ecosystem sustainability. This indicator considers the area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g., soil, nutrient cycling, seed dispersion, pollination, and/or ecological continuity (monitoring of functionally important species such as nematodes, arboreal epiphytes, beetles, fungi, wasps, etc.). It specifically measures whether key ecological components or processes, or ecological continuity are changing in a negative way, suggesting a decline in sustainability. The indicator uses the US national Acid Precipitation Assessment Program (NAPAP) data set.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0024

Indicator Name: Population Levels of Forest-dependent Bird Species

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: genetic diversity

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: Representative species monitored include forest dependent species whose population levels are indicative of overall levels of genetic diversity for a larger group of forest species. This indicator uses the BBS data set.

Dataset Association(s): D-0001 North American Breeding Bird Survey (BBS)

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0025

Indicator Name: Soil Measurements: Infiltration

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This indicator includes a specific set of indicators for monitoring state of soils on rangelands. Project-specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

Dataset Association(s):

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0026

Indicator Name: Soil Measurements: Soil Stability

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This indicator includes a specific set of indicators for monitoring state of soils on rangelands. Project-specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0027

Indicator Name: Soil Measurements: Soil Penetrometer Resistance

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This indicator includes a specific set of indicators for monitoring state of soils on rangelands. Project-specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

Dataset Association(s):

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0028

Indicator Name: Soil Measurements: Soil Depth

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: Rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This indicator includes a specific set of indicators for monitoring state of soils on rangelands. Project-specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

Dataset Association(s):

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0029

Indicator Name: Soil Surface Characterization

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This is a specific indicator used to monitor rangeland health. Specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0030

Indicator Name: Vegetation Characterization: Vegetation Structure

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic/biotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This is a specific indicator used to monitor rangeland health. Specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0031

Indicator Name: Vegetation Characterization: Canopy Cover

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: rangeland ecosystem health

Geographic Scale: regional

Readiness: expected soon

Funding: funded

Narrative Description: This is a specific indicator used at rangeland sites. Specific data sets and associated methods for collecting data are available from the contact. The indicator can be applied to any rangeland ecosystem.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0032

Indicator Name: Satellite Imagery of the Normalized Difference Vegetation Index (NDVI)

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: change (trend)

Response Category: biotic

Measures: changes in vegetation as an indicator of irreversible degradation of rangeland ecosystem

Geographic Scale: regional/southern NM

Readiness: early development

Funding: funded

Narrative Description: This indicator uses advanced very high resolution radiometer (AVHRR) satellite imagery to study ecosystems of large geographic area. This indicator uses project-specific data sets that are available from the contact.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0033

Indicator Name: Slake Test for Soil Surface Stability

Assessment Type: state

Assessment Level: screening

Specificity: grassland/rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: early warning indicator of rangeland/grassland ecosystem degradation

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This is an extremely sensitive indicator of soil ecosystem degradation for coarse-tempered soils which exist on rangeland ecosystems. Soil stability can be determined in three strata: bare soil, grass, and scrubs. This indicator uses project-specific data sets that are available from the contact.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0034

Indicator Name: Bare Patch Index Based on Canopy Cover

Assessment Type: state

Assessment Level: screening

Specificity: grassland/rangeland

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: an indicator of desertification of perennial grasslands; early ecosystem disturbance

Geographic Scale: regional/southwestern US

Readiness: currently available

Funding: funded

Narrative Description: This is an indicator of precipitation and wind driven erosion. It is part of a core set of indicators of desertification. This indicator uses project-specific data sets that are available from the contact.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0035

Indicator Name: Bare Patch Index Based on Soil Surface Measurements

Assessment Type: state

Assessment Level: screening

Specificity: grassland/rangeland

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: an indicator of desertification of perennial grasslands; early ecosystem disturbance

Geographic Scale: regional/southwestern US

Readiness: currently available

Funding: funded

Narrative Description: This indicates overland water flow driven erosion which is a early indication of desertification. Part of a core set of indicators associated with desertification of grasslands. This indicator uses project-specific data sets that are available from the contact.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0036

Indicator Name: Percent Grass Cover, Percent Long-lived Grass Cover,
Percent Cover of Vegetative Reproducers

Assessment Type: state

Assessment Level: screening

Specificity: grassland/rangeland

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: an indicator of desertification of perennial grasslands; early ecosystem disturbance

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This provides early warning indicators of the desertification of grasslands. This indicator uses project-specific data sets that are available from the contact.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0038

Indicator Name: Degree of Biophysical Constraints Indicators

Assessment Type: state

Assessment Level: screening

Specificity: landscape

Use: current state (snap shot)

Response Category: abiotic

Measures: relative geographic position of a farm or subcatchment to the position of the catchment.

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: The indicators are being used in the USEPA Mid-Atlantic pilot project. Specific indicators in this group are: farm position in catchment relative to biophysical constraints, subcatchment position relative to biophysical constraints, and catchment position in region relative to biophysical constraints. This indicator uses remote sensing data, including Advanced Very High Resolution Radiometry. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0039

Indicator Name: Greenness Pattern Indicators

Assessment Type: state/pressure

Assessment Level: screening

Specificity: landscape

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: losses in productivity, increases in erosion and loss in buffer capacity along streams

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This group of indicators is being used in the USEPA Mid-Atlantic pilot project. Specific indicators in this group include normalized difference vegetation index (NDVI) pattern and change, NDVI expected versus observed based on soils, topography, vegetation, and climate, and NDTI changes. This indicator uses landsat and SPOT satellite imagery, aerial photography, and data on soils, geology, topography, and climate. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0040

Indicator Name: Ground Water Indicators

Assessment Type: state/pressure

Assessment Level: screening

Specificity: landscape

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: estimates the local and regional impacts of changes in recharge (water moving beyond rootzone) on catchment behavior.

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This group of indicators is used in the USEPA Mid-Atlantic pilot project. Indicators in this category include albedo change, topographical concavity variation, depth to watertable. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0041

Indicator Name: Land Cover Composition and Pattern Indicators

Assessment Type: state

Assessment Level: screening

Specificity: landscape

Use: current state (snap shot)

Response Category: abiotic

Measures: dominance, spatial distribution and juxtaposition of land cover elements

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This is an indicator set which is being used in the USEPA Mid-Atlantic pilot project. More specific indicators in this group include land cover dominance, land cover connectivity and degree of fragmentation, land cover shape and complexity, land cover patch size, amount of land cover in protective status, percentage of land cover types at different scales and percentage of paddocks on slopes greater than 5%. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0042

Indicator Name: Riparian Extent & Distribution Indicators

Assessment Type: state

Assessment Level: screening

Specificity: landscape

Use: current state (snap shot)

Response Category: abiotic

Measures: size and amount of riparian buffer adjacent to streams and water courses

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This set of inindicator set is being used in the USEPA Mid-Atlantic pilot project. Size and amount of riparian buffer is an important determinant of soil loss, sediment movement and contaminant movement at the farm, subcatchment and catchment scales. Indicators in this group include: percentage of woody vegetation along stream/unit stream distance, connectivity of woody vegetation along streams/unit stream distance, percentage of woody vegetation along streams by width class/unit of stream distance. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0043

Indicator Name: Erosion Potential Indicators

Assessment Type: state

Assessment Level: screening

Specificity: landscape

Use: current state (snap shot)

Response Category: abiotic

Measures: soil loss involving the integration of land cover, precipitation, topography, and soils data

Geographic Scale: regional

Readiness: currently available

Funding: funded

Narrative Description: This set of indicators is being used in the USEPA Mid-Atlantic pilot project. Indicators include estimates of soil loss involving the integration of land cover, precipitation, topography, and soils data. Measurements are made using a universal soil loss model. Specific indicators include percentage of bare soil, soil loss distribution, percentage of farms on erodible soils, distance of agricultural patches from streams, percentage of paddocks on greater than 5% slopes. This indicator was derived from a chapter of a book entitled Indicators of Landscape Integrity by B. Jones, J. Walker, K.H. Riitters, J.D. Wickham, and C. Nicoll from a book entitled Indicators of Catchment Health.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0044

Indicator Name: Area and Growing Stock of Plantations of Native and Exotic Species

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: change (trend)/current state (snap shot)

Response Category: biotic

Measures: forest management intensity, or of efforts to reclaim degraded lands or marginal agricultural lands

Geographic Scale: national

Readiness: currently available

Funding: funded

Narrative Description: This indicator measures net volume of growing stock on timberland in the U.S. by species group and region. Most complete datasets associated with this indicator are for southern region forest plantations. Data sets are from USDA Forest Service, where the most recent data are from 1992.

Dataset Association(s):

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0045

Indicator Name: Nighttime Lights

Assessment Type: state

Assessment Level: screening

Specificity: human population pressure

Use: change (trend)/current state (snap shot)

Response Category: abiotic

Measures: area lit by anthropogenic visible-near infrared emissions (i.e., lights)

Geographic Scale: international

Readiness: currently available

Funding: funded

Narrative Description: A satellite-based inventory of human settlements derived from nighttime data from the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS). The area lit is highly correlated to gross domestic product and electric power consumption. The data can be used to define and update the spatial distribution of human population; however, significant outliers exist in the relation between area lit and population.

Dataset Association(s):

Contact Name: Chris Elvidge

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Indicator Description*Monday, February 16, 1998***Indicator ID:** I-0046**Indicator Name:** Percent of Acreage by Ecological Status

Assessment Type: state**Assessment Level:** screening**Specificity:** rangeland**Use:** current state (snap shot)**Response Category:** biotic**Measures:** degree of similarity of present vegetation to the potential natural, or climax, plant community**Geographic Scale:** BLM lands only**Readiness:** currently available**Funding:** funded**Narrative Description:** This indicator is a component of BLM's Public Land Statistics and is based on Ecological Site Inventories. The data are summarized by state; however, a more detailed assessment may be possible.**Dataset Association(s):**

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0047

Indicator Name: Reforested Lands and Timber Stand Improvements

Assessment Type: state

Assessment Level: screening

Specificity: forest

Use: current state (snap shot)

Response Category: biotic

Measures: acres of reforested land and acres of timber stand improvements

Geographic Scale: BLM lands only

Readiness: currently available

Funding: funded

Narrative Description: This indicator is a component of BLM's Public Land Statistics and may be a measure of forest health conditions on public lands. The data are summarized by state; however, a more detailed assessment may be possible.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0048

Indicator Name: Types of Wildlife Habitats

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: current state (snap shot)

Response Category: biotic

Measures: number of acres of various wildlife habitats (e.g., big game, small game, waterfowl)

Geographic Scale: BLM lands only

Readiness: currently available

Funding: funded

Narrative Description: This indicator is a component of BLM's Public Land Statistics and could possibly be used to assess trends in wildlife habitats on public lands. The data are summarized by state; however, a more detailed assessment may be possible.

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Indicator Description

Monday, February 16, 1998

Indicator ID: I-0049

Indicator Name: Number of Big Game Animals on Public Lands

Assessment Type: state

Assessment Level: screening

Specificity: rangeland

Use: current state (snap shot)

Response Category: biotic

Measures: estimated numbers of big game animals (e.g., antelope, bear, buffalo)

Geographic Scale: BLM lands only

Readiness: currently available

Funding: funded

Narrative Description: This indicator is a component of BLM's Public Land Statistics and could possibly be used to assess trends in big game populations on public lands. The data are summarized by state; however, a more detailed assessment may be possible.

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Indicator Description*Monday, February 16, 1998***Indicator ID:** I-0050**Indicator Name:** Erosion Control Measures

Assessment Type: state**Assessment Level:** screening**Specificity:** soil**Use:** change (trend)/current state (snap shot)**Response Category:** abiotic**Measures:** Acres of brush control, seeding, soil stabilization, and weed control on BLM lands.**Geographic Scale:** BLM lands only**Readiness:** currently available**Funding:** funded

Narrative Description: This indicator is a component of BLM's Public Land Statistics and is a measure of efforts to reduce soil erosion on BLM lands. The data are summarized by state; however, a more detailed assessment may be possible.

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