

Summary of Information Management Standards

National Park Service

Natural Resource Program Center
Inventory and Monitoring Program



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Establishing and adhering to data standards is the foundation for data sharing, data consistency, and working more efficiently. Standards set the stage for data exchange, data aggregation, and federated searching, all of which encourage wide discovery and sharing of NPS data. Below are examples of information management-related standards that the I&M Program applies in its work.

Category	Standard	Description
Database Design	Natural Resource Database Template	A standardized set of core database tables and fields to be used for NPS natural resource-related applications. NRDT decreases database divergence among the I&M networks, and sets the stage for regional or national integration of common data elements. NRDT Documentation includes core tables, field definitions, and relationship diagrams.
	NRDT Front-end Application Builder	A Microsoft Access file that is intended to be used by developers of NRDT applications to create a front-end (user-interface) to an NRDT v.3.2 back-end (database). Features include: <ul style="list-style-type: none"> ▪ table linking utility ▪ data backup ▪ compaction ▪ lookup table management ▪ main menu ▪ standardized data entry forms for core NRDT v.3.2 tables ▪ standardized data "gateway" form for retrieving records The Front-end Application Builder reduces the time needed for protocol-specific form and report development, and provides a standardized look-and-feel across applications for end users.
Geospatial Metadata	Geospatial Data Specifications	Spatial data created or modified by NPS adhere to standards established by the Federal Geographic Data Committee (FGDC). The current Content Standard for Digital Geospatial Metadata will be superseded by the North American Profile (NAP) of ISO 19115:2003 .
	NPS Natural Resource and Metadata Profile	The NPS Natural Resource and GIS Metadata Profile incorporates elements specific to the National Park Service, such as park information and natural resource project details, into a standard metadata profile. The NPS Profile extends the FGDC Content Standard for Digital Geospatial Metadata and includes the Biological Data Profile and the ESRI Profile of the Content Standard for Digital Geospatial Metadata.

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	NPS Metadata Authoring	<p>The NPS Metadata Tools and Editor is an NPS metadata authoring tool that contains all elements in the FGDC and Biological metadata profiles, plus required elements that are specific to NPS. Spatial data being uploaded to the NPS Natural Resource Information Portal must be documented appropriately with FGDC and NPS metadata standards. The NPS GIS Committee requires data layers to be described with FGDC standards and the NPS Metadata Profile.</p>
	Metadata Crosswalk	<p>This crosswalk, developed and used as a guide by the I&M Program, illustrates the correspondence of basic metadata requirements among four metadata systems: Dublin Core, NPS BibMAPS, the NRInfo Reference Application, and ISO 19115:2003.</p>
Bibliographic Metadata	NRInfo Reference Application Documentation (NPS only)	<p>Documentation and user assistance is provided for the NPS Reference Application 2.0, which is part of the Natural Resource Information Portal (NPS only). The document contains a comprehensive guide to application functions and includes domain lists, definitions, data entry standards, and procedures for use.</p>
	<p>NPS Bibliographic Metadata Application Profile Standard [under development, links pending]</p>	<p>The NPS Bibliographic Metadata Exchange Profile Standard (BibMAPS) consists of a proposed NPS enterprise core bibliographic element set with each element designated as mandatory, recommended or optional. The proposed element set is based on qualified Dublin Core standards. The purpose of this standard is to facilitate data exchange, data aggregation, and federated searching of NPS managed bibliographic data. The standard is in review draft and will be available here once it is finalized. The NPS Reference Applications meets or exceeds all BibMAPS standards.</p>
	Dublin Core	<p>Bibliographic Standards used by the I&M Program and BibMAPS (above) are based on the fifteen-element Dublin Core Metadata Initiative.</p>
	Metadata Crosswalk	<p>This crosswalk, developed and used as a guide by the I&M Program, illustrates the correspondence of basic metadata requirements among four metadata systems: Dublin Core, NPS BibMAPS, the NRInfo Reference Application, and ISO 19115:2003.</p>
Organization Units and Codes	NRInfo Portal Unit Service – Executive Summary	<p>The National Park Service comprises multiple “units,” which refer to geographic areas such as parks or monuments, as well as functional or administrative entities such as offices or programs. The Unit Service for the NRInfo Portal is the centrally-managed source of NPS unit names, unit types, codes, and related unit information needed for natural resource-related data management activities and uses. Unit records are actively maintained in order to return up-to-date, accurate information. Unit data can be viewed or downloaded from the NRInfo Portal via the Unit Search link on the Tools tab.</p>

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Digital Photos	Digital Photo Metadata Standard	NPS has established a Digital Photo Metadata Standard that comprises seven mandatory elements along with “mandatory if applicable” and “optional” elements. The standard identifies the metadata elements needed to describe, manage and preserve digital images. (The standard applies to pictorial digital images that are either natively digital or created by scanning. It does not apply to digital images of drawings, maps, or texts, or to satellite images.)
Taxonomy	Integrated Taxonomic Information System USDA Plants	Two systems are used by the I&M Program as primary sources of taxonomic information within the NRInfo Portal. The Integrated Taxonomic Information System (ITIS) is the primary reference for vertebrates and invertebrates; and the USDA PLANTS system is the primary reference for plants. However, the goal of data management tools developed by I&M is a flexible structure with fluency in multiple taxonomies. This allows for name translations and crosswalks among key taxonomic systems, and allows users to assess information combined from different systems regardless of the names used.
Vegetation Inventory and Classification	NPS Vegetation Inventory	A standardized model of data organization, file naming, and formatting of final products for NPS vegetation mapping projects and products.
	National Vegetation Classification Standard	NVCS is a system that is integrated with the major scientific efforts in the taxonomic classification of vegetation, and is a Federal Geographic Data Committee standard. This standard ensures compatibility and widespread use of the information among federal and state agencies and private entities.
	National Map Accuracy Standards	NPS vegetation inventory projects adhere to federal standards established for horizontal and vertical positional accuracy .
Soil Inventory and Classification	Soil Resources Inventory	The Inventory & Monitoring (I&M) Program supports soils mapping and inventory based on standard terminology and techniques of the National Cooperative Soil Survey (NCSS), and produces a standard suite of products for each park unit that is mapped.
	Standards for Soil Resources Inventory	National Cooperative Soil Survey (NCSS) standards are common and shared procedures that provide the foundation for technology transfer, data sharing, and communications among soil survey participants. The National Soil Survey Handbook and other technical and procedural references provide the standards, guidelines, definitions, policy, responsibilities, and procedures for conducting the National Cooperative Soil Survey in the United States.

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	Soil Survey Geographic Standards (SSURGO)	<p>Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. Mapping scales generally range from 1:12,000 to 1:63,360; SSURGO is the most detailed level of soil mapping done by the Natural Resources Conservation Service (NRCS). SSURGO digitizing duplicates the original soil survey maps.</p>
	National Soil Information System (NASIS)	<p>The focus of the National Cooperative Soil Survey (NCSS) is shifting from producing static printed soil survey reports to providing a dynamic resource of soils information for a wide range of needs. The National Soil Information System data system consists of multiple interrelated soil applications and databases. This data system aids in the collection, storage, manipulation and dissemination of soil information.</p>
Geologic Inventory and Classification	Geologic Resources Inventory	<p>Digital geologic maps reproduce all aspects of traditional paper maps, including notes, legend, and cross sections. Bedrock, surficial, and special purpose maps such as coastal or geologic hazard maps may be used by the GRI to create digital Geographic Information Systems (GIS) data that meet park needs.</p>
	NPS Geology-GIS Data Model	<p>The GRI program uses a geology-GIS data model that provides standards for the data capture, organization, and attribution of geologic map information in an ESRI geodatabase format. The model implements many U.S. Geological Survey and FGDC standards including those pertaining to spatial data accuracy, citation formatting and geologic time, as well as using geologic terminology widely accepted within the geologic community. The data model also makes use of much of the functionality an ESRI geodatabase format affords to ensure data quality, topology, and feature/table relationships.</p> <p>The GRI also adheres to FGDC metadata standards, as well as employing NPS Metadata Profile components, to effectively communicate information concerning geologic-GIS data; in particular source data information, data creation process steps, and data discoverability and accuracy.</p>
	National Geologic Map Database Project	<p>NPS and the GRI program adhere to standards established via the National Geologic Map Database Project (NGMDB), a collaborative effort primarily involving the USGS and the Association of American State Geologists. Standards encompass geologic map symbolization, geologic time scales, database design, science terminologies, data interchange formats, and map publication guidelines.</p>

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<p>Water Quality Data</p>	<p>Water Quality Monitoring</p>	<p>The NPS Water Resources Division has developed guidance for I&M networks conducting water quality monitoring. Although networks are able to select and monitor characteristics relevant to their constituent parks, all networks must collect certain key water quality parameters to facilitate national consistency. Networks must also monitor EPA Clean Water Act 303(d)-listed ‘impaired waters.’ Physical, chemical, and biological water quality data collected using funding from the Water Resources Division must be archived in the Environmental Protection Agency’s STORET/WQX Data Warehouse.</p>
	<p>STORET/WQX Data Warehouse</p>	<p>The Environmental Protection Agency’s STORET/WQX Data Warehouse is an archive of physical, chemical, and biological water quality data provided by public, private, and non-profit organizations who have operated distributed copies of STORET (such as the NPS Water Resources Division) or, more recently, organizations who have mapped their data systems to the Water Quality Exchange (WQX) XML schema and flow their data through the Exchange Network or other means into the STORET/WQX Data Warehouse. STORET and WQX are both built upon standards. WQX is a simplification of the STORET data model created by EPA and the Environmental Council of the States.</p>
	<p>NPSTORET</p>	<p>Any physical, chemical, and biological water quality data collected with NPS Natural Resource Challenge water quality funding must be archived in the copy of STORET operated by the NPS Water Resources Division. To facilitate this effort, the WRD has created a series of Microsoft Access-based templates, collectively referred to as NPSTORET, to enable I&M Networks to enter their water quality data in a STORET/WQX-compatible format with all relevant metadata and supporting documentation. NPSTORET is a complete water quality data management system based on STORET, WQX, and the National Water Quality Monitoring Council’s standardized water quality metadata elements. Alternatively, for parks and networks with their own water quality database management system, water quality data can be transmitted to WRD for upload to the STORET/WQX Data Warehouse via an electronic data deliverable specification or WQX.</p>
<p>Air Quality Data</p>	<p>NPS Air Atlas</p>	<p>The NPS Air Quality Inventory focuses on indicator pollutants regulated under the Clean Air Act. Statistical summaries are prepared from data collected by national air monitoring networks during five-year periods of observation. These data are entered into a geographic information system (GIS) where inverse distance-weighted and kriging techniques are applied to create gridded air quality estimates for the contiguous 48 states.</p>

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	National Air Quality Monitoring Networks	<p>Data used in the NPS Air Atlas are collected by the following national monitoring networks:</p> <ul style="list-style-type: none"> • Ozone: EPA Air Quality System and the Clean Air Status and Trends Network (http://www.epa.gov/ttn/airs/aqsdatamart/access.htm and http://www.epa.gov/castnet/) • Wet Atmospheric Deposition: National Atmospheric Deposition Program (http://nadp.sws.uiuc.edu/) • Dry Atmospheric Deposition: Clean Air Status and Trends Network (http://www.epa.gov/castnet/) • Visibility: Interagency Monitoring of Protected Visual Environments (http://vista.cira.colostate.edu/improve/)
Monitoring Protocols	Monitoring Protocols	<p>The NPS I&M Division and the USGS Status and Trends Program developed guidelines for the content and format of monitoring protocols. The guidelines, which were published in the Wildlife Society Bulletin (Oakley et al. 2003), have been adopted as the protocol standard by the NPS I&M program and the USGS Status and Trends Program. All monitoring in national parks that uses funding from the NPS I&M program must develop protocols that meet the Oakley et al. 2003 protocol standards.</p>
	Monitoring Framework	<p>The NPS Ecological Monitoring Framework is a systems-based, hierarchical, organizational structure that promotes coordination among parks, networks, programs, and agencies involved in ecological monitoring. Vital signs selected by parks and networks for monitoring are assigned to Level 1, 2, and 3 categories. For example, the vital sign “Shoreline Change” is assigned to the Level 3 category of “Coastal/oceanographic features and processes” within the Level 2 category of Geomorphology and Level 1 category of “Geology and Soils.” Monitoring protocols across NPS can be searched and summarized in a corresponding protocol database that is based on the framework.</p>
Publications	NPS Natural Resource Publications	<p>Natural Resource Publications comprise five series: Natural Resource Report, Natural Resource Technical Report, Natural Resource Data Series, Scientific Monograph, and Park Science. Manuscripts must adhere to a set of minimum standards and are peer-reviewed to ensure that information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.</p>