

An Overview of the National Park Service's Vital Signs Water Quality Monitoring Program: A National Framework for Land Mgt. Agencies

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National Park Service Overview



Established in 1916 by an Act signed by Woodrow Wilson

Today the service manages under a “protect and preserve” mandate almost 380 areas encompassing 83 million acres in 49 states administered as National Parks, National Seashores, National Lakeshores, National Historic Sites, National Battlefields, and Presidential Libraries.

The Law:

NATIONAL PARKS OMNIBUS MANAGEMENT ACT OF 1998

“The Secretary shall undertake a program of inventory and monitoring of National Park System resources to establish baseline information and to provide information on the long-term trends in the condition of National Park System resources. The monitoring program shall be developed in cooperation with other Federal monitoring and information collection efforts to ensure a cost-effective approach.”

2001 NPS Management Policies

“Natural systems in the national park system, and the human influences upon them, will be monitored to detect change. The Service will use the results of monitoring and research to understand the detected change and to develop appropriate management actions”.



NPS Natural Resource Challenge

Science for Parks - Parks for Science

- Add natural resource stewardship to NPS visitor services capability
- Learn what is in parks (inventories), and monitor the vital signs of natural systems
- Engage the scientific community and the public, and facilitate their inquiries
- Share the information widely

Natural Resource Challenge Vital Signs Monitoring



Revitalize and expand the natural resource program within the park service and improve park management through greater reliance on scientific knowledge

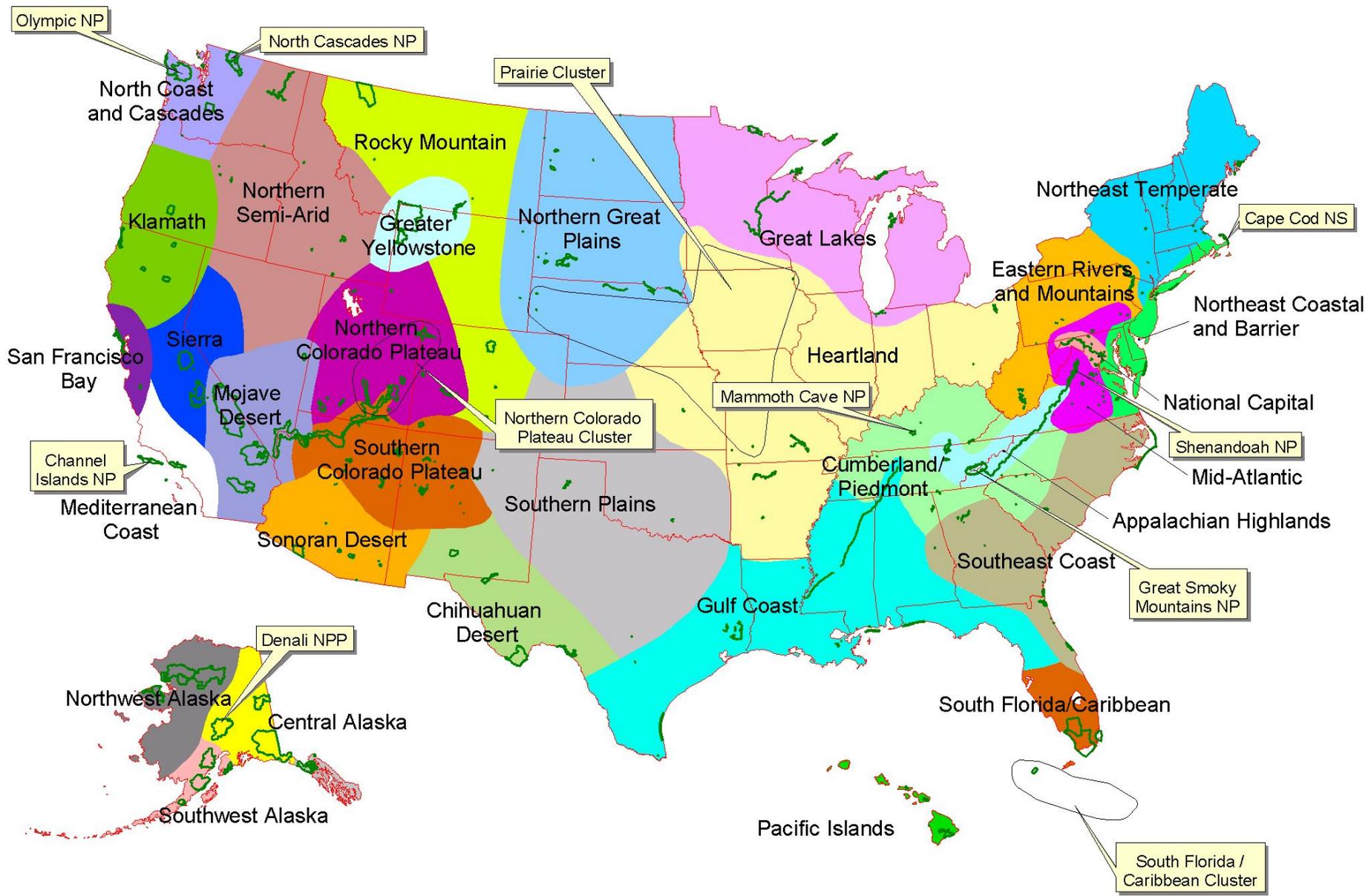
What are Vital Signs?

Vital Signs are key elements that indicate the health of an ecosystem. Vital signs may occur at any level of organization including landscape, community, population, or genetic levels. They may be compositional (referring to the variety of elements in the system), structural (referring to the organization or pattern of the system), or functional (referring to ecological processes). Vital signs can be any measurable feature of the environment that provides insights into the state of the ecosystem.

“Focus on most significant indicators of long-term ecological trends and highest concerns among the parks in each network”

Key Features of New Park/Network Monitoring Program

- Integrated monitoring program: physical and biological resources including weather, air, water, geoindicators, T&E species, exotic plants, other flora & fauna
- Integrate NR information with other park operations including interpretation, maintenance, law enforcement
- Emphasis on making information more useable; tools such as GIS Theme Manager, NR Database template, NPSpecies, Dataset Catalog, NatureBib Bibliography, interconnected web and distributed databases



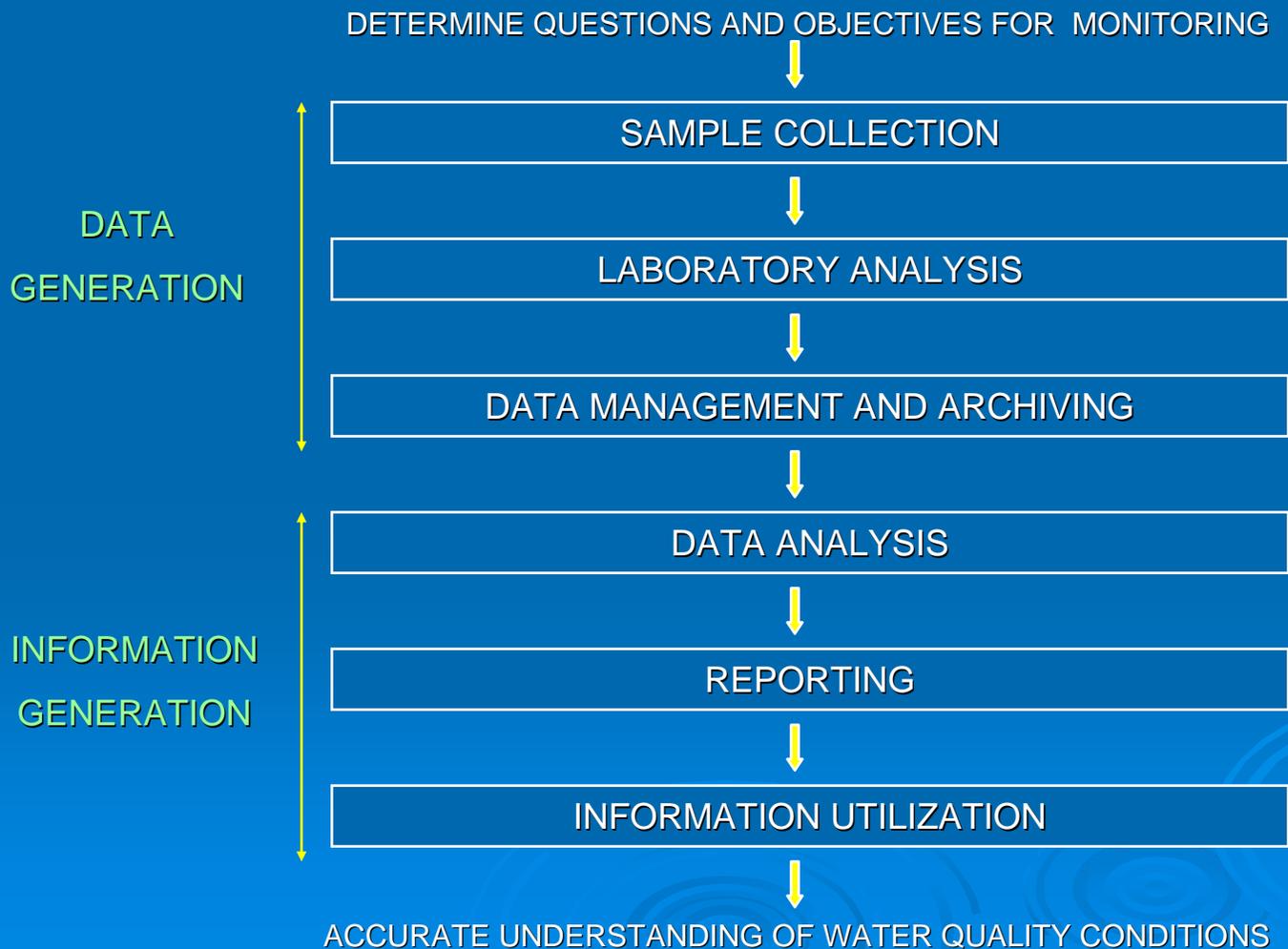
What Is A Water Quality Monitoring Program?

Best viewed as a Water Quality Information System that facilitates the flow of information between monitoring components resulting in management utilization of the information.



WATER QUALITY INFORMATION SYSTEMS

(MODIFIED FROM WARD 1990, DESIGN OF WATER QUALITY MONITORING SYSTEMS)



Purpose of Vital Signs Water Quality Monitoring

- Track and Support Attainment of NPS and DOI Strategic (GPRA) Goals
 - Protect pristine water quality (e.g., ONRW)
 - Support additional CWA protections for unimpaired waters
 - Improve Impaired Water Quality (as defined in GPRA)
 - Support CWA provisions for improving water quality

Service-wide Vital Signs Long-Term Aquatic Monitoring Guidance

Part A: Identification of priority impaired and pristine waters for the water quality vital signs monitoring component.

Part B: Planning Process Steps. Issues to consider and then to document in a detailed study plan that includes a Quality Assurance Project Plan (QAPP) and monitoring "protocols" (Standard Operating Procedures)

Part C: Draft guidance on WRD required and other field parameter measurements, general monitoring methods, and some design considerations in preparation of a detailed study plan.

Part D: Draft guidance on laboratory analytes/ measurements and their consideration in preparation of a detailed study plan.

Part E: Draft guidance on data reporting and archiving in STORET.

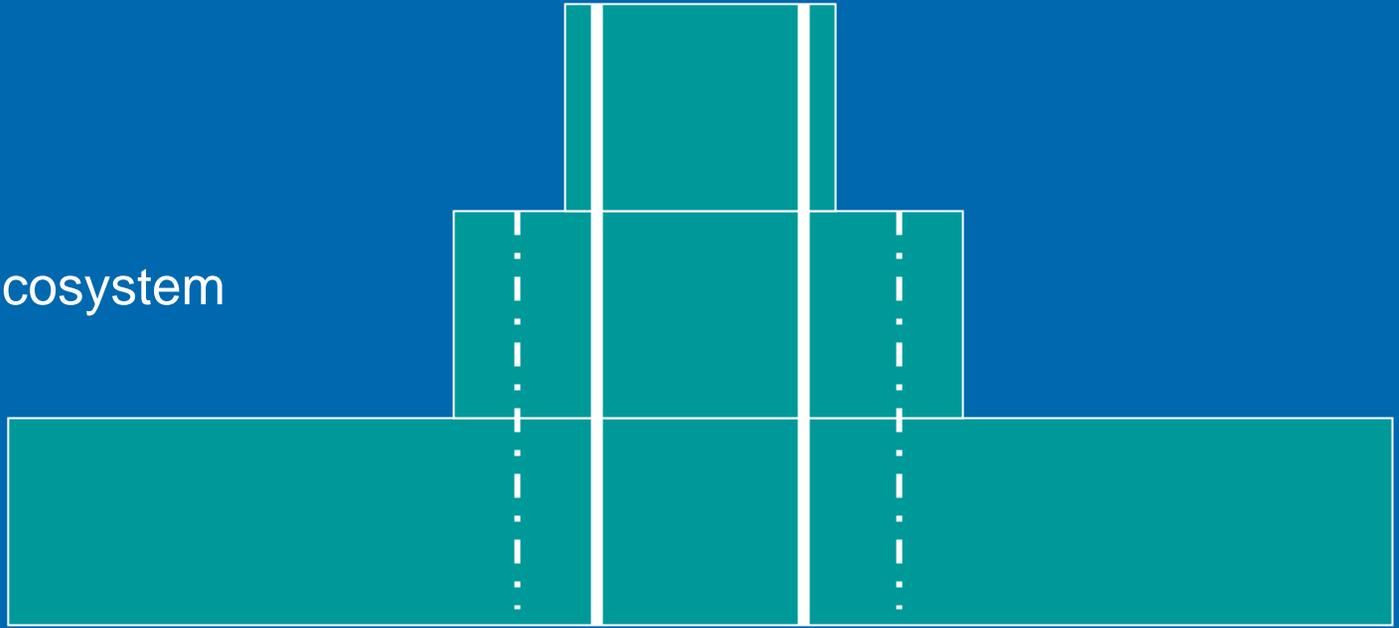
2 Broad Categories as Monitoring Program Drivers

- **Category 1 Sites** – CWA or Regulatory Driven (State)
 - 303d-listed water body/stream segment (“water quality limited”)
 - TMDL is the “fix process”
 - Anti-degradation policy (Protection of Tiers 1, 2, & 3* waters)
 - *ONRW (special status) designation or desired objective (protection)
 - Meet an NPS strategic goal of “measurable or quantifiable” results (GPRA 1a.4) that a regulatory context provides through designated use criteria of narrative and numeric standards (see Part A of WRD Guidance)
- **Category 2 Sites** – Network/Park ID’d Stressors or Threats
 - May not fail an existing designated use narrative or numerical standard but.....
 - Threats or stressors are identified
 - Present or future ecological impairments are possible or likely
 - Need to establish baseline condition (support anti-degradation)
 - Aquatic resource tie-in with other vital sign is apparent (e.g. Air Resource)

National

Network/Ecosystem

Park



Servicewide Core Variables

Network/Ecosystem Core Variables

NPS Natural Resource Challenge

The NPS, for the first time, is developing a data management capability at the park, regional and national levels that will allow parks to make better use of existing data as well as making new data available to managers, researchers, the public and others.

KEY DATABASES

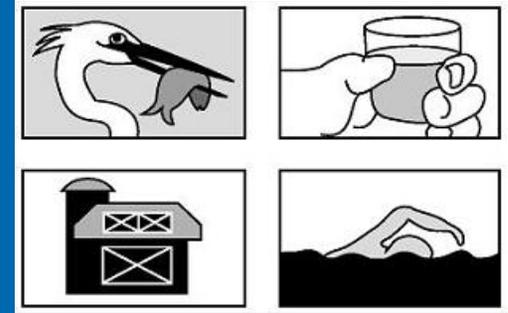
- 1. Water Quality Designated Beneficial Use Classifications**
 - 2. Servicewide Water Quality Data Management and Archiving**
- 

Water Quality Designated Beneficial Use Classifications

Objectives:

- Prepare Designated Use and Impairment (DUI) Reports for parks
- Provide the foundation for construction of a “certified database” for tracking the status of park water quality as required by Servicewide Strategic Plan Goal 1a4.
- Enable NPS coordination with State and Federal agencies that are working to bring the nation’s waters into compliance with standards through implementation of Total Maximum Daily Loads (TMDLs)

Designated Uses and Impairments (DUI)



- CWA State designated uses
- CWA 303(d) quality impaired waters and causes
- Special designations recognizing waters of exceptional quality as defined in State water quality standards
- Hydrographic statistics based on the USGS National Hydrography Dataset (NHD)

NPS Designated Use and Impairment Web Site

Water Resources Division - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites RSS Print Mail News Groups

Address <http://www1.nrintra.nps.gov/wrd/dui/> Go Links SnagIt

Inside Natural Resources

Intranet portal for Natural Resources

National Park Service
U.S. Department of the Interior

Home | [NRSS/NRPC Directory](#) | [Items of Special Interest](#) | [Career Information](#) | [Fund Source Descriptions](#)

WATER RESOURCE DIVISION

- WRD Home

Programs

- Water Info and Data
- Marine Conservation
- Wetlands
- Fisheries
- Hydrology & Watershed Management
- Planning
- Water Rights (pending)
- Colorado River Basin
- Water Quality

In Depth

- Organization Chart (pdf 95kb)
- Contacts
- Key Statistics (xls size kb) (pending)
- Databases
- GPRA & Strategic Planning
- Funding for Water Resources Projects
- Technical Reports for

Designated Uses and Impairments (DUI) is a project of the Water Resources Division (WRD) of the National Park Service (NPS) established to meet certain goals created in response to the [Government Performance and Results Act](#) of 1993 (GPRA). One water resources management goal established by the Department of the Interior (DOI) in response to GPRA requires its bureaus to track the percent of DOI managed surface waters that are meeting [Clean Water Act \(CWA\) water quality standards](#). This goal requires an accurate inventory that spatially quantifies the surface water hydrography that each bureau manages and a procedure to determine and track which waterbodies are or are not meeting water quality standards as determined by [Section 303\(d\) of the CWA](#). This project serves to meet this DOI goal by tracking and inventorying in a geographic information system for the NPS: (1) CWA State-designated uses; (2) CWA 303(d) quality impaired waters and causes; (3) special designations recognizing waters of exceptional quality as defined in State water quality standards; and (4) hydrographic statistics based on the United States Geological Survey (USGS) [National Hydrography Dataset \(NHD\)](#). Hydrographic and 303(d) impairment statistics based on a combination of 1:100,000 and 1:24,000 scale NHD have been completed on Servicewide basis and are available for viewing here. Information on State-designated uses and waters of exceptional quality are only available for a limited number of parks at this time.



Hydrographic & Impairment Statistics

[View hydrographic and impairment statistics by park.](#)

Abraham Lincoln Birthplace NHS

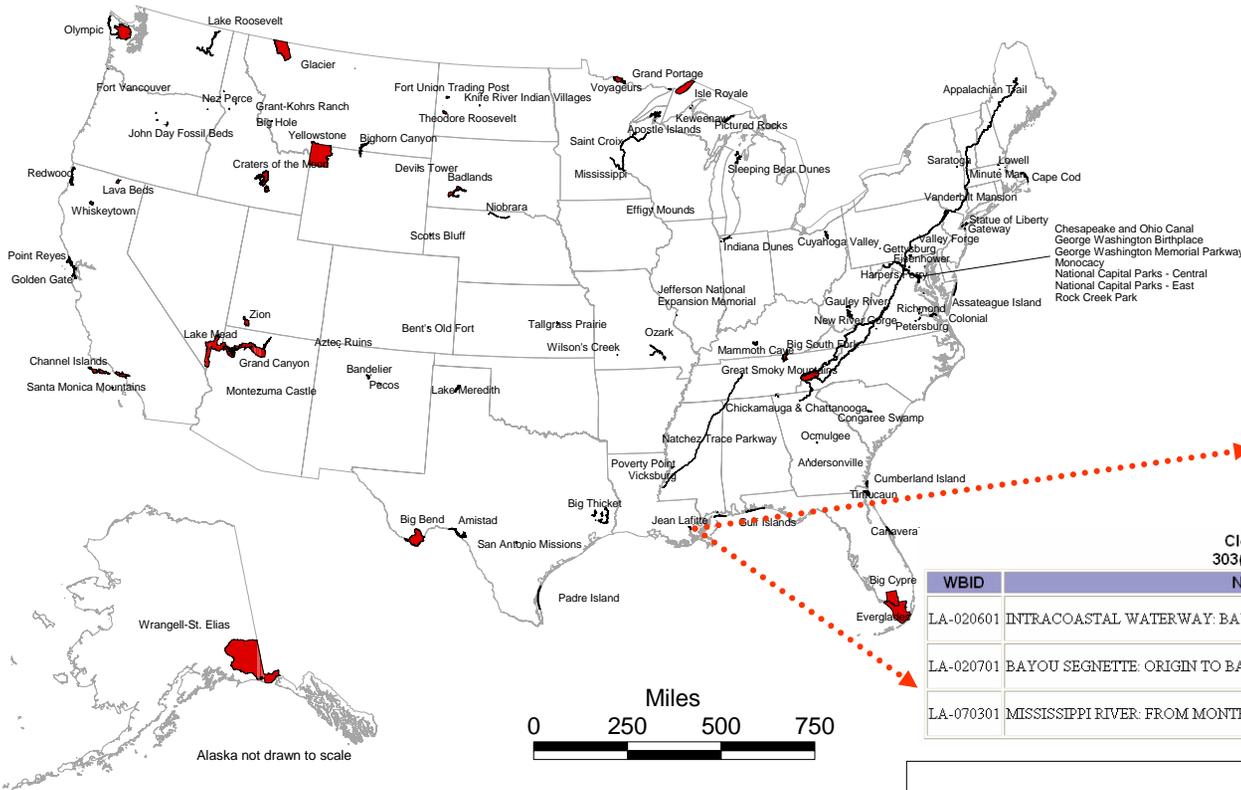
[View totalled Servicewide statistics.](#)

110 Parks Contain CWA 303(d) Impaired Waters



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Parks with Water Quality Exceedances and Use Impairments



Clean Water Act
303(d) Impairments

WBID	Name	Cycle	Pollutant(s)
LA-020601	INTRACOASTAL WATERWAY: BAYOU VILLARS TO MISSISSIPPI RIVER	2002	<input type="button" value="Submit"/>
LA-020701	BAYOU SEGNETTE: ORIGIN TO BAYOU VILLARS	2002	<input type="button" value="Submit"/>
LA-070301	MISSISSIPPI RIVER: FROM MONTE SANO BAYOU TO HEAD OF PASSES	2002	<input type="button" value="Submit"/>

Legend



Water Quality Limited Park



Sources: NPS Water Resources Division, 2004

Water Resources of the National Park System



- **137,400 miles of rivers & streams**

- **1,550 miles of CWA 303(d) impaired rivers & streams**

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Water Resources of the National Park System



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- **5,024,000 acres of lakes, reservoirs, estuaries and marine areas**

- **742,260 acres of CWA 303(d) impaired lakes, reservoirs, estuaries, and marine areas**

Figure 2
Pollutants that Exceed Water Quality Standards in Ten or More Parks

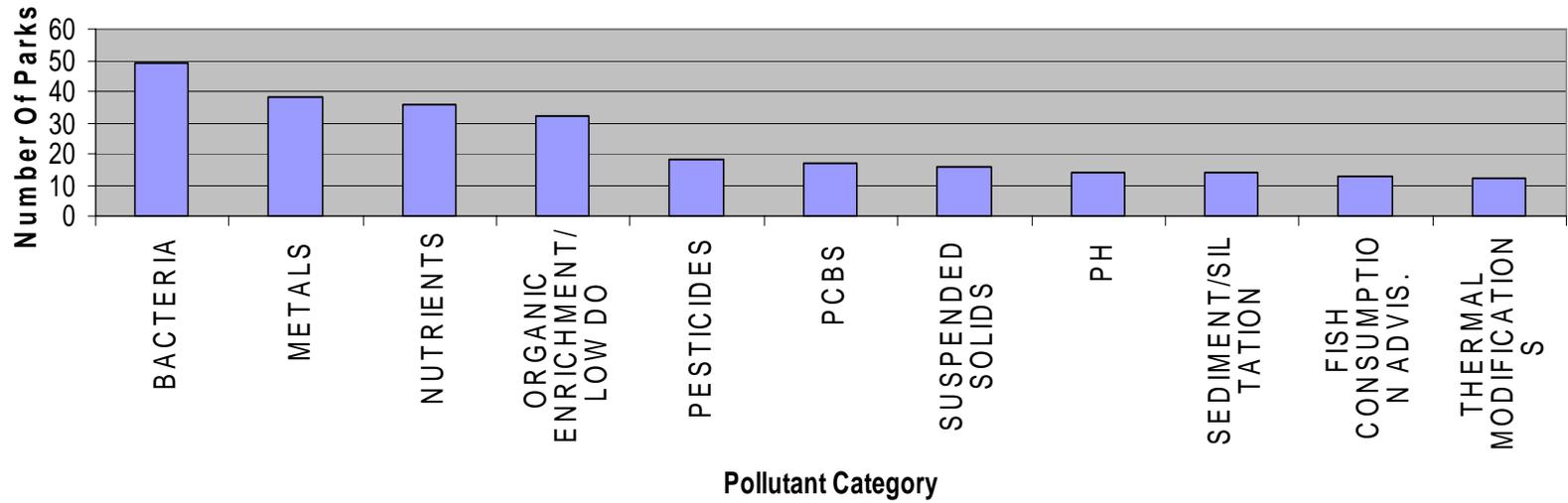
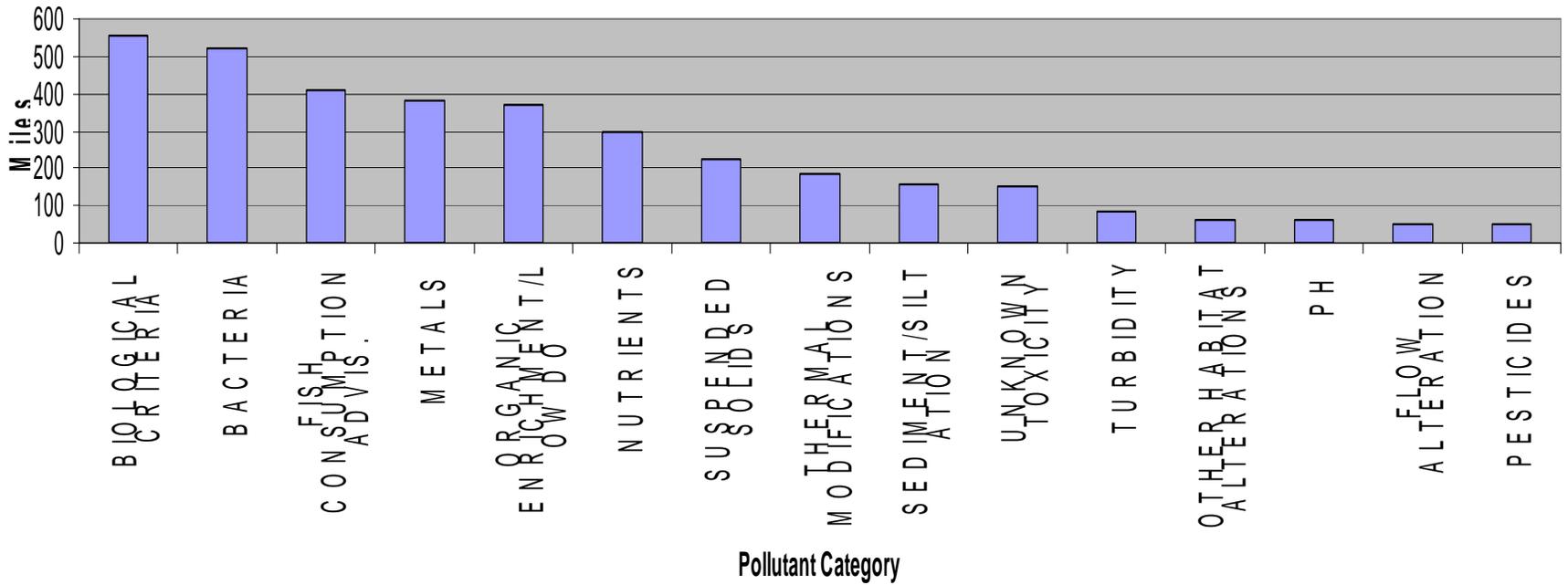


Figure 3
Pollutants that Exceed Water Quality Standards in 50 or More Miles of NPS Managed Rivers



Vital Signs WQ Data Flow

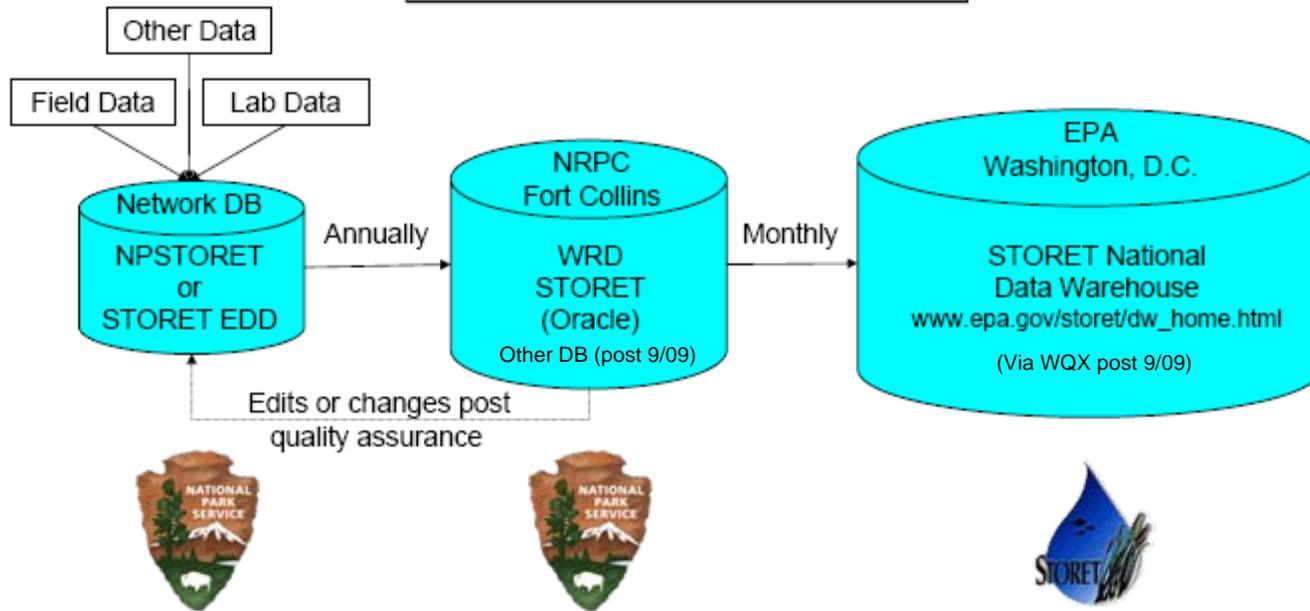
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U.S. Department of the Interior

Water Resources Division
Fort Collins, CO



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Simplified Natural Resource Challenge Vital Signs Water Quality Data Flow



<http://www.nature.nps.gov/water/infoanddata/index.htm>

NPSTORET

National Park Service
U.S. Department of the Interior

Water Resources Division
Fort Collins, CO



-  Microsoft
Access-based
-  N.R. Database
Template for
Water Quality
-  Tailored to flow
data to STORET
-  STORET-lite



Virgin Islands National Park, VI

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NPSTORET Main Switchboard

National Park Service
U.S. Department of the Interior

Water Resources Division
Fort Collins, CO



NPSTORET Main Switchboard [?] [X]

Delete Org & All its Data ... <--- Alpha Testers

Copy Org & All its Data from NPSTORET Back End ... <--- System Users



Main Templates

About ...

Projects

Stations

Metadata

Results

Reports & Stats

Import ...

Options ...

Exit

Available Organizations:

Select the Organization Whose Data You'd Like to Edit or Click "Add New ...":

CUPN	Cumberland Piedmont Network
CUVA	Cuyahoga Valley National Park
GRBA	Great Basin National Park
GRYN	Greater Yellowstone Inventory and Monitoring Network

Add New ...

Available Log In IDs:

Select a Log In ID for this Organization or Click "Add New ...":

KARST	Joe	Meiman
KJS	Katie	Seadler
SHEPARD	Shepard	McAninch
TOM	Tom	Diggs

Add New ...

NPSTORET v.0.97
April 4, 2006

Re-Link ...

STORET Ref. Tables v.0.97
April 4, 2006

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Cumberland
Project II

Characteri

- Atrazine
- Atrazine
- Cl
- Cl
- DO conc
- e. Coli
- FC Field
- Fecal Lab
- F1
- NO2
- NO3
- pH
- pH
- pH
- SO4
- Total Colif
- Turbidity
- Results fil
- Exclude Q
- Project = I
- Censored

Mammoth Cave National Park

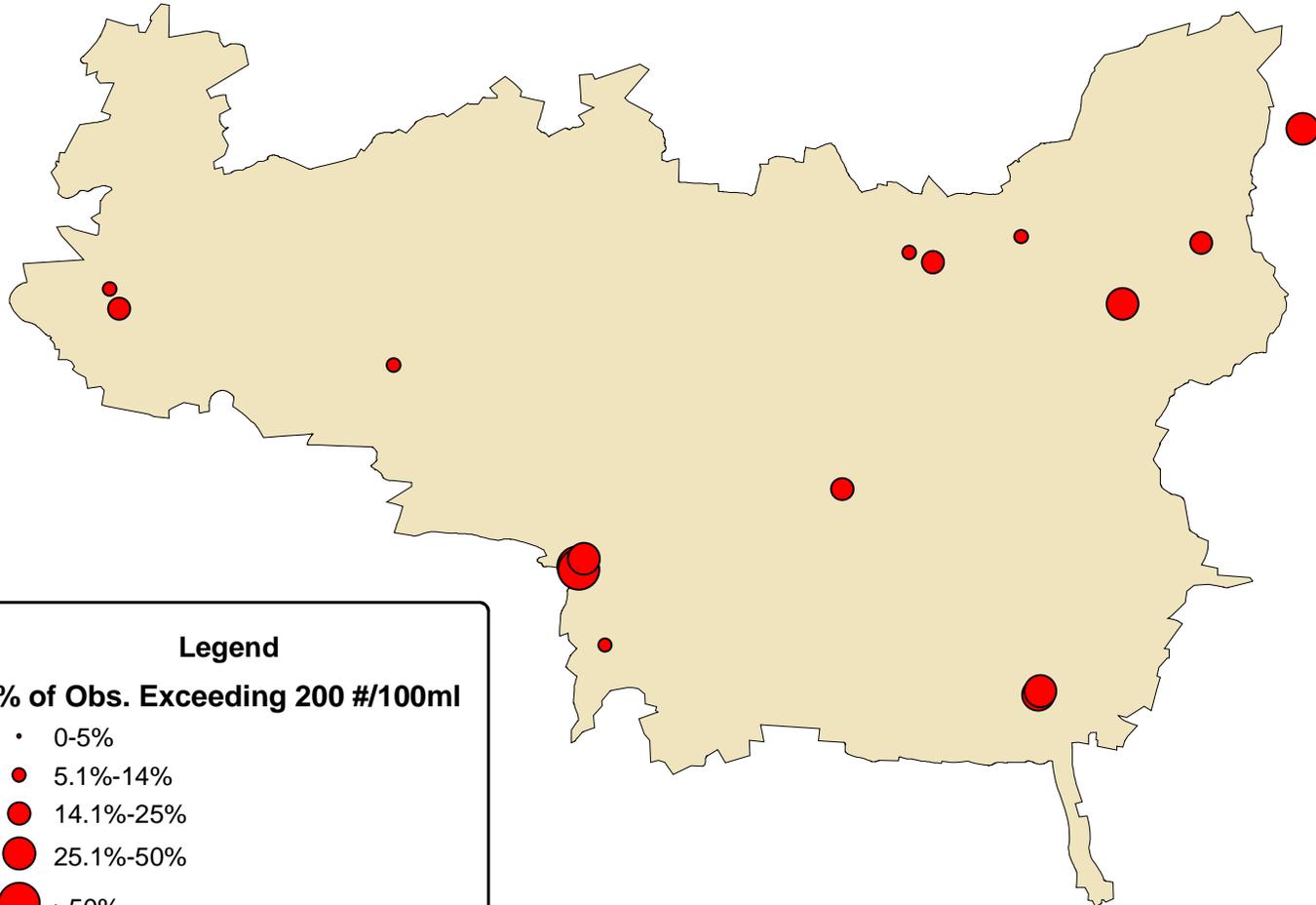
% of Observations Exceeding Fecal Coliform Criterion



Project
2005

Prop.

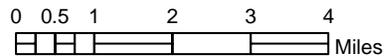
- 0.00
- 0.00
- 0.00
- 0.00
- 0.13
- 0.15
- 0.46
- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
- 0.04
- 0.02



Legend

% of Obs. Exceeding 200 #/100ml

- 0-5%
- 5.1%-14%
- 14.1%-25%
- 25.1%-50%
- >50%



4

Source: NPS Water Resources Division 2005



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