

# The Big Picture: What we are Doing and Why

Integrating Monitoring Information into Park Operations  
Maximizing the Use and Relevance of I&M Results



- Key laws and policy. Marching orders from Congress and OMB – why we received the funding and what we’re accountable for.
- “Condition-based Management” – the role of the I&M network in providing data for management decision-making, park planning, and performance management.
- Three products with immediate management applicability that promote long-term program sustainability.
- Latest developments on IRMA (online decision support system)



*"The Committee applauds the Service for recognizing that the preservation of the diverse natural elements and the great scenic beauty of America's national parks and other units should be as high a priority in the Service as providing visitor services. A major part of protecting those resources is knowing what they are, where they are, how they interact with their environment and what condition they are in.*

*This involves a serious commitment from the leadership of the National Park Service to insist that the superintendents carry out a systematic, consistent, professional inventory and monitoring program, along with other scientific activities, that is regularly updated to ensure that the Service makes sound resource decisions based on sound scientific data."*

*- FY 2000 Congressional Appropriations Language*



NPS policies and federal law require us to know the condition of natural resources in order to conserve parks "unimpaired for future generations".



*"The Service will also strive to ensure that park resources and values are passed on to future generations in a condition that is as good as, or better than, the conditions that exist today."* –

*NPS Management Policies*

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."*

National Parks Omnibus  
Management Act of 1998:

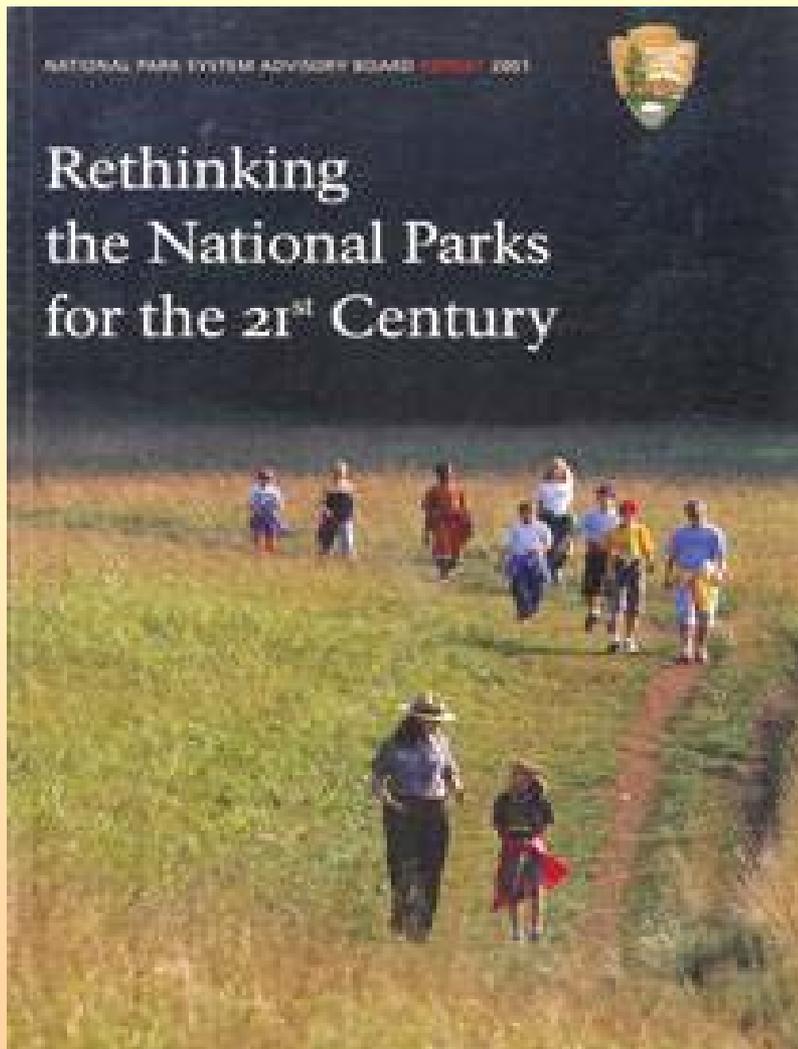


*"The trend in the condition of resources of the National Park System shall be a significant factor in the annual performance evaluation of each superintendent of a unit of the National Park System"*



“Decision makers and planners will use the best available scientific and technical information and scholarly analysis to identify appropriate management actions for protection and use of park resources”.

- NPS Management Policies



“A sophisticated knowledge of resources and their condition is essential. The Service must gain this knowledge through extensive collaboration with other agencies and academia, and its findings must be communicated to the public. For it is the broader public that will decide the fate of these resources.”

**Source: Rethinking the National Parks for the 21st Century. A Report of the National Park System Advisory Board, July 2001**

# The I&M Program

Park Management Informed by Scientific Information



## **Strategic, long-term program designed to:**

Routinely collect, manage, analyze, and report data on the condition or “health” of a modest set of natural resources.

Provide some local scientific expertise to all 270+ parks through the use of shared positions.

Promote integration and cost-sharing across programs and disciplines through a flexible but coordinated approach.

Make data and information more available and useful by promoting good data management/analysis/reporting practices.

## **Primary Audience:**

Park Managers and Planners at the local, park level

# Core Duties of I&M Network Staff:



Using shared staff and funding to facilitate core inventories and do long-term monitoring of a modest set of vital signs:

1. **Determine status and trends in the condition of a few key natural resources for each park, and**
2. **Effectively deliver information to park managers, planners, interpreters, scientists, and other key audiences.**

**I&M is NOT a Stand-Alone Program  
(parks wouldn't get as much if it were)**

# Key Uses for I&M Data and Information



- **Management decision-making** informed by scientific information
  - Triage: allocating limited funding and staff
  - Prioritizing projects and funding requests
- **Park Planning** - connecting science and management
  - Analysis of current condition vs. where you want to be; develop strategies to get there
  - Developing reference conditions, targets
- **Performance Management** - reporting trends in resource condition and demonstrating results at the local and national level
- Data and information are used by park staff, interpreters, others to **develop "stories" that inform others**; knowledge and appreciation leads to decisions that benefit our natural resources

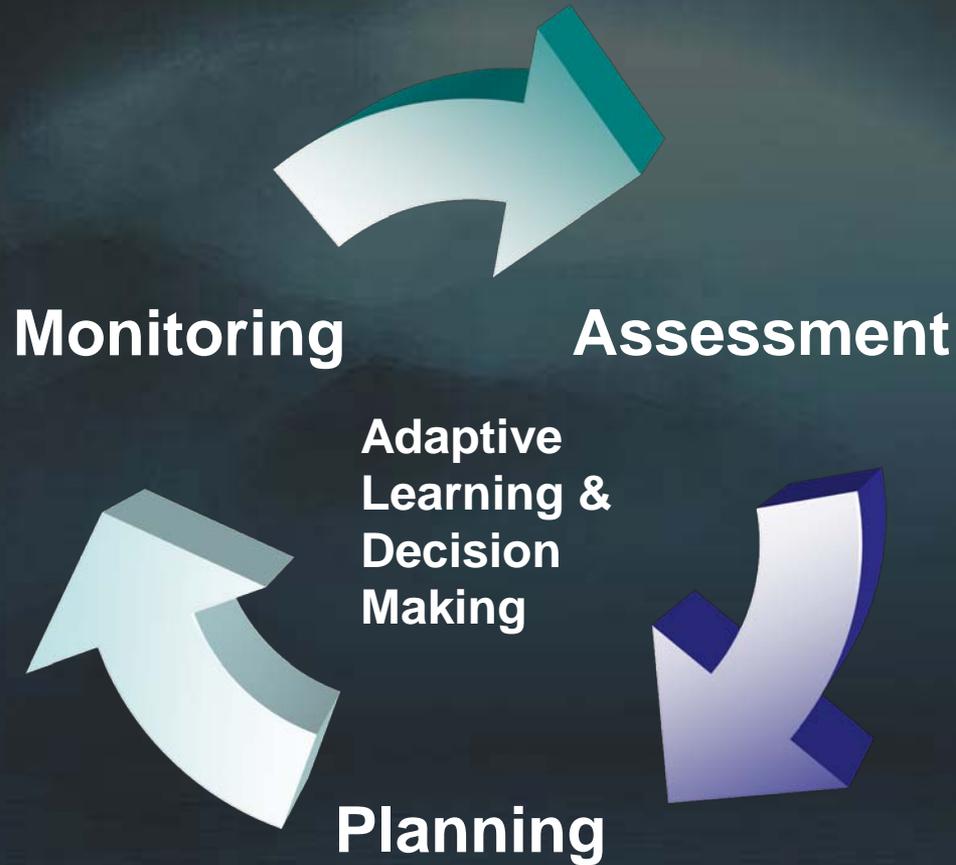
A sunset scene with a bright sun low on the horizon, casting a warm glow over a range of dark, silhouetted mountains. The sky is filled with soft, colorful clouds in shades of orange, red, and purple.

# ***The Role of I&M Networks in Developing and Effectively Delivering Scientific Information***

**A Logical Sequence as part of Park Operations and the Planning Process:**

**12 Core Inventories**  
**Establish Monitoring Networks; Build Expertise**  
**Natural Resource Condition Assessments**  
**Resource Stewardship Strategy**

# Adaptive Management Cycle





# Yellowstone National Park

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## 2008 Report to the Superintendent

### Vital Signs

**DRAFT**



## Executive Summary

The Greater Yellowstone Inventory and Monitoring Network began planning a system of Vital Signs in 2001 to monitor ecological integrity in three National Park Service (NPS) units: Yellowstone and Grand Teton National Parks, and Bighorn Canyon National Recreation Area.

the park. The Greater Yellowstone Ecosystem (GYE) grizzly bear population has increased from an estimated 136 bears to 549 in 2007. In 2007, the U.S. Fish and Wildlife Service announced that the GYE grizzly bear population segment had recovered sufficient numbers and distribution to be removed from the list of threatened species protected under the Endangered Species Act. There were 34 active bald eagle nests observed in 2007 and they produced 26

Resource Category	Indicators	Measures	Current Condition 2008	Reference Condition <small>(see refs. next page)</small>	Goal Met?
Ecosystem Drivers	Climate	precipitation temperature	below average above average	(±50 years)	N/A
	Fire	acres burned	4,247	(median 1972–present)	N/A
	Yellowstone Volcano	earthquakes uplift/subsidence	1,256 18 cm uplift since 2004	—	N/A
Landscape-scale Indicators	Air Quality	six indicators	decline in one indicator: wet deposition of ammonium	national standards	
	Amphibians				
	Landbirds				
	Water Quality			national standards	
Rare and Sensitive	Bald Eagles	# nesting pairs # fledglings	19 26	≥20 ≥15	yes
	Bighorn Sheep	# sheep # lambs/100 ewes	353 northern range 2008 34 lambs/100 ewes	300–500	yes
	Gray Wolves	# wolves YELL # breeding pairs YELL	171 10	≥80 ≥8	yes
	Grizzly Bears	# bears GYE ≥2-year-old female mortality	596 9.5%	500 ≤9% of females	yes
	Pronghorn	# pronghorn	319	300–600	yes
	Trumpeter Swan	# resident adults # nesting pairs # fledglings	8 2 2	≥20 7 2	no
	Westslope Cutthroat Trout (stream)	km of historical habitat occupied	<1% of 1,031 km	50–75%	no
	Yellowstone Cutthroat Trout (lake)	# spawners at Clear Creek	537	20,000–30,000	no
	Yellowstone Cutthroat Trout (stream)	km of historical habitat occupied	75% of 4,446 km	50–75%	yes
Stressors	Aquatic Nuisance Species	# ANS (% composition)	2 of 850 (<1%)	0–1%	yes
	Invasive Plants			GPRAs-based?	
	Lake Trout (Yellowstone Lake)	# Lake Trout (LT) removed # LT CPUE	270,000 LT removed CPUE=2.37	CPUE 0.5–1.0	no
	Land Use				
	Mountain Goats	# goats	175–225 in and near YELL	0	no
	Visitor Use				
	Wildlife Diseases				
Focal Resources	Bison	# bison	3,000	2,500–4,500	yes
	Elk (northern range)	# elk	6,279	4,000–15,000	yes
	Effects of Oversnow Vehicles • effects of winter recreation on wildlife • winter air quality • winter soundscapes			• EIS standards • EIS standards	
	Geothermal Systems				
	Whitebark Pine	% infection rate, blister rust mountain pine beetle	20% infection rate	0%	no

## RARE AND SENSITIVE

### Bald Eagles (YNP)

Bald eagles, which usually mate for life and may reuse their nest year after year, occupy territories near major rivers in Yellowstone and Grand Teton. Juveniles may migrate to habitat in the fall but many adults stay in the parks year-round. Winter numbers are also expanded by the arrival of bald eagles that breed farther north. New territories in Grand Teton and population expansion in recent years. In 2005 and again in 2006, a record number of nesting pairs was counted in both Yellowstone (34) and Grand Teton (14). Although a pair produces an average of two eggs once a year while nesting, the number of eagles that successfully fledge annually depends partly on weather. For example, a large number of Yellowstone nest failures in 2006, attributed primarily to wet weather and strong winds, decreased to 10 numbers from 26 in 2005. In 2007, Grand Teton again experienced record productivity (16), largely due to mild temperatures, and in Yellowstone, fledglings tied the record of 26 set in 2005.

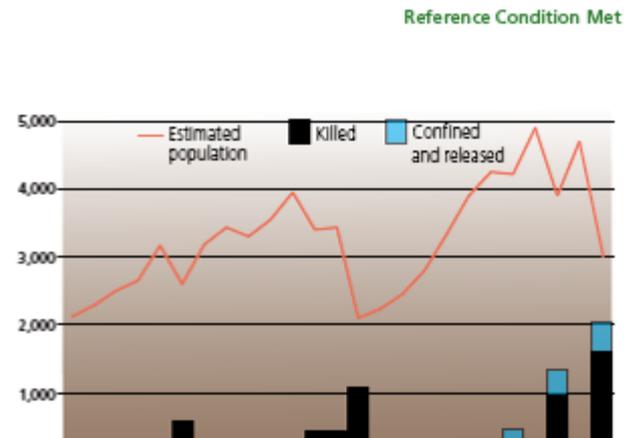
### Gray Wolves (YNP)

In the first years after restoration, the wolf population increased by up to 70% annually—as the newly formed packs successfully establish territories with sufficient prey, which has been elk. After a decline in 2005 when pup survival was especially low because of disease, the wolf count in Yellowstone National Park rebounded to 171 wolves in 11 packs in 2007. Evidence that the park has been bumping against its ecological carrying capacity for wolves may be seen in the departure of some packs from the park and the increasing mortalities from conflicts between packs. The effects of wolf restoration on prey species and predators and scavengers are only beginning to be understood. What extent wolves have been a factor in the decline in stone elk population since the mid-1990s or the possible resurgence of willow in some areas will continue to be debated among biologists.

## FOCAL RESOURCES

### Bison (YNP)

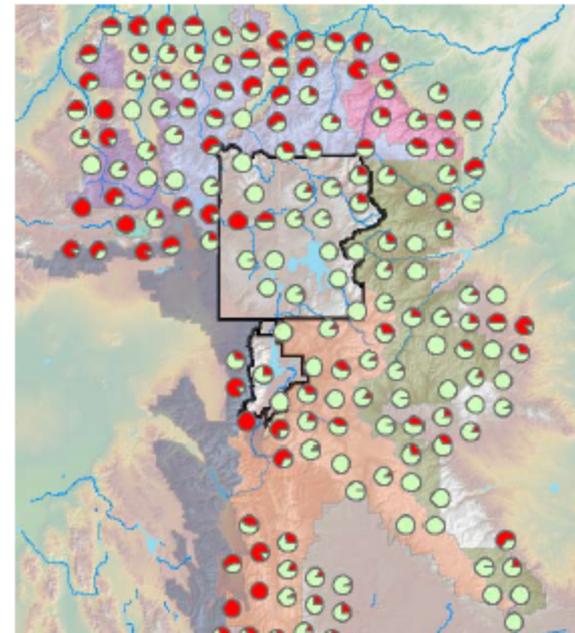
Although poaching reduced the park's bison population to less than 50 at the turn of the 20th century, it grew to more than 2,000 by the 1980s and began expanding its use of lower elevation winter range. The northern sub-population expanded westward along the Yellowstone River into the Gardiner Basin, the interior sub-population expanded into the upper Madison River Valley westward to Hebgen Lake, and part of it began migrating to the northern range. The number of mortalities that occur as part of boundary control operations near Gardiner and West Yellowstone, Montana, reflects annual fluctuations in winter bison movements out of the park. When the estimated 2007 summer population of 4,700 bison encountered a winter of heavy snowfall, hazing efforts along the north boundary became ineffective because of the large



### Whitebark Pine (GRYN)

An interagency whitebark pine monitoring protocol was established to determine the status and trend in blister rust infection and to estimate the survival of individual whitebark pine trees through time. Preliminary estimates suggest the proportion of live trees infected with white pine blister rust is  $0.20 (\pm 0.037 \text{ se})$  in the GYE. This is the first overall estimate of white pine blister rust calculated for the entire GYE based on a probabilistic sample design. The number of live trees per transect ( $n = 176$ ) ranged from 1 to 220 for a total of 4,774 live trees examined. Approximately 86% of the blister rust cankers detected were on branches, as opposed to the main bole of the tree. Bole cankers are generally more detrimental to the survival of a tree than those found on branches. These preliminary estimates apply only to the current status of whitebark pine.

Aerial surveys conducted by the U.S. Forest Service Forest Health Protection Program between 2000 and 2005 documented higher-than-normal levels of mountain pine beetle activity in whitebark pine during this period. Based on aerial detection, approximately 16% of whitebark pine dominated forest stands showed some level of mountain pine beetle mortality by the end of 2005. During establishment of permanent transects between 2004 and 2007, the presence or absence of mountain pine beetle was recorded for

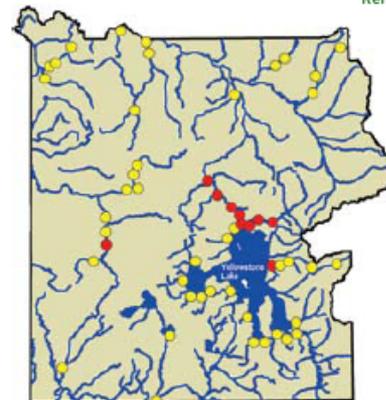


# STRESSORS

## Aquatic Nuisance Species (GRYN)

In Yellowstone, three ANS are having a significant detrimental effect:

- Lake trout (*Salvelinus namaycush*), illegally introduced in Yellowstone Lake where they feed on the native Yellowstone cutthroat trout. The gillnetting of more than 250,000 lake trout since 1994 has saved many more cutthroat trout and slowed the lake trout population growth, but whether this effort will keep the lake trout population suppressed remains uncertain.
- Confirmed in the park in 1998, *Myxobolus cerebralis*, a parasite that causes whirling disease in cutthroat trout and other species, appears most concentrated in the Yellowstone Lake watershed, where it has diminished the cutthroat trout in Pelican Creek. It's also been found in the Firehole and Yellowstone rivers.
- First detected in the park in 1994, New Zealand mud snails (*Potamopyrgus antipodarum*), which form dense colonies and compete with native species, are now in all of the major watersheds.



Reference Condition Met

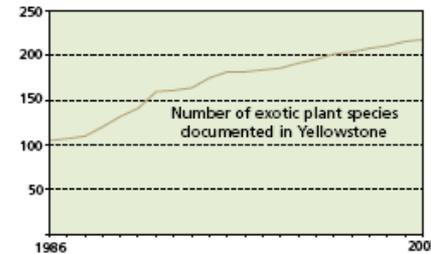
● Positive for *Myxobolus cerebralis*  
● Negative for *M. cerebralis*

Stream sites in Yellowstone examined by the U.S. Fish and Wildlife Service Wild Fish Health Survey or by sentinel cutthroat trout fry exposures, 1995–2005.

## Invasive Plants (GRYN)

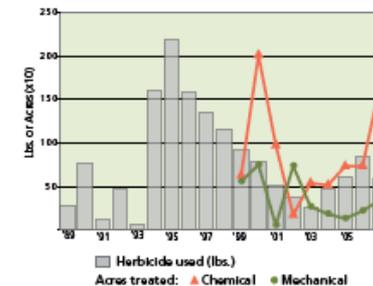
The full extent of non-native plants in Yellowstone is not known, but the number of species that has been documented in the park has increased from 105 to 218 since 1986. (Yellowstone also has about 1,300 native plant species.) The increase in documented non-native species is primarily a result of ongoing survey efforts, but it includes an unknown number of species that have arrived in the park during the last two decades.

Non-native plant species in the park are prioritized according to the threat they pose to park resources and the prospects for successful treatment. Most of the 31 species targeted for treatment in 2007 (about 2,000 acres) are listed by the states of Idaho, Montana, and/or Wyoming as “noxious weeds,” which means that they are foreign species considered detrimental to agriculture, aquatic navigation, fish and wildlife, or public health. The 2007 priority list includes 15 species such as leafy spurge (*Euphorbia esula*) that infested less than one acre and can be eliminated if treated when the outbreak is still small. Some of the other targeted species such as spotted knapweed (*Centaurea maculosa*) appear so frequently that stopping them from spreading is the primary goal. This strategy has helped prevent high priority invasive species from moving into backcountry areas where control is more difficult. However, a 2007 survey of 600 miles of trails and 282 designated backcountry campsites found three high priority species at 12 campsites.



Exotic plant species documented in Yellowstone as of 1986 to 2007.

Not all of the species recorded by 2007 are known to be present in the park now, but most are.



Pounds of herbicide used to treat exotic plants and acres receiving chemical and mechanical treatment. (Comparable data for acres treated before 1999 is not available.)

Search

## Topics

- BIOLOGICAL RESOURCES
- PHYSICAL RESOURCES
- LANDSCAPE PROCESSES
- HUMAN USE
- ARCHEOLOGY
- HISTORY
- ETHNOGRAPHY
- MUSEUMS & COLLECTIONS
- SCIENCE-BASED MANAGEMENT

## Park Units

- BIGHORN CANYON
- GRAND TETON
- YELLOWSTONE

## Get Involved

- RESEARCH
- FIELD INSTITUTES
- OUTREACH
- ABOUT US

## Products

- RESOURCE BRIEFS
- ATLAS OF YELLOWSTONE
- YELLOWSTONE SCIENCE
- PHOTOS & MULTIMEDIA
- REFERENCES & LINKS
- NPS DATA STORE
- BOOKS, MAPS & DVDS

## Welcome



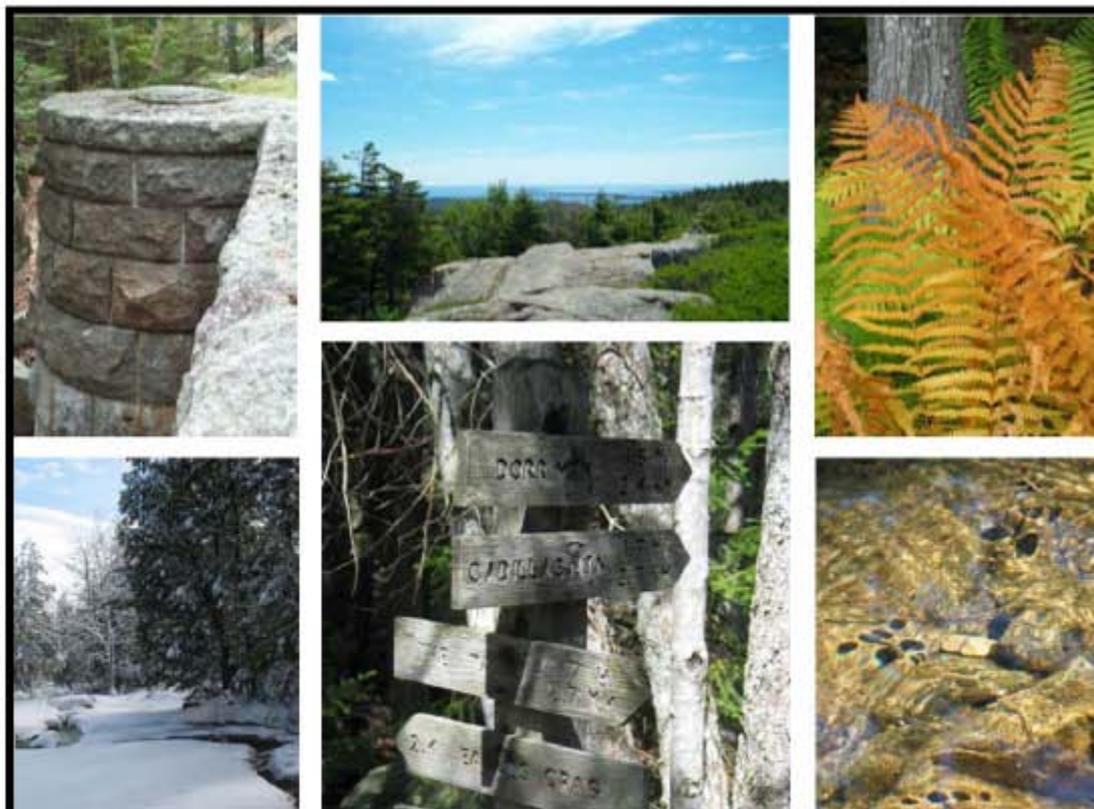
The Greater Yellowstone Science Learning Center is a portal to information about the natural and cultural resources of **Yellowstone** and **Grand Teton** (including John D. Rockefeller, Jr. Memorial Parkway) national parks and **Bighorn Canyon** National Recreation Area. By reporting on what has been learned from research and monitoring in these parks, we hope to increase public awareness of new findings and encourage studies that will help guide park management decisions. The National Park Service has set up **Research Learning Centers** as public-private partnerships that promote the sharing of scientific knowledge about the parks.

<http://www.greateryellowstonescience.org>



# Assessment of natural resource conditions in and adjacent to Acadia National Park, Maine

Natural Resource Report NPS/NRPC/WRD/NRR—2008/069



## Streams

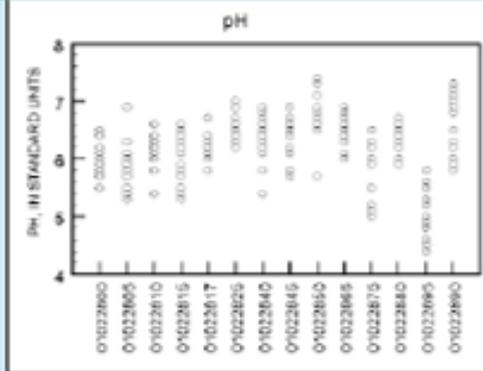
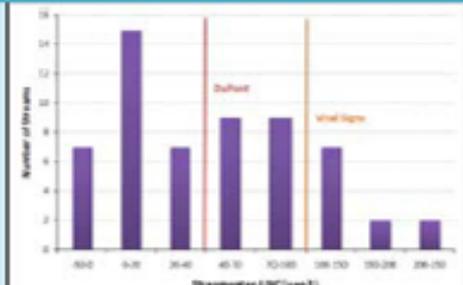
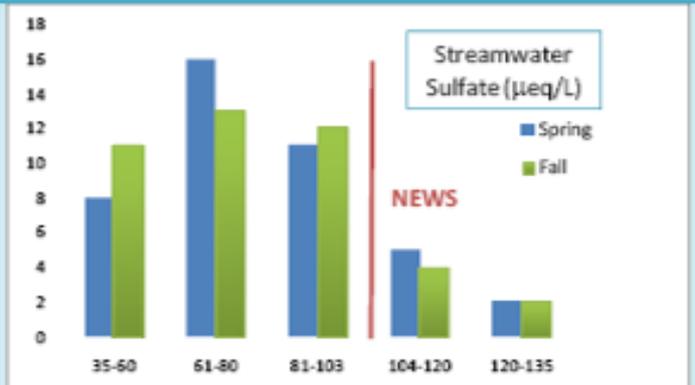
Metric	Condition	Data Summaries and/or Refs.
<p><b>pH*</b></p>	<p><b>GOOD / CAUTION</b></p> <ul style="list-style-type: none"> <li>• 1 out of 14 streams exhibits pH consistently &lt; 6.0.</li> <li>• Episodic acidification documented for several streams.</li> </ul>	 <p>(Fig. 22)</p>
<p><b>ANC*</b></p>	<p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• Many streams have ANC &lt; 40 ueq/L, the tolerance criterion of DuPont <i>et al.</i> (2005) for aquatic organisms (especially fish). However, NETN uses a more protective threshold of 100 ueq/L.</li> </ul>	 <p>(Fig. 23)</p>
<p><b>Sulfate</b></p>	<p><b>GOOD</b></p> <ul style="list-style-type: none"> <li>• Most sites exhibit lower SO<sub>4</sub> concentrations than NEWS reference condition of 104 ueq/L<sup>12</sup>.</li> <li>• Concentrations declining since 1980s (Kahl <i>et al.</i> 2004)</li> </ul>	 <p>(See Fig. 42 for full data)</p>

Table 21. Resource stressor matrix showing extent of problem and knowledge base.

THREAT / STRESSOR	RESOURCE - COMPONENT									
	Terrestrial		Lakes & Streams		Wetlands & Estuaries		Grnd water	Marine		
	<i>Abiotic</i>	<i>Biotic</i>	<i>Abiotic</i>	<i>Biotic</i>	<i>Abiotic</i>	<i>Biotic</i>	<i>Abiotic</i>	<i>Abiotic</i>	<i>Biotic</i>	
UV radiation	--	Unknown	--	Inf	--	Inf	--	--	Unknown	
Visibility	G	--	--	--	--	--	--	--	--	
Ozone	G	G	--	--	--	--	--	--	--	
Atm. deposition: acidity etc.	G	G	G	Inf	Unknown	Inf	--	Unknown	Unknown	
Nutrient enrichment	G	Inf	G	Unknown	G	F	G	P	Inf	
Mercury	G	P	G	F	F	P	Unknown	G	Unknown	
Other contaminants	P	P	P	Unknown	P	Unknown	P	P	P	
Microbial contam.	--	--	F	P	Unknown	Unknown	Unknown	P	F	
Fire	G	G	--	--	--	--	--	--	--	
Altered hydrology	--	--	F	Unknown	P	P	F	--	--	
Habitat loss/impairment	--	Inf	--	F	--	F	--	--	Inf	

**KEY**

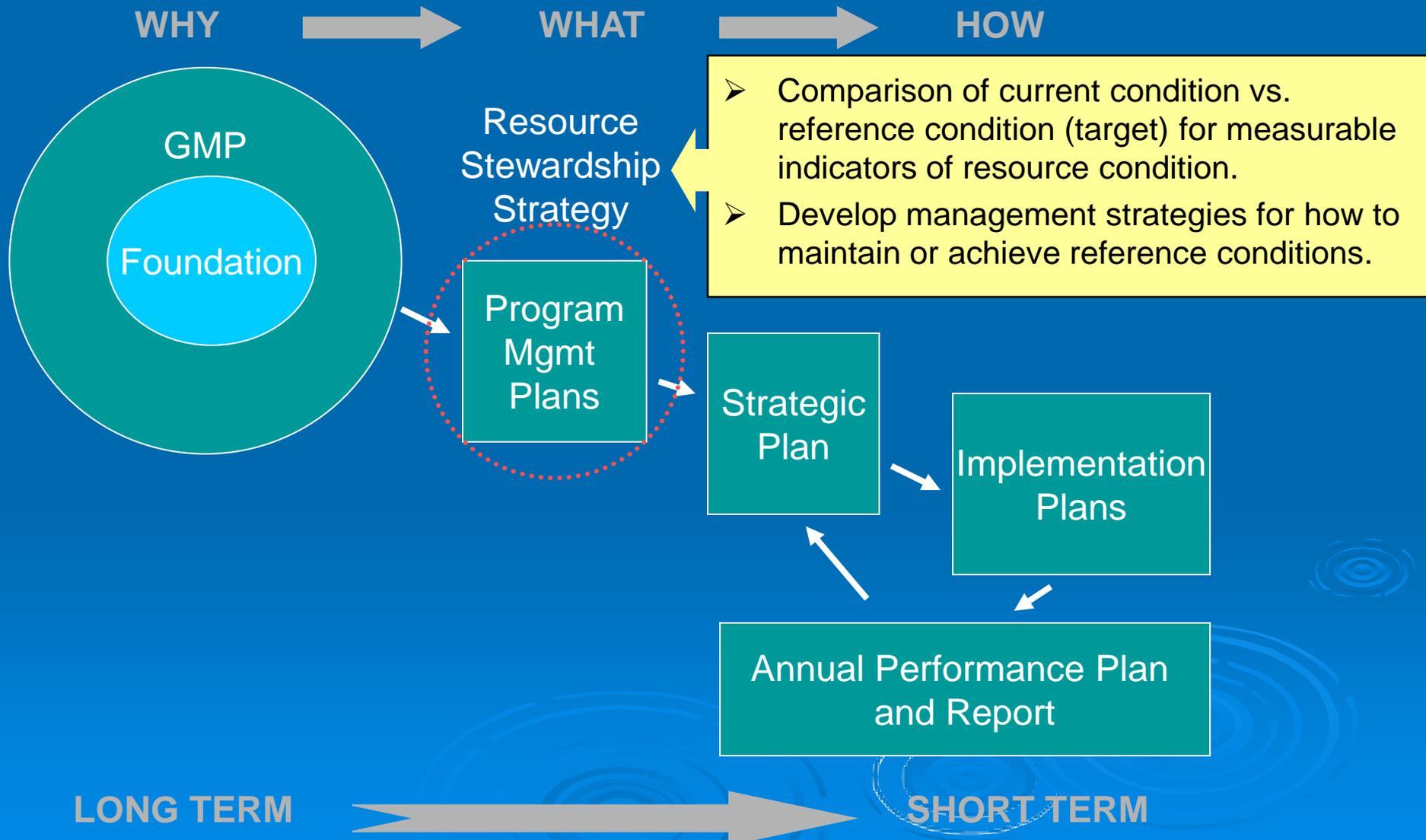
Extent of problem	OK	EP: Existing problem	PP: Potential problem	Unknown
Knowledge base	G = Good	F = Fair	P = Poor	Inf = Inferential

# Rock Creek Park – Natural Resource Condition Assessment

Important Resources and Values	Indicators	Measures	Current Condition	Acceptable Range	Goal Met?
Stream Habitat Zone	<b>Physical Habitat</b>	Physical Habitat Index	61.3	>42	Yes
	<b>Hydrology</b>	Stage	0.4 ft	0.1 - 0.5	Yes
		Flow	0.4 ft/sec	0.1 - 0.5	Yes
		Discharge	1.7 cfs	0.6 - 6.0	Yes
	<b>Water Chemistry</b>	pH	7.7	6 - 8.5	Yes
		Dissolved Oxygen	7.2 mg/L	>= 5 (Mar-Jun)	Yes
		Temperature	Never exceeded	Always < 32.2°C	Yes
	<b>Nutrient Dynamics</b>	Nitrate	2.2 mg/L	0.7	No
		Ammonia	0.12	0.442	Yes
		Phosphorus	97.1 µg/L	0 - 36.5	No
<b>Macroinvertebrates</b>	Index of Biological Integrity	2.62	3 - 5	No	
<b>Freshwater Fish</b>	Index of Biological Integrity	3.08	3 - 5	Yes	
Seeps and Wetlands	<b>Rare Invertebrates</b>	# Occupied Sites	5	5	Yes
	<b>Adult Amphibians</b>	Occupied Habitat	30% of habitat	20 - 80	Yes
Forest Communities	<b>Forest Condition</b>	% Seedling Regeneration	0% of plots	50 - 90 %	No
		% Exotic Species	66% of plots	0 - 5%	No
		% Insect Pests	0% of plots	0 - 1%	Yes
	<b>Forest Birds</b>	Species Richness	TBD	TBD	
	<b>White-tailed Deer</b>	Deer Density	22 per km <sup>2</sup>	4 - 8	No
	<b>Landcover/Landuse</b>	% Park Forested Area	85% of park	60 - 90%	Yes
		Connectivity	340 m between patches	0 - 360 m	Yes
		Core Habitat Area	50% of patches	80 - 100%	No
<b>Landscape Condition</b>	% Impervious Surface	24% of watershed	0 - 10%	No	
Native Wildlife	Wood Thrush	Visitor Encounters	Encountered	Encountered	Yes
	White-tailed Deer	Road Mortality	39 deaths / yr	0 - 30	No

# Park Planning - Connecting Science and Management

## NPS PLANNING FRAMEWORK



## Herbert Hoover NHS – Resource Stewardship Strategy (simplified table)

Important Resources and Values	Indicators	Current Condition	Target Condition
Prairie Community	Shannon Diversity – Native Plants	1.51	>2.63
	Invasive Plant Relative Cover	11%	<8%
	# of Grassland Bird Species	5	5
Stream Community	State Water Quality Standards	Not Met	Met
	Proper Functioning Condition	Nonfunctional	Functioning

# Connect the Dots

A strategic, long-term framework for coordinating the efforts of multiple programs and funding sources over a period of years to decades.

Connecting Science to Park Management through the Planning process.



# Contributors/Supporters

## Connect the Dots Framework:

- NPS Planning Program
  - Kerri Cahill, Patrick Malone
- Resource Stewardship Strategy
  - Gary Mason
- Watershed Condition Assessments
  - Jeff Albright, Bill Jackson
- WRD Planning Program
  - Don Weeks, Dave Vana-Miller
- Inventory and Monitoring Program
  - Bruce Bingham, Shawn Carter, Steve Fancy
  - IMAC - I&M Advisory Council

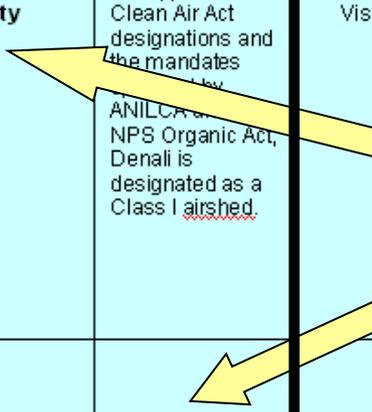
# Connect the Dots Framework

- Improves coordination and integration between NPS science and planning programs → Better Management
- Coordinates the efforts of multiple programs, agencies, & funding sources over a time frame of years to decades.
- Provides park managers and planners with summarized information about the condition of each park's fundamental and other important resources/values.
- Helps to identify data gaps and research needs (could lead to a funding initiative)

# Example of a Natural Resource Summary Table (adapted from DRAFT Resource Stewardship Strategy for Denali NP&Pres)

Fundamental and Other Important Resources and Values	Desired Conditions	Attributes	Beneficial Influences	Detrimental Influences	Indicators	Reference Condition	Management Target	Current Condition	Target Met?
<b>Air Quality</b>	Denali will achieve the highest attainable air quality levels and visibility standards consistent with the applicable Clean Air Act designations and the mandates of ANILCA and the NPS Organic Act. Denali is designated as a Class I airshed.	Visibility	<ul style="list-style-type: none"> <li>Remoteness</li> <li>Distance from industry</li> <li>Prevailing wind patterns</li> </ul>	<ul style="list-style-type: none"> <li>Coal-fired and other types of power</li> <li>Intercontinental contaminant transport</li> <li>Increasing size and frequency</li> </ul>	Visibility on clearest and haziest days, as measured for PMDS Goal 1a3	Visibility on clearest and haziest days – remains stable or improves, as measured for PMDS Goal 1a3	Visibility on clearest and haziest days – remains stable or improves, as measured for PMDS Goal 1a3	<ul style="list-style-type: none"> <li>Visibility on clearest days – improving</li> <li>Visibility on haziest days – stable</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>Yes</li> </ul>
<b>Wildlife populations, habitat, ecosystems</b>	The natural abundance, behavior, diversity, and ecological integrity of native animals as part of their ecosystems will be maintained	Natural regulation of animal numbers and distribution	<ul style="list-style-type: none"> <li>Size of protected area</li> <li>Lack of human disturbance</li> <li>Protection from hunting</li> </ul>	<ul style="list-style-type: none"> <li>Climate and vegetation change</li> <li>Potential for increased harvest in certain areas</li> <li>Disturbance in wintering areas</li> <li>Inhibition of normal migration patterns</li> </ul>	<ul style="list-style-type: none"> <li>Numbers, demography, and distribution of caribou in the Denali Caribou Herd</li> <li>Numbers and distribution of Dall's sheep</li> </ul>	Herd size and demography of each species remains within the range observed 1987-2007	Herd size and demography of each species remains within the range observed 1987-2007	<ul style="list-style-type: none"> <li>Caribou – Slowly increasing</li> <li>Moose – decreasing</li> <li>Dall's sheep – unknown</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>Yes</li> </ul>

**Park Planning Elements:**  
 Fundamental and other Important Park Resources and Values  
 Desired Conditions from GMP



# Example of a Natural Resource Summary Table (adapted from DRAFT Resource Stewardship Strategy for Denali NP&Pres)

Fundamental and Other Important Resources and Values	Desired Conditions	Attributes	Beneficial Influences	Detrimental Influences	Indicators	Reference Condition	Management Target	Current Condition	Target Met?
<b>Air Quality</b> Dena achieve higher air qu and v stand consid the at Clear desig the m speci ANILC NPS Dena desig Class I	Dena achieve higher air qu and v stand consid the at Clear desig the m speci ANILC NPS Dena desig Class I	Remoteness	Remoteness	<ul style="list-style-type: none"> <li>◇ Coal-fired and other types of power</li> <li>◇ Intercontinental</li> </ul>	Visibility on clearest and on haziest days, as measured through the agency Monitoring of Protected Visual (IMPROVE) program	Visibility on clearest and haziest days – remains stable or improves, as measured for	Visibility on clearest and haziest days – remains stable or improves, as measured for	Visibility on clearest days – improving  Visibility on haziest days –	Yes  Yes
<b>Wildlife populations, habitat, ecosystems</b>	The natural abundance, behavior, diversity, and ecological integrity of native animals as part of their ecosystems will be maintained	Natural regulation of animal numbers and distribution	<ul style="list-style-type: none"> <li>◇ Size of protected area</li> <li>◇ Lack of human disturbance</li> <li>◇ Protection from hunting</li> </ul>	<ul style="list-style-type: none"> <li>◇ Possible loss of habitat due to climate and vegetation change</li> <li>◇ Potential for increased harvest in certain areas</li> <li>◇ Disturbance in wintering areas</li> <li>◇ Inhibition of normal migration patterns</li> </ul>	<ul style="list-style-type: none"> <li>◇ Numbers, demography, &amp; distribution of caribou in the Denali Caribou Herd</li> <li>◇ Numbers, demography, and distribution of moose</li> <li>◇ Numbers and distribution of Dall's sheep</li> </ul>	Herd size and demography of each species remains within the range observed 1987-2007	Herd size and demography of each species remains within the range observed 1987-2007	Caribou – Slowly increasing  Moose – decreasing  Dall's sheep – unknown	Yes  Yes

**Science Elements:**  
 Indicators of resource condition  
 Estimates of Current Condition

# Example of a Natural Resource Summary Table (adapted from DRAFT Resource Stewardship Strategy for Denali NP&Pres)

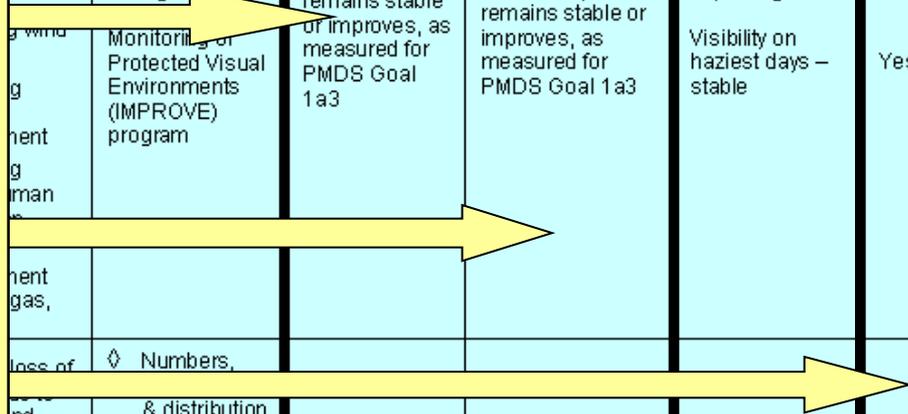
Fundamental and Other Important Resources and Values	Desired Conditions	Attributes	Beneficial Influences	Detrimental Influences	Indicators	Reference Condition	Management Target	Current Condition	Target Met?
Air Quality				<ul style="list-style-type: none"> <li>◇ Coal-fired and other types of power</li> </ul>	<ul style="list-style-type: none"> <li>◇ Visibility on clearest and on haziest days, as measured through the</li> <li>◇ Monitoring of Protected Visual Environments (IMPROVE) program</li> </ul>	<ul style="list-style-type: none"> <li>◇ Visibility on clearest and haziest days – remains stable or improves, as measured for PMDS Goal 1a3</li> </ul>	<ul style="list-style-type: none"> <li>◇ Visibility on clearest and haziest days – remains stable or improves, as measured for PMDS Goal 1a3</li> </ul>	<ul style="list-style-type: none"> <li>◇ Visibility on clearest days – improving</li> <li>◇ Visibility on haziest days – stable</li> </ul>	<ul style="list-style-type: none"> <li>◇ Yes</li> <li>◇ Yes</li> </ul>
Wildlife populations, habitat, ecosystems	<ul style="list-style-type: none"> <li>◇ Threats to biodiversity, and ecological integrity of native animals as part of their ecosystems will be maintained</li> </ul>	<ul style="list-style-type: none"> <li>◇ regulation of animal numbers and distribution</li> </ul>	<ul style="list-style-type: none"> <li>◇ Lack of human disturbance</li> <li>◇ Protection from hunting</li> </ul>	<ul style="list-style-type: none"> <li>◇ increased harvest in certain areas</li> <li>◇ Disturbance in wintering areas</li> <li>◇ Inhibition of normal migration patterns</li> </ul>	<ul style="list-style-type: none"> <li>◇ Numbers, &amp; distribution of caribou in the Denali Caribou Herd</li> <li>◇ Numbers, demography, and distribution of moose</li> <li>◇ Numbers and distribution of Dall's sheep</li> </ul>	<ul style="list-style-type: none"> <li>◇ Herd size and demography of each species remains within the range observed 1987-2007</li> </ul>	<ul style="list-style-type: none"> <li>◇ Herd size and demography of each species remains within the range observed 1987-2007</li> </ul>	<ul style="list-style-type: none"> <li>◇ Caribou – Slowly increasing</li> <li>◇ Moose – decreasing</li> <li>◇ Dall's sheep – unknown</li> </ul>	<ul style="list-style-type: none"> <li>◇ Yes</li> <li>◇ Yes</li> </ul>

**Management Elements:**

Reference conditions for indicators of condition (managers, scientists, and planners work together to develop)

Management target if different from Reference Condition

Comparison of Current Condition to Management Target

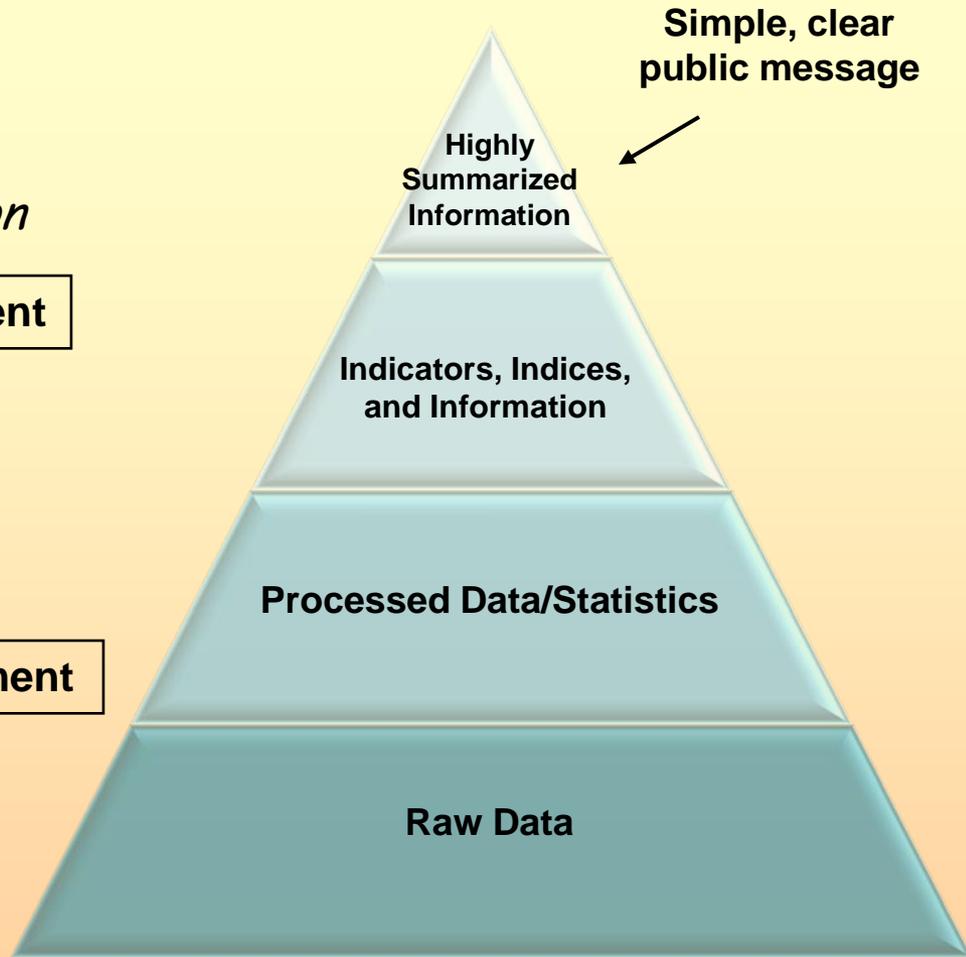


# Core Duties of I&M Network Staff:



Using shared staff and funding to facilitate core inventories and do long-term monitoring of a modest set of vital signs:

1. Determine status and trends in the condition of a few key natural resources for each park, and
2. Effectively deliver information to park managers, planners, interpreters, scientists, and other key audiences.



**Simple, clear  
public message**



**Policy makers,  
Non-Scientists**



**Use Assessment  
by experts to  
translate scientific  
findings for policy  
and decision-  
making**

**Scientists,  
Field-level  
Practitioners**

*Effective  
communication*

**Public Environment**

**Science Environment**

*Sound  
Science*

*Effective communication*

**Public Environment**

Resource Briefs  
Condition Summary Tables

Models,  
Synthesis Reports,  
Assessment Reports,  
Integrated GIS Analyses

Data Summaries,  
Technical Reports, Maps,  
Trend Analyses,  
Processed Data

**Science Environment**

*Sound Science*

Databases, GIS Products, Spreadsheets  
Metadata, Catalogs, NPS Data Store

Policy makers,  
Non-Scientists



Partnerships with others to help communicate scientific findings to the public and for policy and decision-making

Scientists,  
Field-level Practitioners

I&M Network Staff need to develop and deliver products to parks at all levels of the pyramid; set aside adequate time and funding to make sure we provide park managers and planners with information, not just data.

# Three products with near-term management applicability that promote long-term program sustainability

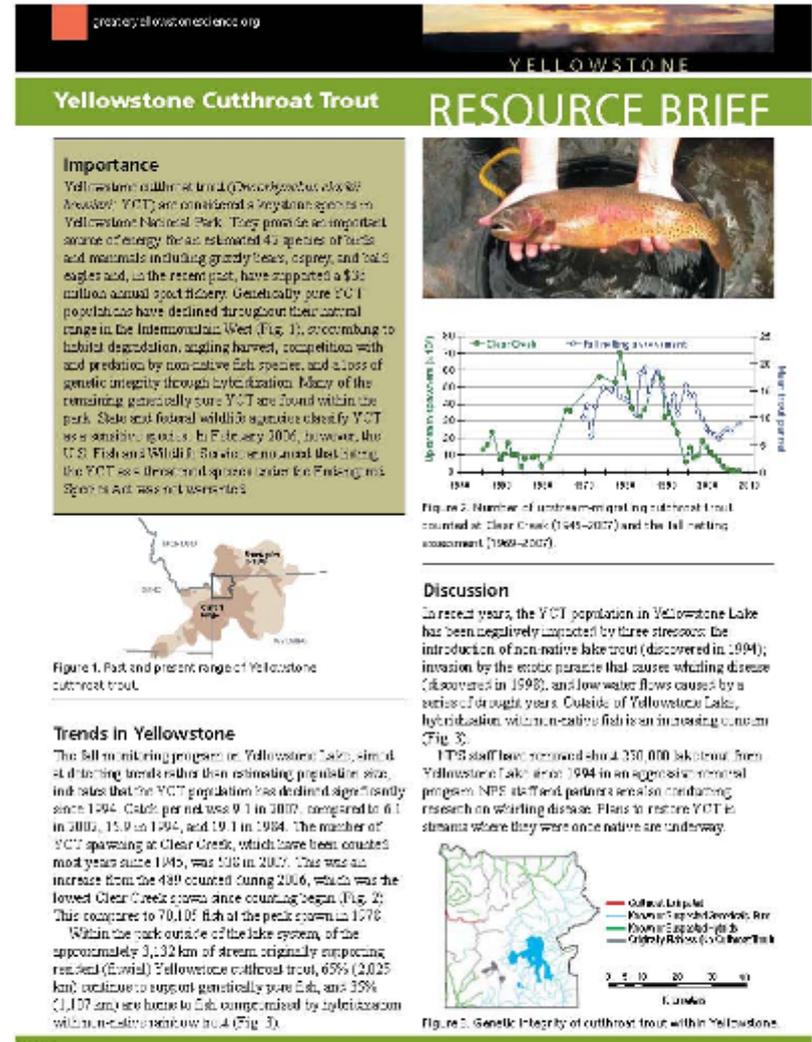
- Resource Briefs
- Parallel set of intranet and internet websites to provide current results for each vital sign; emphasis is on internal audiences
- Natural Resource Summary Tables

# Resource Brief

## One page synopsis of a resource topic:

- Why is it Important?
- Status and Trend
- Management Implications; So What?

“Top of the pyramid” executive summary; can drill down to the underlying science, reports, details if interested.



**Air Quality**

**Importance**

Even at relatively low levels, Greater Yellowstone, air pollution leach nutrients from soil, injure fertilize lakes and streams. The 1977 designated Yellowstone the 156 national parks and wilderness areas, but the high-elevation basins, such as vegetation, short growing season hydrology, make them more to acid deposition and nutrient deposition. Air pollution sources include energy development, agricultural air emissions in

**Trends**

Winter air quality at Yellowstone Faithful has improved since 2000 mobile numbers and because all park are required to have "Best accompanied by a licensed gusticulate matter, and atmospheric fur are monitored year-round in Western sites where ammonium have increased in recent years. rain and snow are related to fertilizers and animal feedlots. This tion is of concern because it stur the structure and diversity of and encourages algal growth in

Unlike ozone in the stratospheric radiation, ground-level ozone is the reaction of UV radiation with organic compounds that are emitted from wildfires, and other sources of miles on air currents. It may of stratospheric ozone, so determining ozone levels is difficult. Ozone typically peak in spring rather than human influences are less atmospheric circulation and less ozone levels at many national parks remain well below the maximum may be high enough to cause such as aspen (Fig. 1).

**Amphibians**

**Importance**

Amphibians represent an important terrestrial ecosystems in the Great (GYE). They are prey for many fish species and, in turn, they eat a wide and invertebrate species. Amphibian environmental change due to their factors such as pollution, introduced destruction, and disease. Amphibians affected by these factors and exhibit site occupancy, distribution, abundance increases in both disease occurrence other aspects of the ecosystem, such as competitor populations, energy flow

**Status and Trend in Yellowstone National Parks**

Amphibians are found in wetlands in the Yellowstone and Grand Teton National Parks at the highest elevations. The occurrence is influenced by characteristics of the depth, emergent vegetation, presence of upland sites needed for over-winter migrations. In 2007, a total of 420 sites were surveyed for amphibians through the National Vital Signs Monitoring Program. USGS Amphibian Research and Monitoring State University. Catchments are sites that constitute monitoring units; the wetlands that may serve as amphibian by the presence of eggs, larvae, or tadpoles. In 2007, breeding sites for four amphibian species were detected in 56% and 59% of the catchments. Boreal toad breeding catchments, but in supplementary sites 17 of 23 previously identified toad breeding sites or bullfrogs were found during

Because of intensifying drought conditions, potential amphibian breeding sites dropped from 199 sites in 2006 to 62 sites surveyed in 2007 and fluctuations modify amphibian breeding

**Northern Colorado Plateau Network**  
*Resource Brief*



**Water Quality Monitoring**

**Importance**

Most Northern Colorado Plateau Network (NCPN) parks are located in semi-arid to arid environments where water is a major factor in determining the distribution of flora, fauna, and historic human habitation. Additionally, the abundance and quality of water resources reflect human activities and land use in and near parks, and are a primary factor influencing park visitation and recreational activities. Water bodies in national parks are protected by the Clean Water Act and other policies that prevent unacceptable levels of pollution and establish acceptable values for other water-quality measures. Park managers need information on status and trends in surface-water quality and quantity to comply with the Clean Water Act and to mitigate historic and future impacts to park water resources that may have ecological and social significance.

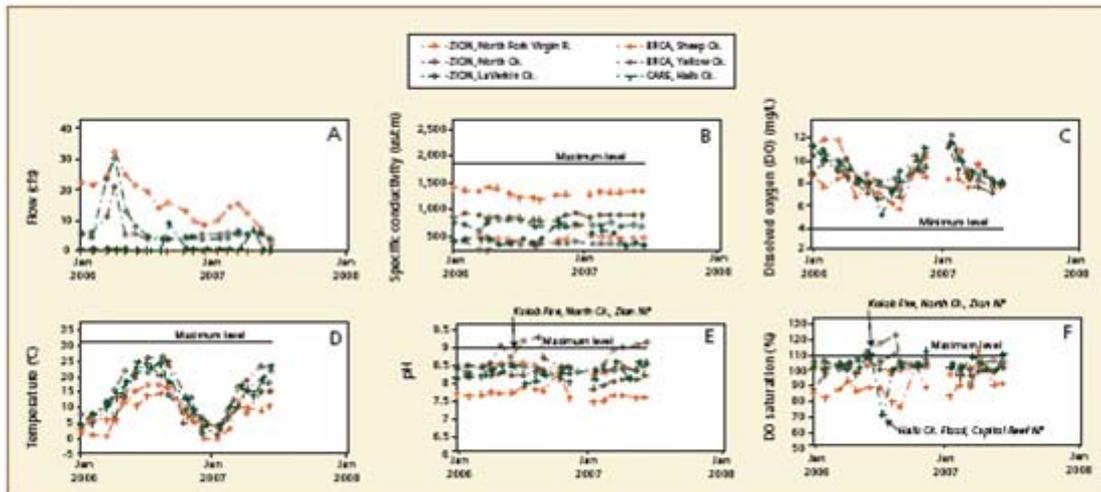


View of the Yampa River at Harding Hole in Dinosaur National Monument.

**Long-term Monitoring**

Water quality monitoring sites are selected based on historic impacts, perceived threat, current monitoring by others, or

75% of average upstream of most parks and as little as 25% of average in some parks (Figure 1a, next page). More information about increasing temperatures and



Water quality criteria, managers may investigate the causes and implement management actions that will improve water qual-

Black Canyon of the Gunnison NP  
Bryce Canyon NP  
Dinosaur NM  
Hovenweep NM

# Northeast Temperate Network Inventory & Monitoring Program

National Park Service  
U.S. Department of Interior



Acadia NP    Appalachian National Scenic Trail    Boston Harbor Islands NPA    Marsh-Billings-Rockefeller NHP    Minute Man NHP  
Morristown NHP    Roosevelt-Vanderbilt NHS    Saratoga NHP    Saugus Ironworks NHS    Saint-Gaudens NHS    Weir Farm NHS

## REGIONALLY IMPORTANT BIRDS DETECTED

BREEDING BIRD MONITORING IN THE NORTHEAST TEMPERATE NETWORK: SARATOGA FORESTS & GRASSLANDS

**BREEDING BIRDS PLAY AN IMPORTANT ROLE IN PARK ECOSYSTEMS AND CAN SERVE AS AN EARLY WARNING OF DISTURBANCE OR CHANGE TO NATURAL COMMUNITIES IN AND AROUND PARKS IN THE NORTHEAST TEMPERATE NETWORK (NETN).**

During the 2006 and 2007 monitoring seasons, 73 different species, totaling nearly 900 individual birds, were detected by volunteer citizen-scientists at Saratoga National Historical Park (SARA). Of the species detected, 16 were of regional conservation concern, suggesting that the park is providing crucial breeding habitats for breeding birds that depend on the unique and regionally declining grasslands found there.

The species of regional conservation concern that were detected at SARA included Bobolink and Field Sparrow, which were also among the most abundant species at the park.

Established to commemorate a crucial American victory during

the Revolutionary War, Saratoga National Historical Park is unique among the Northeast Temperate Network (NETN) parks because it contains both forested areas and substantial (803 acres) grassland habitats.

Across the landscape of the northeastern U.S., forests are expanding as farms disappear and, with them, populations of breeding birds that rely on grasslands, open fields, and shrub habitats during the breeding season.

Attracting a mate and successfully rearing a clutch of eggs requires a lot of energy. Grasslands provide breeding birds with food in the form of insect prey, seeds, and even small mammals. In addition,

grasslands provide unique nesting materials for breeding birds that weave nests from grass stems or seek to hide in dense bushes.

Monitoring efforts in NETN parks will continue well into the future, enabling NETN scientists to determine how ecosystem disturbances, like climate change, and park management practices impact breeding birds.



*A male Blue-Winged Warbler.*  
© Charley Eiseaman

## RESOURCE BRIEF: BREEDING BIRD MONITORING

What do we want to understand about breeding birds?

1. Annually determine breeding bird composition and track long-term trends.
2. Annually estimate relative abundance of common and rare breeding bird species; track long-term trends.
3. Correlate changes in breeding bird communities with management actions and landscape changes.



## Why Are Breeding Birds Important?

Breeding birds are an important component of forest and grassland ecosystems whose presence *or absence* serves as an indication of system health.

## Vital Signs

- Amphibians and Reptiles
- Atmospheric Deposition & Stress
- Breeding Landbirds
- Breeding Coastal Birds
- Climate
- Contaminants
- Deer
- Estuarine Nutrient Enrichment
- Fish
- Forest Soil
- Forest Vegetation
- Intertidal Community Health
- Invasive/Exotic Plants-Early Detection
- Invasive/Exotic Animals-Early Detection
- Land Use
- Land Cover
- Ozone
- Phenology
- Shoreline Geomorphology
- Stream Macroinvertebrates
- Visitor Usage
- Water Chemistry
- Water Quantity
- Wetland Communities

am



National Park Service  
U.S. Department of the Interior



## Northeast Temperate Network

NPS » Nature & Science » Inventory & Monitoring » Networks » Northeast Temperate

### Inventory and Monitoring Program

The Northeast Temperate Network (NETN) was established by the U.S. National Park Service (NPS) to monitor ecological conditions in 11 parks located in northeastern states as well as six additional states through which the Appalachian National Scenic Trail passes. The NETN operates with the mandate to protect park natural resources "unimpaired for future generations." These resources include water, air, geological, faunal and floral, and the various biological, and physical processes that act on these resources. The information obtained through long term natural resource monitoring will have multiple applications for management decision-making, research, education, and promoting public understanding of park resources.

The condition of natural resources in national parks is fundamental to the Service's ability to manage them. Historically, managers and scientists have sought a way to characterize and determine trends in natural resources in parks and other protected areas to provide early warning of impending threats and to assess the effectiveness of management practices and restoration efforts. The challenge of protecting and managing a park's natural resources relies on a partnership based ecosystem approach because most parks are open systems, where threats such as air and water pollution, and invasive species, originate outside established park boundaries and are beyond the control of park managers. Natural resource monitoring provides site-specific information needed to detect and identify change in complex, variable, and imperfectly understood natural systems and to assess whether observed changes are within natural levels of variability.

**Report; Progress on Wetland, Forest Monitoring 01-05-2009** - The final Saugus Iron Works vegetation map was completed for the Northeast Temperate Network. This report can be downloaded from the NETN web site at [http://www.nature.nps.gov/im/units/NETN/inventory/docs/inventory%20Reports/SAIR\\_veg\\_report.pdf](http://www.nature.nps.gov/im/units/NETN/inventory/docs/inventory%20Reports/SAIR_veg_report.pdf).

### Parks in this Network

Please select a park



Northeast Temperate Network  
Map

National I & M Map



Nature & Science  NPS

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## San Francisco Bay Area Network

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[Nature & Science](#) »

[Inventory & Monitoring](#) »

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[SFAN Intranet \(NPS only\)](#)

**Vital Signs**

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[Weather and Climate](#)

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### San Francisco Bay Area Network Inventory and Monitoring Program

The *Inventory and Monitoring Program* is a major component of the National Park Service's strategy to improve park management through greater reliance on scientific information.

Nationwide, 270 national parks have been grouped into 32 Vital Signs Networks linked by geographic similarities, common natural resources, and resource protection challenges. The network approach facilitates collaboration, information sharing, and economies of scale in natural resource monitoring. The San Francisco Bay Area Network (SFAN) encompasses eight park units.

The goals of Inventory and Monitoring networks are:

- inventory the natural resources and park ecosystems under National Park Service stewardship to determine their nature and status;
- monitor park ecosystems to better understand their dynamic nature and condition, and to provide reference points for comparisons with other, altered environments;
- establish natural resource inventory and monitoring as a standard practice throughout the National Park system;
- integrate natural resource inventory and monitoring information into National Park Service planning, management, and decision making;
- share accomplishments and information with others and form partnerships for reaching common goals and objectives. >> [read more](#)

#### Parks in this Network

Please select a park



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Network Map](#)

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#### Quick Links

[Year in Review - 2007](#)

[Salmon of Redwood Creek  
Brochure](#)

[Internship Announcement](#)



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## Northeast Temperate Network

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### Background

Knowing the condition of natural resources in national parks is fundamental to the National Park Service's ability to manage park resources in a manner that "preserves, unimpaired, the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." NPS has implemented a strategy to institutionalize scientifically credible natural resource inventory and monitoring servicewide as a means to meet this mandate of the NPS Organic Act. The effort will ensure that the 270 park units with significant natural resources possess the information needed for effective, science-based resource protection and management.

Parks, with significant natural resources, have been grouped into 32 monitoring networks to help accomplish NPS inventory and monitoring goals.

### Vital Signs Monitoring Program Goals

1. Determine the status and trends in selected indicators of park ecosystems to allow managers to make better-informed decisions and to work more effectively with other agencies and individuals for the benefit of park resources.
2. Provide early warning of abnormal conditions of selected resources to help develop effective mitigation measures and reduce costs of management.
3. Provide data to better understand the dynamic nature and condition of park ecosystems and to provide reference points for comparisons with other, altered environments.

### Parks in this Network

Please select a park



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[National I & M Map](#)

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# Inventory & Monitoring Intranet

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## Northeast Temperate Network

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### Internal Reports and Meetings

- Quarterly Updates
- Connect the Dots Spreadsheets
- Draft Connect the Dots Reports
- Board of Directors Meetings

### Quarterly Updates

- 2008 4th Quarter [DOC]
- 2008 3rd Quarter [DOC]
- 2008 2nd Quarter [DOC]2008 1st Quarter [DOC]

### Connect the Dots Spreadsheets

In 2008, the 32 I&M networks were required to develop a first draft of a Vital Signs Supporting Table for each park, which will feed into the larger Natural Resource Summary Table. The draft spreadsheets listed for each park below summarize the key measures of resource condition that the Northeast Temperate Network will routinely provide data for as part of core duty of measuring the condition of selected park resources.

- Acadia NP [XLS]
- Appalachian NST [XLS]
- Boston Harbor Island NPA [XLS]
- Eleanor Roosevelt Home NHS [XLS]
- Home of Franklin D. Roosevelt NHS [XLS]
- Marsh-Billings-Rockefeller NHP [XLS]
- Minute Man NHP [XLS]
- Morristown NHP [XLS]
- Saint-Gaudens NHS [XLS]
- Saugus Iron Works NHS [XLS]
- Saratoga NHP [XLS]
- Vanderbilt Mansion NHS [XLS]
- Weir Farm NHS [XLS]

# Northeast Temperate Network Inventory & Monitoring Program

National Park Service  
U.S. Department of Interior



Acadia NP  
Morristown NHP

Appalachian National Scenic Trail  
Roosevelt-Vanderbilt NHS

Boston Harbor Islands NPA  
Saratoga NHP

Marsh-Billings-Rockefeller NHP  
Saugus Ironworks NHS

Saint-Gaudens NHS

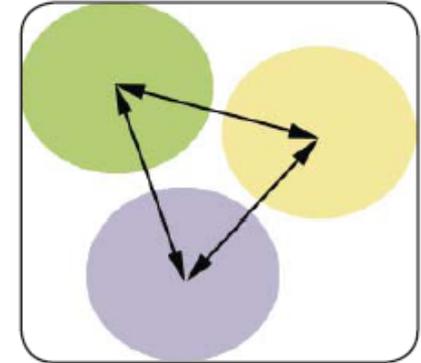
Minute Man NHP  
Weir Farm NHS

## CONNECT-THE-DOTS REPORT SAINT-GAUDENS NATIONAL HISTORIC SITE, 2008

INTEGRATING SCIENCE, PLANNING, AND MANAGEMENT IN THE NORTHEAST TEMPERATE NETWORK

**“DECISION MAKERS AND PLANNERS WILL USE THE BEST AVAILABLE SCIENTIFIC AND TECHNICAL INFORMATION AND SCHOLARLY ANALYSIS TO IDENTIFY APPROPRIATE MANAGEMENT ACTIONS FOR PROTECTION AND USE OF PARK RESOURCES.”**

**– NPS MANAGEMENT POLICIES 2006**



**INTRODUCTION.** The Northeast Temperate Network (NETN) is one of 32 National Park Service Inventory and Monitoring Networks. Each Network Exists as part of a National effort to better understand and manage Park lands using science-based information.

In order to focus this effort, 270 national park units with significant natural resources were grouped into 32 regional networks.

The Northeast Temperate Network (NETN) is made up of 13 parks: Acadia National Park, the Appalachian National Scenic Trail, Boston Harbor Islands National Park Area, Marsh-Billings-Rockefeller National Historical Park, Minute Man National Historical Park, Morristown National Historical Park, Roosevelt-Vanderbilt National Historic Sites, Saint-Gaudens National Historic Site, Saratoga National Historical Park, Saugus Iron Works National Historic Site, Weir Farm National Historic Site.

The parks in the NETN represent a great diversity of climate and landform, from northern coniferous forests to coastal estuaries. What they share in common is exposure to a 4-season temperate climate, landscape shaped by glacial activity, and prevalence of forested ecological systems.

condition can also be aggregated to evaluate the status of whole categories (e.g. Plants or Environment).

**MEASURES OF PARK ECOSYSTEM HEALTH.** Vital Signs are measured in a variety of ways. Specific, scientifically and statistically driven protocols have been or will be developed for each vital sign by NETN scientists and cooperating researchers. These detailed protocols provide step-by-step guidance for collecting, analyzing, and reporting data for each vital sign. Data is collected by NETN staff, park staff, citizen-science volunteers, other agencies and organizations, or through agreements with cooperators. Techniques and protocols used to collect the information presented in this report is discussed briefly in the section on Measures of Park Ecosystem Health; the section on References and Resources will guide to to more detailed information on methods.

**CONNECT-THE-DOTS REPORT.** This report is designed to summarize the status of vital signs and other measures collected by the NETN, park staff, and cooperating agencies and organizations to evaluate the health of ecosystems for an individual network park. Detailed information about data collection and analysis can be found in the protocol associated with that vital sign or by contacting the NETN directly. A list of reference material and useful links is provided. All publications mentioned in this report can be



[InsideNPS](#) » [NRSS](#) » [Inventory & Monitoring](#) » [San Francisco Bay Area Network](#)

## San Francisco Bay Area Network

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[Plants - Rare](#)

[Raptors](#)

[Riparian Habitat](#)

[Snowy Plover, Western](#)

### SFAN Intranet

This site is designed to share information from the SFAN Inventory and Monitoring program with other NPS programs, divisions, and staff. Content include draft documents, project specific annual reports, trend reports, meeting notes, and other information generally not suitable for a public website. Note that some of the reports include sensitive data and are not intended to be shared with the public.

Public documents including fact sheets, executive briefings, including general information about the vital signs monitoring efforts will continue to be posted on the [SFAN Internet](#).

### New Documents

[SFAN Paleo Inventory Research Summary - NEW](#)

[Three - Year Review](#)

[SFAN Network Paleo Inventory](#)

[Muir Woods Viutal Signs Status Summary - Draft](#)

[SFAN Climate Change Briefing V2.2 - Draft](#)

### Parks in this Network



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## San Francisco Bay Area Network

### Raptors

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[June 2007](#)

[March - May 2007](#)

[February 2007](#)

[January 2007](#)

#### [Annual Reports](#)

[Raptor Monitoring Annual Report 2006](#)

[Raptor Monitoring Annual Report 2005](#)

[Raptor Monitoring Annual Report 2004](#)

[Raptor Monitoring Annual Report 2003](#)

[Raptor Monitoring Annual Report 2002](#)

[Raptor Monitoring Annual Report 2001](#)

[Raptor Monitoring Annual Report 2000](#)

[Raptor Monitoring Annual Report 1999](#)

[Raptor Monitoring Annual Report 1998](#)

[Raptor Monitoring Annual Report 1997](#)

[Raptor Monitoring Annual Report 1996](#)

[Raptor Monitoring Annual Report 1995](#)

[Raptor Monitoring Annual Report 1994](#)

[Raptor Monitoring Annual Report 1993](#)

[Raptor Monitoring Summary Report 1984-1992](#)

# Three products with near-term management applicability that promote long-term program sustainability

- Resource Briefs
- Parallel set of intranet and internet websites to provide current results for each vital sign; emphasis is on internal audiences
- **Natural Resource Summary Tables**

Resource Category	Indicators	Measures	Current Condition 2008	Reference Condition <small>(see refs. next page)</small>	Goal Met?
Ecosystem Drivers	Climate	precipitation temperature	below average above average	(±50 years)	N/A
	Fire	acres burned	4,247	(median 1972–present)	N/A
	Yellowstone Volcano	earthquakes uplift/subsidence	1,256 18 cm uplift since 2004	—	N/A
Landscape-scale Indicators	Air Quality	six indicators	decline in one indicator: wet deposition of ammonium	national standards	
	Amphibians				
	Landbirds				
	Water Quality			national standards	
Rare and Sensitive	Bald Eagles	# nesting pairs # fledglings	19 26	≥20 ≥15	yes
	Bighorn Sheep	# sheep # lambs/100 ewes	353 northern range 2008 34 lambs/100 ewes	300–500	yes
	Gray Wolves	# wolves YELL # breeding pairs YELL	171 10	≥80 ≥8	yes
	Grizzly Bears	# bears GYE ≥2-year-old female mortality	596 9.5%	500 ≤9% of females	yes
	Pronghorn	# pronghorn	319	300–600	yes
	Trumpeter Swan	# resident adults # nesting pairs # fledglings	8 2 2	≥20 7 2	no
	Westslope Cutthroat Trout (stream)	km of historical habitat occupied	<1% of 1,031 km	50–75%	no
	Yellowstone Cutthroat Trout (lake)	# spawners at Clear Creek	537	20,000–30,000	no
	Yellowstone Cutthroat Trout (stream)	km of historical habitat occupied	75% of 4,446 km	50–75%	yes
Stressors	Aquatic Nuisance Species	# ANS (% composition)	2 of 850 (<1%)	0–1%	yes
	Invasive Plants			GPRA-based?	
	Lake Trout (Yellowstone Lake)	# Lake Trout (LT) removed # LT CPUE	270,000 LT removed CPUE=2.37	CPUE 0.5–1.0	no
	Land Use				
	Mountain Goats	# goats	175–225 in and near YELL	0	no
	Visitor Use				
	Wildlife Diseases				
Focal Resources	Bison	# bison	3,000	2,500–4,500	yes
	Elk (northern range)	# elk	6,279	4,000–15,000	yes
	Effects of Oversnow Vehicles • effects of winter recreation on wildlife • winter air quality • winter soundscapes			• EIS standards • EIS standards	
	Geothermal Systems				
	Whitebark Pine	% infection rate, blister rust mountain pine beetle	20% infection rate	0%	no

# Rock Creek Park – Natural Resource Condition Assessment

Important Resources and Values	Indicators	Measures	Current Condition	Acceptable Range	Goal Met?
Stream Habitat Zone	<b>Physical Habitat</b>	Physical Habitat Index	61.3	>42	Yes
	<b>Hydrology</b>	Stage	0.4 ft	0.1 - 0.5	Yes
		Flow	0.4 ft/sec	0.1 - 0.5	Yes
		Discharge	1.7 cfs	0.6 - 6.0	Yes
	<b>Water Chemistry</b>	pH	7.7	6 - 8.5	Yes
		Dissolved Oxygen	7.2 mg/L	>= 5 (Mar-Jun)	Yes
		Temperature	Never exceeded	Always < 32.2°C	Yes
	<b>Nutrient Dynamics</b>	Nitrate	2.2 mg/L	0.7	No
		Ammonia	0.12	0.442	Yes
		Phosphorus	97.1 µg/L	0 - 36.5	No
<b>Macroinvertebrates</b>	Index of Biological Integrity	2.62	3 - 5	No	
<b>Freshwater Fish</b>	Index of Biological Integrity	3.08	3 - 5	Yes	
Seeps and Wetlands	<b>Rare Invertebrates</b>	# Occupied Sites	5	5	Yes
	<b>Adult Amphibians</b>	Occupied Habitat	30% of habitat	20 - 80	Yes
Forest Communities	<b>Forest Condition</b>	% Seedling Regeneration	0% of plots	50 - 90 %	No
		% Exotic Species	66% of plots	0 - 5%	No
		% Insect Pests	0% of plots	0 - 1%	Yes
	<b>Forest Birds</b>	Species Richness	TBD	TBD	
	<b>White-tailed Deer</b>	Deer Density	22 per km <sup>2</sup>	4 - 8	No
	<b>Landcover/Landuse</b>	% Park Forested Area	85% of park	60 - 90%	Yes
		Connectivity	340 m between patches	0 - 360 m	Yes
<b>Landscape Condition</b>	Core Habitat Area	50% of patches	80 - 100%	No	
Native Wildlife	Wood Thrush	Visitor Encounters	Encountered	Encountered	Yes
		White-tailed Deer	Road Mortality	39 deaths / yr	0 - 30

# Vital Signs Summary Tables



**Acadia National Park - Vital Signs Condition Summary Table**

Vital_Sign	Metric	Value	Metric Units	Start	End
Air Quality (Acid Deposition)	Wet Deposition - Ammonium		TBD		
Air Quality (Acid Deposition)	Wet Deposition - Nitrate	3.12	Normalized N, kg/ha/yr	2001	2005
Air Quality (Acid Deposition)	Wet Deposition - Nitrate	3.12	Normalized N, kg/ha/yr	2001	2005
Air Quality (Acid Deposition)	Wet Deposition - Sulfate	3.82	Normalized S, kg/ha/yr	2001	2005
Air Quality (Acid Deposition)	Wet Deposition - Sulfate	3.82	Normalized S, kg/ha/yr	2001	2005
Air Quality (Ozone)	High Ozone Measure	79.54	ppb (3-yr ave of annual 4th	2001	2005
Air Quality (Visibility)	Haze Index - Moderate Days	5.28	Deciviews/yr	2001	2005
Breeding Birds (Forest)	Bark Prober Guild	0.12	Proportion of total species	2007	2007
Breeding Birds (Forest)	Exotic Species Guild	0.00	Proportion of total species	2007	2007
Breeding Birds (Forest)	Interior Forest Obligate Guild	0.41	Proportion of total species	2007	2007
Breeding Birds (Forest)	Number of PIF Priority Species	3.00	Number of species	2007	2007
Breeding Birds (Forest)	Number of Species Detected	41.00	Number of species	2007	2007
Breeding Birds (Forest)	Resident Guild	0.32	Proportion of total species	2007	2007
Breeding Birds (Forest)	Species Diversity Index	3.20	Shannon-Wiener Diversity	2007	2007
Climate	Climate Metrics TBD		TBD		
Deer Herbivory	Deer Browse Index		Index		
Estuarine Health	Hydrology Metrics TBD		TBD		
Estuarine Health	Vegetation Metrics TBD		TBD		
Estuarine Health	Water Quality Metrics TBD		TBD		
Forest Soil	Soil Acid Stress (ave Ca:Al ratio)	8.63	Ca:Al ratio	2006	2007
Forest Soil	Soil Acid Stress (proportion below	0.46	Proportion below Ca:Al ratio	2006	2007
Forest Soil	Soil Nitrogen Saturation (ave C:N ratio)	33.85	C:N ratio	2006	2007
Forest Soil	Soil Nitrogen Saturation (proportion	0.03	Proportion below C:N ratio of	2006	2007
Forest Vegetation	Biotic Homogenization		Trend in index	2006	2007
Forest Vegetation	Coarse Woody Debris Volume	0.09	Percent of live tree volume	2006	2007
Forest Vegetation	Snag Abundance	7.78	Med-Lg snags / ha	2006	2007
Forest Vegetation	Stand Structural Class	0.15	Percent with late	2006	2007
Forest Vegetation	Tree Condition - Foliage		Percent of foliage problems	2006	2007
Forest Vegetation	Tree Condition - Key Pests		Key pests per plot	2006	2007
Forest Vegetation	Tree Growth and Mortality		TBD	2006	2007
Forest Vegetation	Tree Regeneration		Index	2006	2007



## Resource Inventories

NPS » Nature & Science » Inventory & Monitoring » Inventories

### Natural Resource Inventories in the National Parks

The Inventory and Monitoring Program provides guidance, funding, and technical assistance for parks to complete a set of 12 core natural resource inventories. These baseline inventories are common to all parks with significant natural resources, and are intended to provide park managers with the minimum information needed to effectively manage the natural resources of their park. *[Click on the name of the inventory for more information]*

- Natural Resource Bibliography
- Base Cartography Data
- Air Quality Data
- Air Quality Related Values
- Climate Inventory
- Geologic Resources Inventory
- Soil Resources Inventory
- Water Body Location and Classification
- Baseline Water Quality Data
- Vegetation Inventory
- Species Lists
- Species Occurrence and Distribution

**Search the Inventory Tracking Database [click here](#)**

*(searching allows you to select and view inventory status and products)*

- Inventories
- I & M
- NPS.gov

#### Nature & Science »

#### I & M Home

- Parks & Networks
- Inventories
- Monitoring
- Data Management
- Applications & Databases
- GIS
- Reports
- Standards & Policies
- Contacts
- I & M Intranet
- Glossary
- Site Map

#### Parks: Nature & Science



Inventory & Monitoring

NPS » Nature & Science » Inventory & Monitoring » Search Inventory

### Search for Natural Resource Inventory Information

Use the control "Ctrl" key for multiple selections in the Units, Inventory Status, and Inventory List Boxes.  
Search Help for additional information. After selecting zero or more Search Parameters Click the Search Button.

[Inventory Home](#)  
[List of I&M Parks and Networks](#)

Select Unit(s):

- BLRI Blue Ridge Parkway
- BLUE Bluestone National Scenic River
- BOHA Boston Harbor Islands National Recreation Area**
- BOWA Booker T. Washington National Monument

OR

Network Map

Select Network: Northeast Temperate

OR

Region Map

Select Region: \*Select Region

Select Inventory Status:

[View Status Definitions](#)

- \*Select Status(es)
- Complete
- In Progress
- In Update

Login

Select Inventory:

- \*Select Inventory(ies)
- Air Quality Data
- Air Quality Related Values
- Base Cartography Data

Search

Reset Search

**Inventory Tracking Database**

[Export Table to Excel](#)
[Export Related Products to Excel](#)

Region	Network	Unit	Unit Name	Inventory	Status FY	Status	1st Year Complete	Products	Comments
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Air Quality Data</a>	2006	Complete	2006	<a href="#">P</a>	
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Air Quality Related Values</a>	2008	Complete	2008	<a href="#">P</a>	visibility=X; vegetation=X; surface_waters=Unknown; soils=Unknown; fish_wildlife=X
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Base Cartography Data</a>	2004	Complete	2004	<a href="#">P</a>	
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Baseline Water Quality Data</a>	2008	Planned			NULL
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Climate Inventory</a>	2007	Complete	2007	<a href="#">P</a>	
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Geologic Resources Inventory</a>	2008	In Progress			map planned for 2008, report planned for after 2011, scoping completed 2007
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Natural Resource Bibliography</a>	2007	Complete	2001	<a href="#">P</a>	
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Soil Resources Inventory</a>	2008	In Progress			Est. Completion date: 2008
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Species Lists</a>	2008	Complete	2007	<a href="#">P</a>	Total Certified Species Lists: 6. Completed on 3/20/2007
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Species Occurrence and Distribution</a>	2007	Complete	2007	<a href="#">P</a>	
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Vegetation Inventory</a>	2008	In Progress			Draft Map Complete
NERO	Northeast Temperate	BOHA	Boston Harbor Islands National Recreation Area	<a href="#">Water Body Location and Classification</a>	2008	In Progress		<a href="#">P</a>	NHD Complete; No NWI; Beneficial Uses Incomplete



# IRMA

## NRPC F

- NRPC
- Create
- Elimina
- Develo
- Transit
- with NF

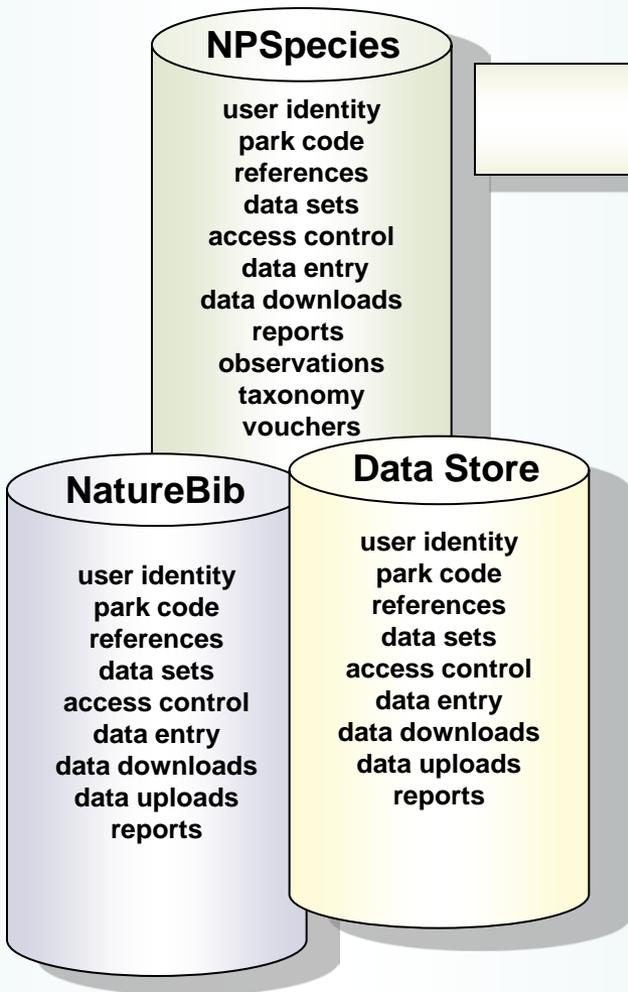


applications  
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 functions  
 applications  
 (A), starting  
 a Store.

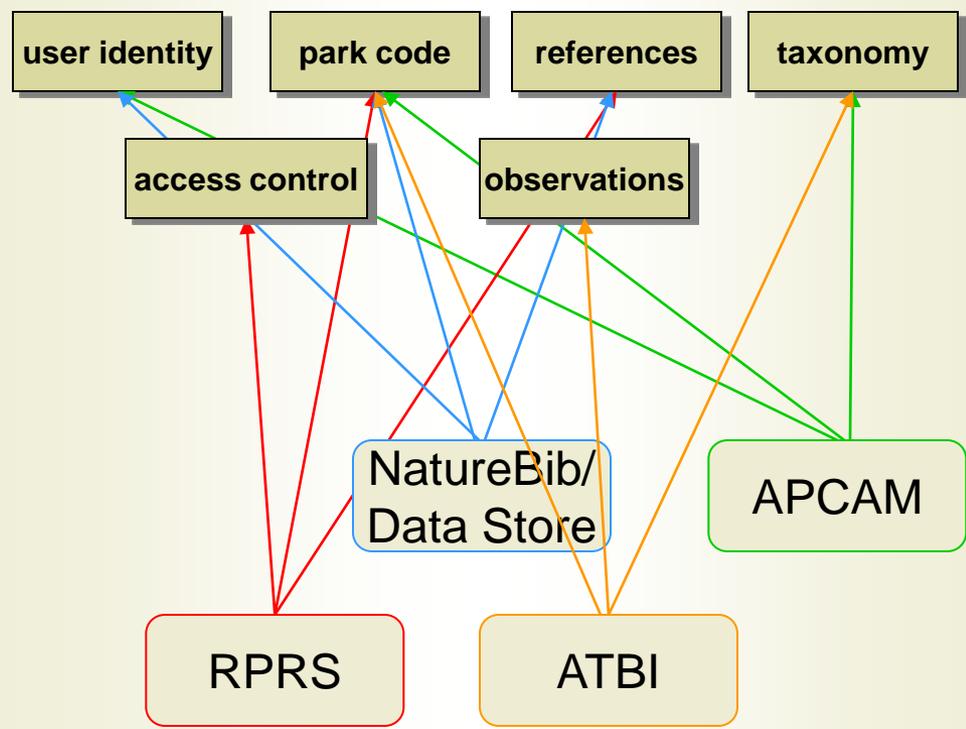
IR

policy.

**Silos:** stand-alone systems that duplicate data and don't interact well



**SOA:** silos are deconstructed into reusable, multipurpose "services"



Example of how services being created initially for NPSpecies could be used by other systems.



## Welcome

### Natural Resource Data & Applications

#### Portal Links:

##### [Certified Species Lists](#)

View, print, or download certified species lists.

#### Web Links:

##### [Monitoring Protocols](#)

Quick view of NPS monitoring protocols available on the Internet.

##### [Vital Signs & Protocols](#)

Intranet application to browse, edit, and manage vitals signs and protocols.

##### [Natural Resource Inventories](#)

Find out the status and get products for natural resource inventories for your park.

##### [NPS Climate Data](#)

Find, view, and download data from climate stations in and around parks.

*Coming in early 2009: We will be adding more tools and links to make it easier for you to organize, search for, and download natural resource data and information.*



#### Quick Links

##### Portal Links:

- [Certified Species Lists](#)

##### Web Links:

- [Vital Signs & Protocol Database](#)
- [NR Inventory Status & Products](#)
- [NPS Climate Data](#)
- [I & M Intranet](#)
- [I & M Internet](#)
- [Nature & Science](#)
- [NRPC Intranet](#)
- [NRPC SharePoint](#)

# Possible Navigation Scheme – Option 1: reflects Ecological Monitoring Framework

**Natural Resource Information Portal**

National Park Service  
U.S. Department of the Interior  
Natural Resource Program Center

Welcome: Guest

HOME DATA Search Search box here

Home	Air & Climate	Geology & Soils	Water	Biology	Landscapes	Human Use	References	Maps	Tools
<ul style="list-style-type: none"> <li>•NRInfo Portal home</li> <li>•Set Preferences</li> <li>•User-customized</li> </ul>	<ul style="list-style-type: none"> <li>• Air Quality</li> <li>•Climate data</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Geology</li> <li>•Soils</li> <li>•Cave/Karst</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Water quality</li> <li>•Hydrology</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Species</li> <li>•Vegetation</li> <li>•Invasives</li> <li>•T&amp;E</li> <li>•ATBI</li> <li>•Wildlife Disease</li> <li>•Etc,</li> </ul>	<ul style="list-style-type: none"> <li>•Fire &amp; Fuels</li> <li>•Landscape Dynamics</li> <li>•Natural Sounds</li> <li>•Climate Change</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Visitors &amp; recreation</li> <li>•Human effects</li> <li>•Permits</li> <li>•PEPC</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Citation service (former Bib and Data Store)</li> <li>•DOI Library</li> <li>•NPS pub series</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Base carto</li> <li>•Park maps</li> <li>•Imagery</li> <li>•GIS downloads</li> <li>•Etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Metadata Tools and Editor</li> <li>•Metadata Extractor</li> <li>•Download park list</li> <li>•Etc.</li> </ul>

NRPC Intranet NRPC Internet NRPC SharePoint



HOME DATA

Welcome: Guest



### NP Species

Search



Search: Certified Species List ▼

#### Define Search Criteria

Unit: Boston Harbor Islands National Recreation Area ▼

Category: Bird ▼

Search

- Welcome

+ NP Species  
- Search

# Certified Bird Species List for Boston Harbor Islands National Recreation Area

**Disclaimer:** Includes only Locally Accepted Names where the Accepted Status and Occurrence have been certified. Other Park Status fields may not include all three Locally Preferred Common Names are used unless none exist, then the first three ITIS Common Names are used.

Download Options:

Data Migrated as of December 15, 2008

Certified as of March 20, 2007

Records in

Order ▼	Family	Scientific Name	Common Name	Occurrence	Abundance	Residency	Nativity
Anseriformes	Anatidae	<i>Anas platyrhynchos</i>	Mallard	Present in Park	Common	Breeder	Native
Anseriformes	Anatidae	<i>Anas rubripes</i>	American Black Duck	Present in Park	Common	Breeder	Native
Anseriformes	Anatidae	<i>Branta canadensis</i>	Canada Goose	Present in Park	Common	Breeder	Native
Anseriformes	Anatidae	<i>Cygnus olor</i>	Mute Swan	Present in Park	Unknown	Resident	Non-Native
Anseriformes	Anatidae	<i>Somateria mollissima</i>	Common Eider	Present in Park	Uncommon	Migratory	Native
Apodiformes	Apodidae	<i>Chaetura pelagica</i>	Chimney Swift	Present in Park	Uncommon	Resident	Native
Ciconiiformes	Accipitridae	<i>Buteo jamaicensis</i>	Red-tailed Hawk	Present in Park	Unknown	Unknown	Native
Ciconiiformes	Accipitridae	<i>Pandion haliaetus</i>	Osprey	Present in Park	Unknown	Unknown	Native
Ciconiiformes	Ardeidae	<i>Ardea alba</i>	Great Egret	Unconfirmed	NA	NA	Native
Ciconiiformes	Ardeidae	<i>Ardea herodias</i>	Great Blue Heron	Present in Park	Uncommon	Resident	Native
Ciconiiformes	Ardeidae	<i>Butorides virescens</i>	Green Heron	Present in Park	Uncommon	Breeder	Native
Ciconiiformes	Ardeidae	<i>Casmerodius albus</i>	Great Egret	Present in Park	Common	Breeder	Native
Ciconiiformes	Ardeidae	<i>Egretta caerulea</i>	Little Blue Heron	Unconfirmed	NA	NA	Native
Ciconiiformes	Ardeidae	<i>Egretta thula</i>	Snowy Egret	Present in Park	Common	Breeder	Native
Ciconiiformes	Ardeidae	<i>Nycticorax nycticorax</i>	black-crowned night heron, Black-crowned Night-Heron	Present in Park	Abundant	Breeder	Native
Ciconiiformes	Charadriidae	<i>Charadrius vociferus</i>	killdeer	Present in Park	Uncommon	Unknown	Native

# Search Page for Reference Service

The screenshot shows a web browser window displaying the 'Natural Resource Information Portal'. The page features a navigation menu on the left with options like 'Home', 'Citation', 'Search', and 'Results'. The main content area is titled 'Citation Search' and includes a 'Search Details' section with several input fields: 'Type of search' (Basic), 'Citation Type Group' (All), 'Data Source to Search' (All), 'Any Field Contains' (moose), and 'Units' (ACAD). A 'Search' button is located at the bottom right of the search form. The page also includes a header with the National Park Service logo and a footer with links for 'NRPC Intranet', 'NRPC Internet', and 'NRPC SharePoint'.

- Search both datasets and documents
- Searches keyword through all fields
- Easily select one or more park units

# Search Results

## Search Results

**Search Details**

**Search Type:** Basic  
**Citation Type:** All  
**Data Source:** All  
**Units:** ACAD  
**Containing:** moose

[Revise Search](#)

Download Results Table as:  [Download](#)

**Results**

Type	Display Citation	Attached File	Attached Files D...
Journal Article	<a href="#">Wyman, J. 1866. An account of some kioekkenmoeddings, or shell-heaps, in Maine and Massachuse...</a>		
Report	<a href="#">Procter, W. 1938. Biological survey of the Mount Desert region : the insect fauna with references to ...</a>		
Report	<a href="#">Holmes, L. 1944. Mount Desert deer : past and present.</a>		
Report	<a href="#">Procter, W. 1946. Biological survey of the Mount Desert region : the insect fauna with references to ...</a>		
Report	<a href="#">Van Hemert, D. 1966. A distribution study of the marine algae of Acadia National Park.</a>		
Conference Proc...	<a href="#">Theokritoff, G. and W. W. Wiles. 1974. The paleontology of the present : littoral environments on a su...</a>		
Report	<a href="#">Feely, J. 1979. A descriptive list of rare plants in Hancock County, Maine.</a>		
Report	<a href="#">Korschgen, C. E. 1979. Coastal waterbird colonies : Maine. US Fish &amp; Wildlife Service, Washington, ...</a>		
Report	<a href="#">Drury, W. 1980. Habitats of special interest in Acadia National Park.</a>		
Report	<a href="#">Maine Critical Areas Program, n.d. Maine critical areas with in Acadia.</a>		

Page 1 of 3

Displaying results 1 - 20 of 46

- Shows search criteria
- Columns can be added and sorted
- Optionally download search results as a file

# Reference Summary



The screenshot displays a web interface for a citation summary. The main content area is titled "Citation Summary" and includes the following information:

- Citation:** Fairbanks, R. B., W. S. Collings and W. T. Sides. 1968. Biological Investigations in the Cape Cod Canal Prior to the Operation of A Steam Generating Plant. Massachusetts Division of Marine Fisheries&#47;&#47;Canal Electric, Boston.
- Report:** Legacy System: NatureBio, Legacy ID: 554081
- Content Description:** Fairbanks, R. B., W. S. Collings and W. T. Sides. 1968. Biological Investigations in the Cape Cod Canal Prior to the Operation of A Steam Generating Plant. Massachusetts Division of Marine Fisheries&#47;&#47;Canal Electric, Boston.
- Content Date Range:** 1/1/1900
- Date of Issue:** 1/1/1968
- Attachments:** No attachments available
- Author Information:** Collings, W.; Fairbanks, R.; Sides, W.
- Units:** BOHA
- Publisher:** Massachusetts Division of Marine Fisheries/Canal Electric
- Keywords:** Power plants, Environmental assessment, Survey, Discharge, Cape Cod Canal, biology, Cape Cod Bay, CAPE COD,

The interface includes a navigation menu on the left with options like "Home", "Welcome: Guest", "Welcome", "Citation", "Search", "Results", and "Profile". The bottom of the page shows a taskbar with "NRDC Internet" and "100%" zoom level.

- Same general layout for documents and datasets
- Easy to read and print

# Yellowstone Demonstration Project



- Demonstrate ability to extract data directly from IRMA and display on Greater Yellowstone Science Learning Center website.
- We provide them with specifications and guidelines: what's available, how to ask, and what they get.
- Example:
  - Fetch a list of records in the data store using park code and keyword
  - Fetch the attached file
- Using industry standards for exchanging information *in both directions*





- Monitoring
- I & M
- NPS.gov



Boston Harbor Islands,  
a National Park Area

NPS » Nature & Science » Inventory & Monitoring

## Certified Species List

Select the taxonomic group from the Group dropdown list.

For more information on a species, please click on the row of that species.

Select Taxonomic Group:

**Taxonomic Group: Birds**

Click [here](#) to view a more detailed grid.

Rows per page <input type="button" value="v"/>				
Common Name	Scientific Name	Abundance	Residence	Nativity
<a href="#">Red-throated Loon</a>	<a href="#">Gavia stellata</a>	<a href="#">Uncommon</a>	<a href="#">Migratory</a>	<a href="#">Native</a>
<a href="#">Double-crested Cormorant</a>	<a href="#">Phalacrocorax auritus</a>	<a href="#">Abundant</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Great Blue Heron</a>	<a href="#">Ardea herodias</a>	<a href="#">Uncommon</a>	<a href="#">Resident</a>	<a href="#">Native</a>
<a href="#">Green Heron</a>	<a href="#">Butorides virescens</a>	<a href="#">Uncommon</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Snowy Egret</a>	<a href="#">Egretta thula</a>	<a href="#">Common</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Black-crowned Night-Heron</a>	<a href="#">Nycticorax nycticorax</a>	<a href="#">Abundant</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Glossy Ibis</a>	<a href="#">Plegadis falcinellus</a>	<a href="#">Common</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Mute Swan</a>	<a href="#">Cygnus olor</a>	<a href="#">Unknown</a>	<a href="#">Resident</a>	<a href="#">Non-Native</a>
<a href="#">Canada Goose</a>	<a href="#">Branta canadensis</a>	<a href="#">Common</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Mallard</a>	<a href="#">Anas platyrhynchos</a>	<a href="#">Common</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">American Black Duck</a>	<a href="#">Anas rubripes</a>	<a href="#">Common</a>	<a href="#">Breeder</a>	<a href="#">Native</a>
<a href="#">Common Eider</a>	<a href="#">Somateria mollissima</a>	<a href="#">Uncommon</a>	<a href="#">Migratory</a>	<a href="#">Native</a>



input search

search

- Monitoring
- I & M
- NPS.gov



## Boston Harbor Islands Birds

NPS » Nature & Science » Inventory & Monitoring

**Great Blue Heron**  
*Ardea herodias*  
Order: Ciconiiformes  
Family: Ardeidae

### Status in Boston Harbor Islands

**Residency:** Resident  
**Abundance:** Uncommon  
**Native:** Native

The links below lead to non-NPS websites. While these sites are not endorsed by NPS, they are sources of generally reliable information that we can link directly to the species pages. They will open up in new windows after the official NPS warning and disclaimer.

### For general ecological information:



Cornell Lab of Ornithology All About Birds



University of Michigan Museum of Zoology at the Animal Diversity Web



eNature

**“The 32 I&M networks are designing a system for scientific data collection, analysis, and reporting that is unprecedented in the history of the National Park Service”**

**Purpose of this Review**

