

Freshwater Issues for Parks of the Northeastern United States

PHASE I: A Scoping Report for the Northeast Temperate Network (NETN)

Submitted to the National Park Service by:

Robert W. Dudley, P.E.
U.S. Geological Survey
196 Whitten Road
Augusta, ME 04330
(207) 622-8201 ext. 115
rwdudley@usgs.gov

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PROBLEM STATEMENT

The ecological health of freshwater resources within national park boundaries are subjected to natural and anthropogenic impacts and alterations. In many cases, such stressors have affected them for many years. Threats confronting NPS aquatic ecosystems throughout the northeastern US include:

- Increased visitor usage
- Nutrient and contaminant inputs (e.g. agriculture, septic leaching)
- Hydrologic and hydraulic alterations (e.g. bridges, roads, culverts, drainage improvements)
- Groundwater withdrawal impacts on surface freshwater resources (e.g. competing water-use interests)
- Invasive and non-native species encroachments
- Air deposition of contaminants

PURPOSE OF PROPOSED PROJECT

Provide the National Park Service and their collaborative agencies with data and guidance for identifying and prioritizing freshwater resource monitoring needs to identify stressors and detect change in park freshwater resources throughout the Northeastern Temperate Parks Network. The inventory and freshwater-resources monitoring design will be conducted in three phases (See how compatible this 3- phase approach is to May 2, 2002 Memo to Regional Directors outlining 3-phase approach of I & M Program that Integrates Water Quality Monitoring):

PHASE I: Scoping report

Current Budget → Purpose: Produce a Scoping Report for the Northeast Temperate Network.

PHASE II: Design prototype network-wide monitoring protocols

Purpose: Design prototype guidance for monitoring of freshwater in the Northeast Temperate Parks Network.

PHASE III: Implement pilot feasibility tests

Purpose: Conduct feasibility (pilot) testing of recommended freshwater quality/aquatic-resource monitoring components at select national park freshwater resources in order to finalize Network freshwater resource monitoring design.

PROJECT OBJECTIVE

Create a resource inventory for freshwater resources in the Northeastern Temperate Network upon which the design of long-term freshwater-resources monitoring efforts can be based.

PHASE I: Scoping report

- a. Location and classification of primarily surface freshwater resources
- b. A catalogue describing significant park freshwater bodies and potential stressors, currently available water-quality data and ongoing monitoring

Current
Future

- c. Identify the most important management issues and scientific issues for each park and important agents of change that could impact park aquatic resources
- d. Synthesize information into major categories, identifying present and emerging issues
- e. Identify candidate monitoring variables within each major category

PHASE II: Design prototype network-wide monitoring protocols

- a. Assess how threats and stressors identified in Phase I have the potential to or presently are altering the health of the freshwater resources and aquatic ecological systems
- b. Identify sources and locations of freshwater quantity/flow data (e.g. stream/lake/reservoir gaging stations of flow/level) to facilitate interpretation of water-quality information (information from Phase I)
- c. Design prototype freshwater monitoring protocols at the network-wide level and finalize the selection of candidate spatial and temporal monitoring variables

PHASE III: Implement pilot feasibility tests

- a. Identify pilot test locations for feasibility studies of proposed freshwater-resources monitoring programs
- b. Assist NETN park managers in implementing proposed freshwater resources monitoring plans through direct participation by Maine District staff and (or) by acting as a liaison with other USGS district offices in the northeastern region. This should lead to full scale implementation of the Network-wide monitoring program and fine tuning of the detailed monitoring plan developed as the initial step of this phase of work
- c. Finalize the design of the freshwater-resources monitoring plan for the NETN network in cooperation with park managers

METHODS AND APPROACH

To meet the project objective, the USGS Maine District proposes a three-phase approach. While all three phases are outlined below, Phase I is described in greatest detail.

PHASE I: Scoping report

Locate and assemble existing freshwater quality data for all freshwater resources in each of the following ten parks within the Northeast Temperate Parks Network:

1. Acadia NP, ME
2. Boston Harbor Island NPA, MA
3. Marsh-Billings-Rockefeller NHP, VT
4. Minute Man NHP, MA
5. Morristown NHP, NJ
6. Roosevelt-Vanderbilt NHS, NY
7. Saint-Gaudens NHS, NH
8. Saugus Iron Works NHS, MA
9. Saratoga NHP, NY
10. Weir Farm NHS, CT

Due to the scope of the subject area, an eleventh park, the Appalachian Trail from PA to ME, will be included as a special case. In this case, four to five freshwater resources of particular interest will be identified by the National Park Service to be included in the project.

The water-quality data to be catalogued for this project will be drawn from sources including but not limited to:

- Natural resource bibliographies
- NPS Water Resource Scoping Reports
- NPS Water (and Natural) Resource Management Plans
- "Horizon" baseline water quality data inventory and analysis reports
- NPS and State GIS data layers
- State 305b and 303d water quality reports
- USGS NWIS and other pertinent and readily available databases of monitoring agencies (State, Federal, Municipal) as appropriate
- National Hydrography Dataset
- USGS National Land Cover Data

After all existing freshwater quality data have been catalogued, it will be analyzed to identify existing stressors or potential threats to the freshwater resources.

A Water Resource and Water Quality Issues Scoping Report will be produced providing a bibliographic catalogue and summary of available water-quality and quantity data. The report will include discussion identifying the most important management issues and scientific issues for each park and important agents of change that could impact park aquatic resources. The report discussion will synthesize information into major categories, and identify candidate-monitoring variables within each major category and discuss current and emerging freshwater resource threats. (Note: freshwater quantity data will be important as well, such as the locations of streamflow gaging stations in and around parks. This is due to the importance of flow information when collecting water quality/aquatic monitoring data and the possibility that some gaging stations may be upgraded to obtain water quality data also, as a cost effective measure in long term monitoring of the more significant freshwater resources)

For each of the 11 parks within the Northeast Temperate Parks Network, the Scoping Report will document the following information:

- Description of the freshwater body types present within the park
- Identification of specific freshwater resources that are of unique importance on watershed or regional scales
- Freshwater body area statistics based on park-GIS coverages, National Wetland Inventory databases, and State coverages
- Summarization of information from State 305(b) reports and 303(d) lists to USEPA
- 1) • Description of ongoing inventory or monitoring programs related to park freshwater resources and water quality
- 2) • Identify the most important management issues and scientific issues for each park and important agents of change that could impact park aquatic resources

A network-wide synthesis of information in this phase will include:

- Categorization of present and emerging issues
- Identification of candidate monitoring variables within each major category

A Maine District staff hydrologist will oversee the project as the project chief. The project chief will work with a staff Hydrologic Technician and consult with on-staff colleagues who have expertise in aquatic chemistry and ecology. Personnel will accomplish the objective through literature searches and contact with scientists and managers associated with each of the parks, State environmental protection agencies, and EPA. Park site visits and field and aerial photographic assessments will also be done as necessary.

PHASE II: Design prototype network-wide monitoring protocols

Making use of the scoping report findings from Phase I, the USGS Maine District will evaluate past and present water quality monitoring designs at each park in order to develop guidance for future monitoring to address these threats. Data analysis will be done in an effort to finalize the selection of candidate monitoring variables for the network.

The focus will be on a monitoring program based at the Network level, not necessarily a compilation or continuation of the type of monitoring (site or park-specific) that has occurred at parks in the past. The monitoring questions being answered may be of a broader scope or context on a Network wide basis focusing on detecting change and preserving and protecting the more significant aquatic resources by selecting parameters (biological, physical, chemical) to measure most sensitive to those changes.

PHASE III: Implement pilot feasibility tests

The USGS Maine District will act as liaison with all other USGS district offices in the northeastern region to help the NPS implement water-quality monitoring feasibility studies at select national parks. The Maine District will conduct the feasibility study at Acadia NP if this park is chosen as one of the experimental sites. (Note: this should lead to full scale implementation of the Network wide monitoring program and fine tuning of the prototype monitoring plan developed in Phase II.)

See the May 2, 2002 guidance on "Development of Park Vital Signs Monitoring and Integration of Water Quality Monitoring" that discusses implementation schedule and content for 3-phase process.

PHASE I SCHEDULE: TWO-YEAR TIMELINE SPANNING FY03-04

TASKS	FY03								FY04							
	END	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Information gathering and cataloging				X	X	X	X	X	X	X	X	X	X			
Data-analysis and interpretive work						X	X	X	X	X	X	X	X	X	X	
Report writing												X	X	X	X	X

Deadlines:

Sep 30, 2003

Feb 28, 2003

End of FY03 progress report/presentation to NPS
Complete information-gathering efforts on the location and classification of surface-water resources, identification of potential stressors, and currently available water quality data and ongoing monitoring; progress report/presentation to NPS

May 31, 2004

Complete data-analysis and interpretive work necessary to identify park- and network-specific threats (issues) to freshwater resources.

June 30, 2004

Draft report ready for review; report/presentation to NPS. Phase II could begin at this time.

Sept 30, 2004

Phase I USGS Administrative Report approved, printed, and distributed

PHASE I BUDGET

LABOR	FY03	FY04
Hydrologist (project chief)	\$ 8,829	\$ 22,072
Hydrologic Technician	\$ 8,055	\$ 9,613
GIS/Publications	\$ -	\$ 2,064
Travel	\$ 2,840	\$ 710
Printing/Distribution costs	\$ -	\$ 600
Overhead (15%)	\$ 2,958	\$ 5,259
	\$ 22,682	\$ 40,318

TOTAL \$ 63,000