

The Network will make use of and build upon existing federal, tribal, state, and local monitoring. The Network will not replace existing efforts; rather, it will supplement these efforts and help make resulting products more definitive and useful.

### Partner Organizations

More than 100 individuals, representing over 50 organizations, participated actively in the Network design and pilot studies, including individuals from:

- 15 State Agencies
- 7 Federal Agencies
- 11 Universities
- 15 Non-Government Organizations
- 3 Private Sector Companies

For complete listings, as well as the full Network Design Report and Appendices, please see the Network website at:

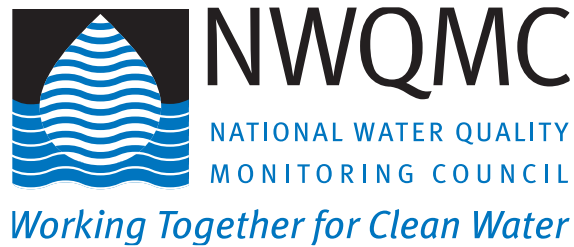
<http://acwi.gov/monitoring/network/>



Water Quality Sampling

USGS

### Network Interagency Committee



### A National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries

A Network of the U.S. Ocean Action Plan



San Francisco Bay

public domain

*“Effective management and mitigation of the impacts of human activities, hurricanes and climate change on coastal communities depend on rapid detection and timely prediction of changes in the condition of coastal ecosystems ....Just as weather forecasts and predictions of climate change depend on the sustained provision of meteorological and oceanographic data, timely predictions of these impacts depend on sustained provision of water quality information by the Network as a key component of the U.S. Integrated Ocean Observing System.”*

Tom Malone, Deputy Director of Ocean.US, Professor at the University of Maryland Center for Environmental Studies, and past President of the American Society of Limnology and Oceanography.

## A National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries

The Network shares many attributes with ongoing monitoring efforts but is unique in that it uses an integrated, multi-disciplinary approach to address a broad range of resource components, from upland watersheds to offshore waters. Key design features include:

- Clear objectives linked to management questions.
- Linkage to the Integrated Ocean Observing System (IOOS).
- Flexibility in design over time.
- Importance of metadata, quality assurance, comparable methods, and ready access.

### Objectives

1. Define status and trends of key water quality parameters and conditions on a nationwide basis.
2. Provide data relevant to determining whether goals, standards, and resource management objectives are being met, thus contributing to sustainable and beneficial use of coastal and inland water resources.
3. Provide data to identify and rank existing and emerging problems to help target more intensive monitoring, preventive actions, or remediation.
4. Provide data to support and define coastal oceanographic and hydrologic research, including influences of freshwater inflows.
5. Provide quality-assured data for use in the preparation of interpretive reports and educational materials.

### Goals

The goal of the Network is to provide information about the health of our oceans and coastal ecosystems and inland influences on coastal waters for improved resource management through efforts to:

- Integrate, coordinate, and enhance water quality monitoring efforts needed to make informed management decisions for sustainable use of aquatic resources.
- Communicate the availability of quality-assured data, and disseminate information products relevant to national, regional, and local needs.

### Pilot Studies

Three Pilot Studies to test the Network design were selected from among 12 expressions of interest. The pilots are:

- *Delaware Bay* – Led by the Delaware River Basin Commission, working with 12 partners, and the Mid-Atlantic Coastal Ocean Observing Regional Association.
- *Lake Michigan* – Led by the Great Lakes Commission, working with 19 partners, including the Lake Michigan Monitoring Coordination Council and the Great Lakes Observing System.
- *San Francisco Bay* – Led by the San Francisco Estuary Institute, working with 16 partners, including the Central and Northern California Ocean Observing System.

These Pilot Studies will help to refine the Network design through evaluation and selection of environmental parameters, sampling protocols and details of measurements. They will conduct an inventory of ongoing monitoring to identify gaps in existing data through comparison with the Network design.

The next phase of Network development will be Demonstration Studies, which could begin as early as Fiscal Year 2008. This effort would add sensors in the field, collect and analyze environmental samples, improve data sharing and data management, and other activities to move towards a fully implemented Network in the Demonstration Study areas.

**The Network uses three basic approaches for data collection: remote sensing, continuous sampling, and discrete sampling.**

NOAA-NOS

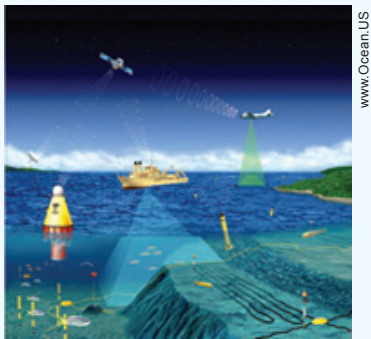


The offshore environment is so vast that the primary means of monitoring will be remote sensing, shipboard surveys, and moored or drifting buoys. Similar technologies may be used to supplement observations from fixed sampling sites in coastal waters.

# The National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries

**The Network is designed to allow for trend detection, and to be flexible to change over time.**

The Network provides a major contribution to the Integrated Ocean Observing System (IOOS). One of the seven societal goals of the IOOS is to provide data and information needed by decision makers to protect and restore healthy coastal ecosystems more effectively. Achieving this goal requires sustained monitoring of land-based sources of pollution and their impacts on coastal ecosystems. An important consideration for the successful development of both the Network and IOOS is the need to customize observations and analysis based on environmental conditions and monitoring requirements for different regions of the Nation's coastal waters. IOOS Regional Associations (<http://usnfra.org>) will help specify monitoring requirements for the Network. Improved data integration and information exchange will help to achieve the common goals of both the Network and the IOOS.



IOOS - The System

**The Network is to provide integrated monitoring of coastal and upland watersheds, estuaries and the coastal ocean using common criteria and standards.**

## San Francisco Bay

The proposed study area will encompass the San Francisco Bay estuary, the largest estuary on the West Coast, and will extend into the delta to the city of Sacramento to the north and the city of Stockton to the south. The study area will include the delta and the two major tributaries to the delta, the San Joaquin and Sacramento Rivers. The watersheds for these two tributaries drain approximately 75 percent of the state of California. At the western boundary, the study area will include those waters monitored by the Central and Northern California Ocean Observing System. The delta and the estuary are an important area of biological diversity and are a key transit point for migrating birds. Approximately 8 million people work and live around the San Francisco Bay estuary.

## Delaware Bay

The Delaware River Basin encompasses 13,539 square miles (mi<sup>2</sup>) and contains one of the longest un-dammed rivers in the United States, extending 330 miles from the confluences of its east and west branches at Hancock, N.Y., to the mouth of Delaware Bay. Significant amounts of historical and current water-quality monitoring (physical, chemical, and biological) have been conducted in the watersheds, estuaries, near-shore, and off-shore parts of the basin by federal, state, local, private, and academic entities. It is the intent of this effort to inventory, compare methods, and enhance data exchange in support of the National Monitoring Network.

## Lake Michigan

The Great Lakes – Michigan, Huron, Superior, Erie and Ontario – are a dominant part of the physical and cultural heritage of North America. Shared with Canada and spanning more than 750 miles from east to west, these vast inland freshwater seas provide water for consumption, transportation, power, recreation and a host of other uses.

Lake Michigan is the second largest of the Great Lakes. It is the only Great Lake entirely within the United States. The northern part is in the colder, less developed upper Great Lakes region. It is sparsely populated, except for the Fox River Valley, which drains into Green Bay. This bay has one of the most productive Great Lakes fisheries but receives the wastes from the world's largest concentration of pulp and paper mills. The more temperate southern basin of Lake Michigan is among the most urbanized areas in the Great Lakes system. It contains the Milwaukee and Chicago metropolitan areas, with over 11 million people dependent on the lake for drinking water. This region represents about one-fifth of the total population of the Great Lakes basin.

**Rivers will be monitored to determine the flow of water and loads of contaminants into estuaries and the Great Lakes.**

**The Network will provide the information necessary to assure effective stewardship of ocean and coastal resources.**

## A Network of Networks

- National network at specified spatial and temporal density
- Conditions and trends identified at national scale

## Design Features

- Nine resource compartments
- Both fixed station (identified) and probabilistic designs
- Parameters and sampling frequencies specified
- Provisions for data comparability, management and access

## Structure of the Design—Continuum of Observations

- Estuaries
- Nearshore
- Offshore and Exclusive Economic Zone
- Great Lakes
- Coastal beaches
- Wetlands
- Rivers
- Atmosphere
- Groundwater

## Environmental Issues to be Assessed

- Nutrient enrichment
- Oxygen depletion
- Sedimentation
- Toxic contamination
- Habitat degradation

## Samples to be Analyzed

- Physical characteristics (flow, sediments, habitat)
- Chemical constituents (organics and inorganics)
- Biological (chlorophyll and algae, bacteria and viruses, macroinvertebrates and fish)