

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 U.S. Integrated Ocean Observing System (IOOS, www.ocean.us) consists of global and coastal ocean modules. One of the seven societal goals of the IOOS is to provide data and information needed by decision makers to sustain and restore healthy ecosystems more effectively. Achieving this objective requires sustained monitoring of land-based sources of pollution and their impacts on coastal ecosystems, e.g., inputs of sediments, nutrients and chemical contaminants and their impacts on marine and estuarine ecosystems as indicated by phytoplankton blooms, toxic algal events, oxygen depletion, and loss of biodiversity. This underscores the importance of developing the National Water Quality Monitoring Network (Network) as a major contribution to the IOOS. An important consideration for 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. Regional Associations (RAs, <http://usnfra.org/>) have been established for the purposes of IOOS. As a part of this process, RAs will play a key role in the development of the NMN by helping to specify monitoring requirements for the network (e.g., site selection and the resolution of measurements in time and space) and integrating data and information needed to achieve the common goals of the NMN and IOOS.

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

San Francisco Bay Region

The proposed study area will encompass the San Francisco 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 estuary.

Delaware River Basin

The Delaware River Basin encompasses 13,539 square miles (mi²) and contains one of the longest un-dammed rivers in the United States, extending 330 miles from the confluence 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) has 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.

Great Lakes Commission

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. The Great Lakes are the largest surface freshwater system on the Earth. They contain about 84 percent of North America's surface freshwater and about 21 percent of the world's supply. Only the polar ice caps contain more freshwater.

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.

The Network is to provide coordinated, comprehensive monitoring that integrates water quality-related monitoring of coastal and upland watersheds, estuaries and the coastal ocean using common criteria and standards.

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

A Network of Networks

- Existing federal efforts augmented with state and local network compliant data
- National network at specified spatial and temporal density
- Conditions and trends identified at national scale
- Eighty participants in the National Water Quality Monitoring Network Design

Design Features

- Nine resource compartments
- Fixed station and probabilistic designs
- Stations identified
- Parameters and sampling frequencies specified
- Provisions for sampling and analytical methods comparability
- Design and data management linked to Integrated Ocean Observing System

Structure of the Design

- A continuum of observations
- Estuaries
- Nearshore
- Offshore and Exclusive Economic Zone
- Great Lakes
- Coastal Beaches
- Wetlands
- Rivers
- Atmosphere
- Groundwater

Data Collection Approaches

- Remote sensing
- Continuous sampling
- Discrete sampling

Environmental Issues to be Assessed

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

Samples to be Analyzed

- Physical characteristics
 - Flow, magnitude and direction; sediments, physical habitat
- Chemical constituents
 - Inorganics - major ions, nutrients, metals, mercury
 - Organics - carbon, pesticides, PCBs, PAHs, emerging contaminants
- Biological
 - Chlorophyll and algae
 - Bacteria and viruses
 - Macroinvertebrates and fish