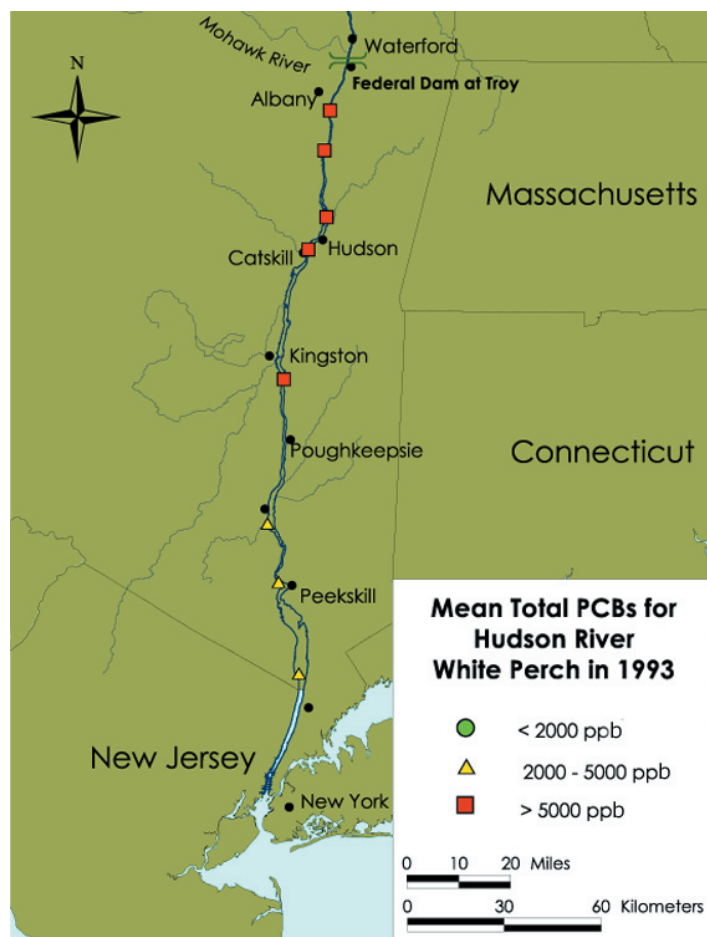


Watershed Database and Mapping Projects/Hudson River (New York)

Protection and restoration of coastal watersheds requires the synthesis of complex environmental issues. Contaminated site remediation, dredging and disposal of contaminated sediments, and restoring injured habitats are a few of the challenges facing coastal managers. The evaluation of multiple environmental issues can be significantly improved by combining scientific data and watershed characteristics into a Geographic Information System (GIS). NOAA's Assessment and Restoration Division (ARD) has developed decision-support tools for specific watersheds that combine the use of a standard database structure, database-mapping application (Query Manager™/ MARPLOT®) and an ArcView® GIS project (i.e., Watershed Database and Mapping Projects). Sediment contaminant and toxicity and tissue data, natural resources, and potential habitat restoration projects can be overlaid on a watershed's features and land uses, and displayed on maps at flexible spatial scales. This approach simplifies data analysis and presentation, provides valuable tools for complex decision-making, and improves our understanding of dynamic aquatic ecosystems.

NOAA has used this approach in several watersheds affected by contaminant releases from Superfund sites and other sources including Newark Bay, San Francisco Bay, Christina River, Sheboygan River, Puget Sound, and Calcasieu Estuary. These Watershed Projects use a standard structure along with information tailored to the major objectives of each watershed. For example, the Newark Bay Watershed Project supports decisions about remediation and disposal of contaminated sediment, while the San Francisco Bay Watershed Project focuses on Superfund site remediation and habitat restoration. The common organizational structure for data and spatial information promotes data sharing among Federal, state, and local agencies working within a watershed.

NOAA's approach is to provide a rapid, convenient way to create maps of the watershed that display analyzed, sorted, and summarized data that coastal managers have selected from a menu of programmed queries. The primary data types stored in the Watershed Projects include sediment chemistry, sediment toxicity, and tissue chemistry data. The base maps also display geomorphology, habitat characteristics, and land-use information. Integrating remedial investigation data with recent data in a single system helps investigators associate the distribution of contaminants with specific sources and evaluate the possibility of contaminant effects in potential habitat restoration areas. Combining restoration information and contaminant distributions across the watershed enhances the potential for successful restoration of wide-ranging populations. The Watershed Projects have benefited a variety of user groups and have enhanced cooperation and data sharing.



Mean total PCB concentrations (ppb) in white perch collected from the lower Hudson River in 1993 as part of EPA's ecological risk assessment for the Hudson River Superfund site.

ARD is developing the Hudson River Watershed Project, which includes the entire Hudson River Superfund site, over 200 river miles from the mouth of the river in New York Harbor to beyond Hudson Falls. Fish and sediments throughout the river are contaminated with polychlorinated biphenyls (PCBs), causing commercial and recreational fishing bans and advisories throughout the river.

The project integrates sediment chemistry and tissue chemistry data from

- EPA's Superfund Reassessment Remedial Investigation;
- Monitoring of PCB and other contaminant concentrations in fish throughout the river;
- General Electric's investigations of sediment and fish;
- NOAA's studies of PCB levels in fish; and
- The U.S. Department of the Interior's studies of PCB concentrations in tree swallow nestlings, eggs and prey organisms.

The Hudson River Watershed Project's objective is to provide state and federal trustees with the ability to integrate the large amount of existing point data on sediment chemistry, tissue chemistry, and sediment toxicity with maps that identify key habitats, potential restoration sites, and potential point sources (including stormwater). Maps will show the distribution of Brownfield sites, land uses, contaminant distributions, wetlands, and other information relevant to project objectives.

Analytical tools such as database queries and import/export scripts developed for one project can be applied to all projects because of the common database and GIS project structure. Query Manager can be used to select and export data to any program that supports standard spreadsheet, database, or tab-delimited text files. Scripts have been developed for seamless import of data from Query Manager to ArcView® GIS to enhance and simplify further data analysis and presentation.

The Watershed Projects run on standard desktop Microsoft Windows®-based personal computers. The database and mapping application, Query Manager is an easy-to-use, interactive system that allows you to query the database and rapidly display the results on a map in MARPLOT® or deliver the data in the appropriate form to the watershed ArcView GIS project. In addition, both standard and customized base maps are developed in ArcView to support all Watershed Projects. Standard layers include wetlands, Superfund sites, and regulated industrial facilities and NOAA digital navigation charts. Custom imagery and other spatial data layers also are routinely used with data from the Query Manager database.

ARD's Watershed Projects are proving useful throughout the Superfund remedial decision-making process, from identifying locations for the collection of additional samples to providing the historical context for interpreting data, to identifying areas for restoration. This versatile tool improves NOAA's ability to protect and restore the biodiversity of watersheds that contribute to healthy coastal habitats.

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NOAA's Office of Response & Restoration—Protecting our Coastal Environment

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