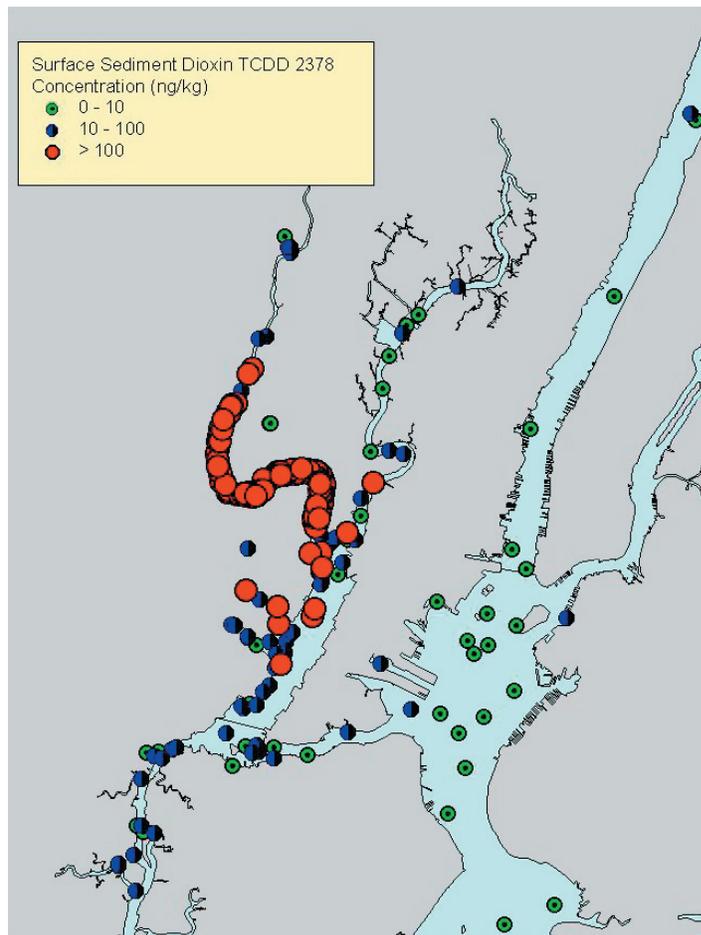




Watershed Database and Mapping Projects/Newark Bay (New Jersey)

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 pilot watersheds affected by contaminant releases from Superfund sites and other sources: Charles River, Hudson River, Newark Bay, Christina River, Anacostia River, Sheboygan River, St. Andrew Bay, Calcasieu Estuary, San Francisco Bay, and Puget Sound. 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.



Surficial sediment dioxin concentration in the Newark 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.

ARD is developing the Newark Bay Watershed Project, which includes Diamond Alkali Superfund Site on the lower Passaic River. Fish, shellfish and sediments of the Newark Bay Complex (Passaic River, Newark Bay, Hackensack River, Arthur Kill, Kill van Kull) are contaminated with dioxins and furans, resulting in commercial and recreational fishing bans and advisories throughout the complex

The project integrates sediment chemistry and tissue chemistry data from:

- EPA's Superfund Remedial Investigation (RI);
- EPA's EMAP and REMAP program;
- NOAA's National Status and Trends program; and
- NJ Department of Environmental Protection.

Incorporation of additional data is planned from:

- The U.S. Department of the Interior's studies of cormorant nestlings, eggs and prey organisms;
- The Contaminant Assessment Reduction Program (CARP); and
- Supplemental sampling as part of the RI and by the natural resource trustees.

The Newark Bay 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 combined sewer overflows). Maps will show the distribution of Brownfield and hazardous waste sites, land uses, contaminant distributions, wetlands, mudflats, 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 Macintosh™ and 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 basemaps 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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