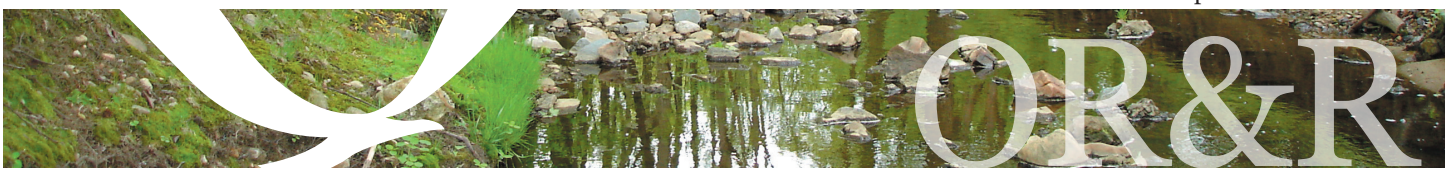
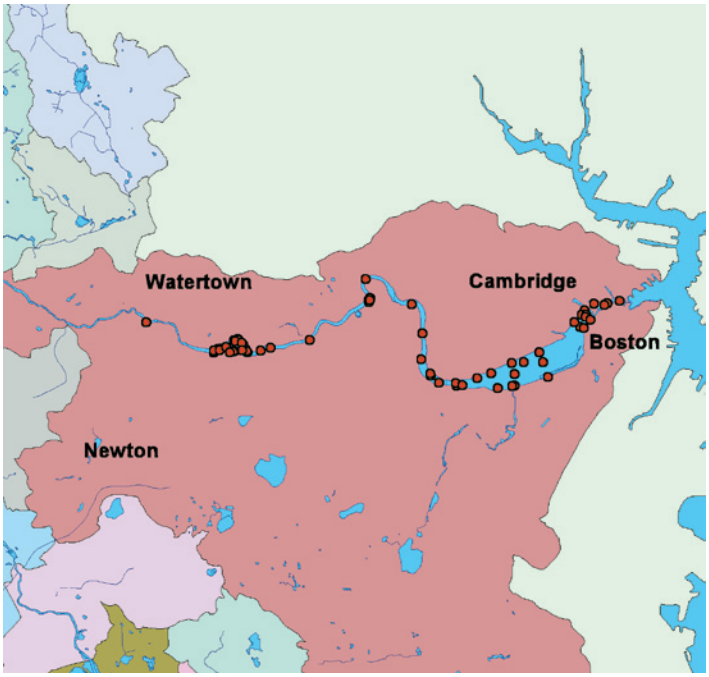


Watershed Database and Mapping Projects/Charles River (Massachusetts)

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.



The number of Sediment Quality guidelines eceeded in surface sediment mapped in ArcView. The locations where more than 10 of the chemicals measured were greater than the ERM Sediment Quality guidelines.

ARD is developing the Massachusetts Charles River Watershed project as part of its participation in the "Clean Charles 2005" initiative. The goal of the initiative is to make the Charles River swimmable and fishable by Earth Day 2005. The Charles River, considered one of the busiest recreational rivers in the county, flows for 80 miles through 23 towns and cities before discharging into Boston Harbor, a coastal embayment of Massachusetts Bay. The USEPA, ACOE, MA-Executive Office of Environmental Affairs, MADEP, the MWRA, the USGS, and the Charles River Watershed Association (CRWA), are all working cooperatively to achieve fishable/swimmable conditions in the Charles River. NOAA also has an interest is in improving river habitat for the benefit of resident and migratory natural resources. Twenty species of fish inhabit the Charles River. Four anadromous species include two species of river herring (alewife and blueback) and rainbow smelt and American shad.

The project integrates sediment chemistry, bioassay, and tissue data from:

- The United States Geological Survey (USGS);
- The United States Environmental Protection Agency (EPA);
- Massachusetts Department of Environmental Protection (MADEP);

- U.S. Army Environmental Center (USAEC) Remedial Investigation of the former U.S. Army Materials Technology Laboratory in Watertown, MA;
- The Massachusetts Department of Public Health (MDPH); and
- The Massachusetts Water Resources Authority (MWRA).

The Charles River Watershed Project's objective is to provide users with the ability to query existing point data on sediment chemistry, sediment toxicity, and tissue chemistry, and to view the data spatially along the river with maps that identify key features such as outfall locations. This combined database and mapping project, which can be easily updated, will be a useful tool for data sharing, education, presentations and future river studies to regulatory agencies, citizen groups, academic investigators, and any other groups interested in the Charles River.

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 benefitted a variety of user groups and have enhanced cooperation and data sharing. The database mapping system allows users to:

- Evaluate multiple data sets within a geographic area;
- Identify chemical concentration and toxicity gradients;
- Prioritize problem areas based on sediment chemistry, sediment toxicity, and/or tissue chemistry;
- Catalog and evaluate potential habitats for restoration;
- Identify important data gaps; and
- Add and share new information.

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 an 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.

For additional information:
Alyce Fritz (206) 526- 6305
Nancy Beckvar (206) 526-6557
Ken Finkelstein (617) 918-1499
http://response.restoration.noaa.gov

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

For further information about NOAA's Office of Response and Restoration, please visit our Web site at

http://response.restoration.noaa.gov or call (301) 713-2989.