Watershed Database and Mapping Projects
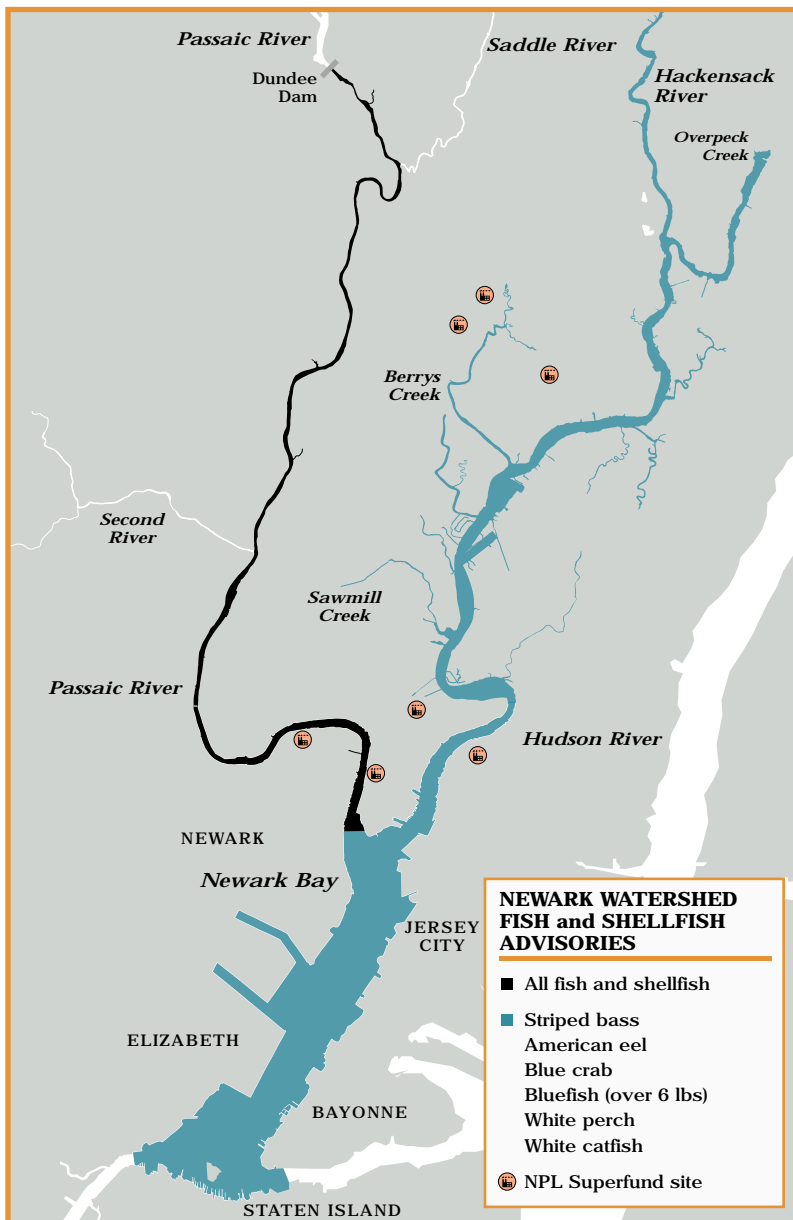
Protection and restoration of coastal watersheds requires the synthesis of complex environmental issues. Contaminated site remediation, dredging and disposal of contaminated sediments, and restoring injured habitats are a few of the challenges facing coastal managers. The evaluation of multiple environmental issues can be significantly improved by combining scientific data and watershed characteristics into a Geographic Information System (GIS). NOAA's

Coastal Protection and Restoration Division (CPRD) has developed an integrated assessment tool that combines the use of a database, database-mapping application (Query Manager) and GIS. 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 six pilot watersheds affected by contaminant releases from Superfund sites and other sources: Newark Bay, San Francisco Bay, Christina River, Sheboygan River, Puget Sound, and Calcasieu Estuary. These projects combine a standard database structure and the Query Manager database-mapping application with information tailored to the major objectives of each watershed. For example, the Newark Bay project supports decisions about remediation and disposal of contaminated sediment, while the San Francisco Bay 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 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 relational database 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 database-mapping (GIS) system helps investigators associate the distribution of contaminants with specific

Passaic River

Saddle River

Dundee Dam

Hackensack River

Overpeck Creek

Berrys Creek

Second River

Sawmill Creek

Passaic River

Hudson River

NEWARK

Newark Bay

JERSEY CITY

ELIZABETH

BAYONNE

STATEN ISLAND

NEWARK WATERSHED FISH and SHELLFISH ADVISORIES

- ■ All fish and shellfish
- ■ Striped bass
  American eel
  Blue crab
  Bluefish (over 6 lbs)
  White perch
  White catfish
- ⬤ NPL Superfund site

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.

Query Manager, the Coastal Protection and Restoration Division's watershed database and mapping application developed for the NOAA watershed projects, runs on standard desktop

Macintosh™ and Microsoft Windows™-based personal computers. Query Manager is an important tool for all NOAA's watershed projects. It 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 sediment chemistry data from the Query Manager database.

NOAA's watershed database mapping system is 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 watershed database and mapping information, call Alyce Fritz at 206/526-6938 or Jay Field at 206/526-6404 or visit our website at **http://response.restoration.noaa.gov**

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