

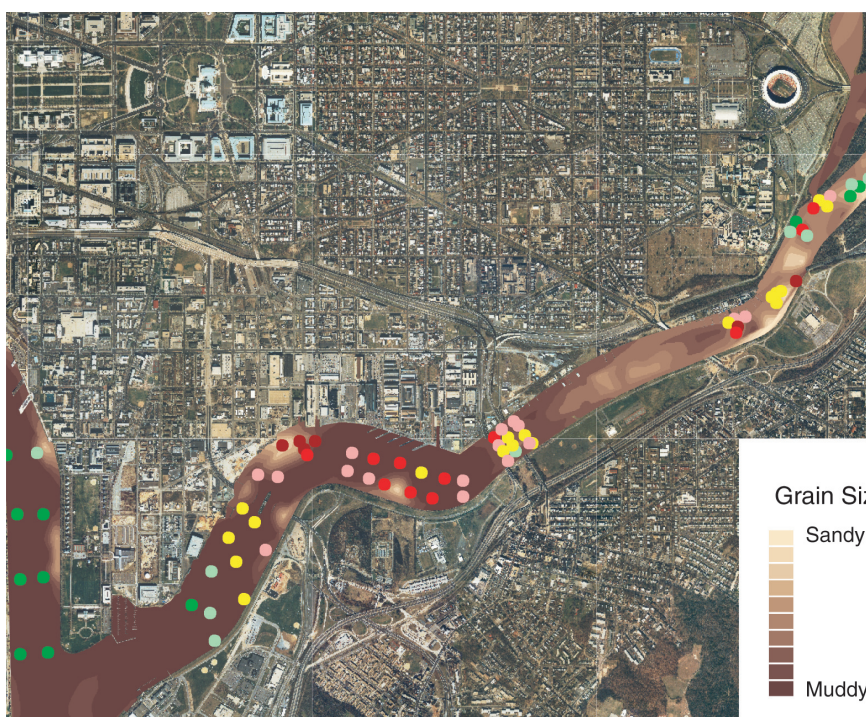
Watershed Database and Mapping Projects/Anacostia River (Maryland/District of Columbia)

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 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.

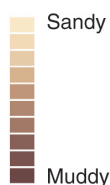
The Anacostia River region has been populated for over three centuries. Years of population, resource use, industrial development, and urbanization have resulted in a river basin that



PCBs (µg/kg)



Grain Size



The NOAA watershed tool allows for rapid analysis of data from various sources, thus providing insights not easily obtained otherwise. For example, data from two recent but independent surveys (Spring and Summer 2000) are combined here, with results shown for an area upstream from the mouth of the Anacostia. Comparisons between sediment PCB concentrations and sediment texture indicate that "hot-spots" (the red dots ●) of organic contamination in this river system are not, as would usually be expected, associated with fine-grained sediment.

has been drastically altered and degraded from its natural state. These impacts include the presence of chemicals in fish tissue that has resulted in fish consumption advisories and bans, plus fishing restrictions. The Chesapeake Bay Program has declared the Anacostia River as one of three Areas of Concern due to the overall poor health of the river.

ARD has developed the Anacostia River Watershed Project as part of its membership in the Anacostia Watershed Toxics Alliance. The Alliance was formed as a public-private consortium to work together in good faith as partners to evaluate the impacts of contaminants of the river and to take actions to restore the river to its beneficial use. The Alliance is unique among other organizations working on the Anacostia because of its focus on toxic contaminants.

The Anacostia River Watershed Project's objective is to provide the Alliance and stakeholders with the information required to assess the ecological and human health risks due to contamination of the river, and also with the capacity to conduct analysis of these data. The second release of the project includes expanded information on sediment, and fish tissue chemical analyses; sediment toxicity; the health of the benthic and fish communities; and the quality of habitat. This information has been presented within a screening risk assessment framework, and has been a valuable foundation for the investigation and remediation process matures to designing restoration options.

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. 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 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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