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OFFICE *of* RESPONSE *and* RESTORATION

*Coastal Protection and Restoration Division*

# A user-friendly database and mapping tool for planning remediation and monitoring in the Charles River

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# Major Components of CPRD Watershed Projects

- Query Manager Database-Mapping application (Marplot)
- ArcView GIS Project

# Purpose:  Integrate Science and Technology into Management Decisions

- Make all data available to all managers

- Make better use of available data

- Improve coordination among partner agencies

- Provide easy-to-use tools for public outreach

# Database and Mapping Tool

- Query Manager database-mapping application
  - standard relational database structure
  - integrated, multi-agency database
  - menu of flexible, pre-programmed database queries
  - direct link to mapping application (MARPLOT™ or ArcView)

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http://response.restoration.noaa.gov/cpr/cpr.html
http://response.restoration.noaa.gov/cpr/qm/
windowsqm.html

**3) Individual Databases** Select a link below to download the database for a given watershed area.

- Anacostia River, Washington D.C. (218 KB; updated 11/19/99)
- Calcasieu Estuary, Louisiana (781 KB; updated 6/3/99)
- Charles River, Massachusetts (452 KB; updated 3/20/00) * Special Instructions
- Christina River, Delaware (292 KB; updated 2/23/00)
- Hudson River, New York (8.29 MB; updated 1/25/00)
- Newark Bay, New Jersey (2.14 MB; updated 8/23/99)
- Puget Sound, Washington (3.96 MB; updated 1/28/00)
- San Francisco Bay, California (900 KB; updated 11/30/99) * Special Instructions
- St. Andrew Bay, Florida (241 KB; updated 2/7/99)

**4) Individual Maps** Select a link below to download the maps for a given watershed area.

- Anacostia River, Washington D.C. (8.83 MB)
- Calcasieu Estuary, Louisiana (2.13 MB)
- Charles River, Massachusetts (25.98 MB) * Special Instructions
- Christina River, Delaware (1.08 MB)
- Hudson River, New York (15.07 MB)
- Newark Bay, New Jersey (14.89 MB)
- Puget Sound, Washington (19.37 MB)
- San Francisco Bay, California (20.50 MB) * Special Instructions
- St. Andrew Bay, Florida (1.43 MB)

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# Primary Data Types

- **Sediment chemistry**
  - **Surface**
  - **Subsurface**
- **Sediment toxicity**
- **Tissue chemistry**
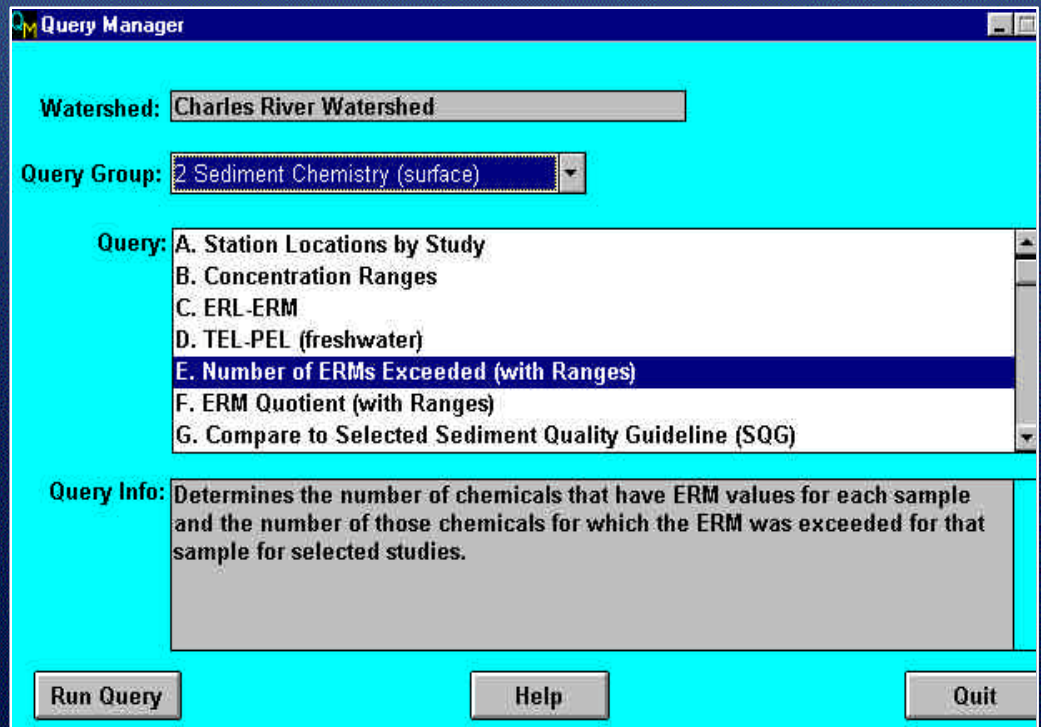
# Charles River Watershed

- Most densely populated river basin in New England

- Long history of water quality and habitat degradation

- "Clean Charles 2005" - EPA goal to restore river for fishing and swimming

# Methods - Chemistry data compilation

- Identify all sediment chemistry, sediment toxicity, and tissue chemistry data from state, federal, local, and academic sources

- Acquire electronic or paper records of data

- Data from different formats entered into one relational database in a standardized format

# Charles River, MA

- ## Sediment Chemistry
  (7 studies) 266 Stations
- ## Toxicity
  (1 study) 6 Stations
- ## Tissue Chemistry
  (9 studies) 13 Stations

**Charles River Watershed**

Choose which studies to include in your query.

Available studies:

1990 MWRA CSO Inputs into Sediments
1991 Weston AMTL Superfund Site Study
1992 Weston AMTL Superfund Site Study
1995 Plexus AMTL Superfund Site Study
1996 Brandeis Univ Cram's/Purgatory Cove
1996 EPA Sediment/Water Quality Project
1998 USGS Contaminant Database

[All]   Add   Remove   None

Selected studies:

# Army Materials Technology Laboratory Superfund Site (AMTL)

- Compare site-related contaminant concentrations with concentrations up- and downstream
  - Aroclor 1254
  - DDE

# Concentrations of Aroclor 1254 in the back channel near the AMTL site compared to concentrations up-and downstream.
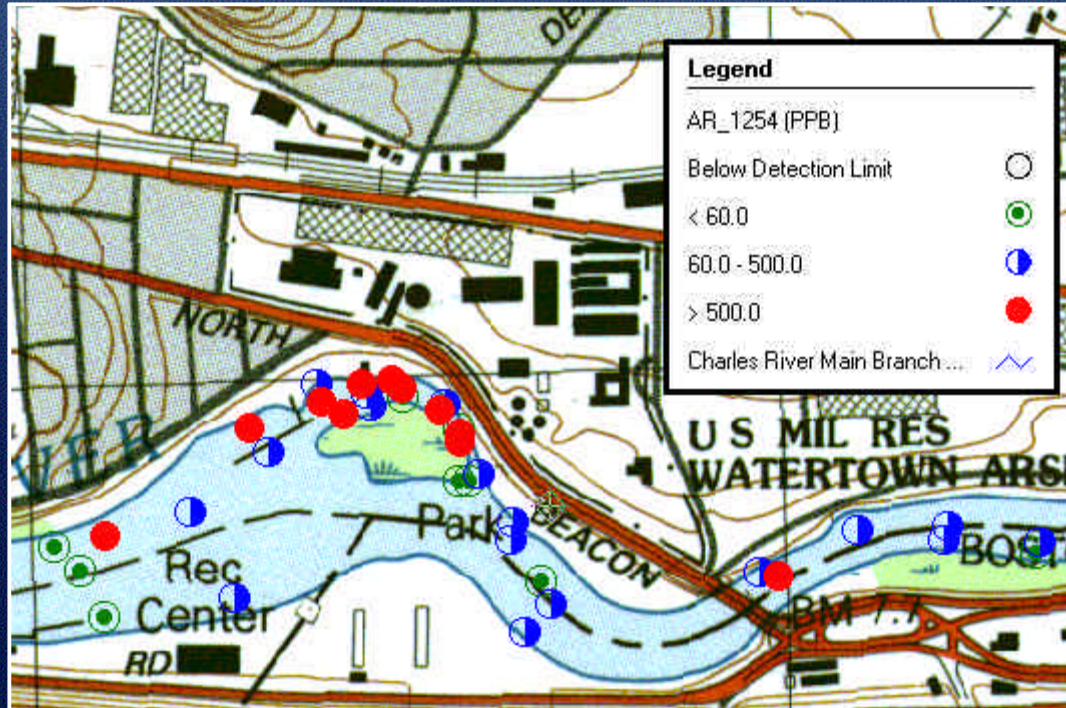
# Fish Tissue Residue Data

PCBs in Carp

- Lower river - 1.6 ppm, max. 2.6 ppm
- Upper river -  0.18 ppm, max. 0.52 ppm

PCBs in Largemouth Bass

- Lower river -  0.42 ppm, max. 1.1 ppm
- Upper river  - 0.047 ppm, max. 0.17 ppm
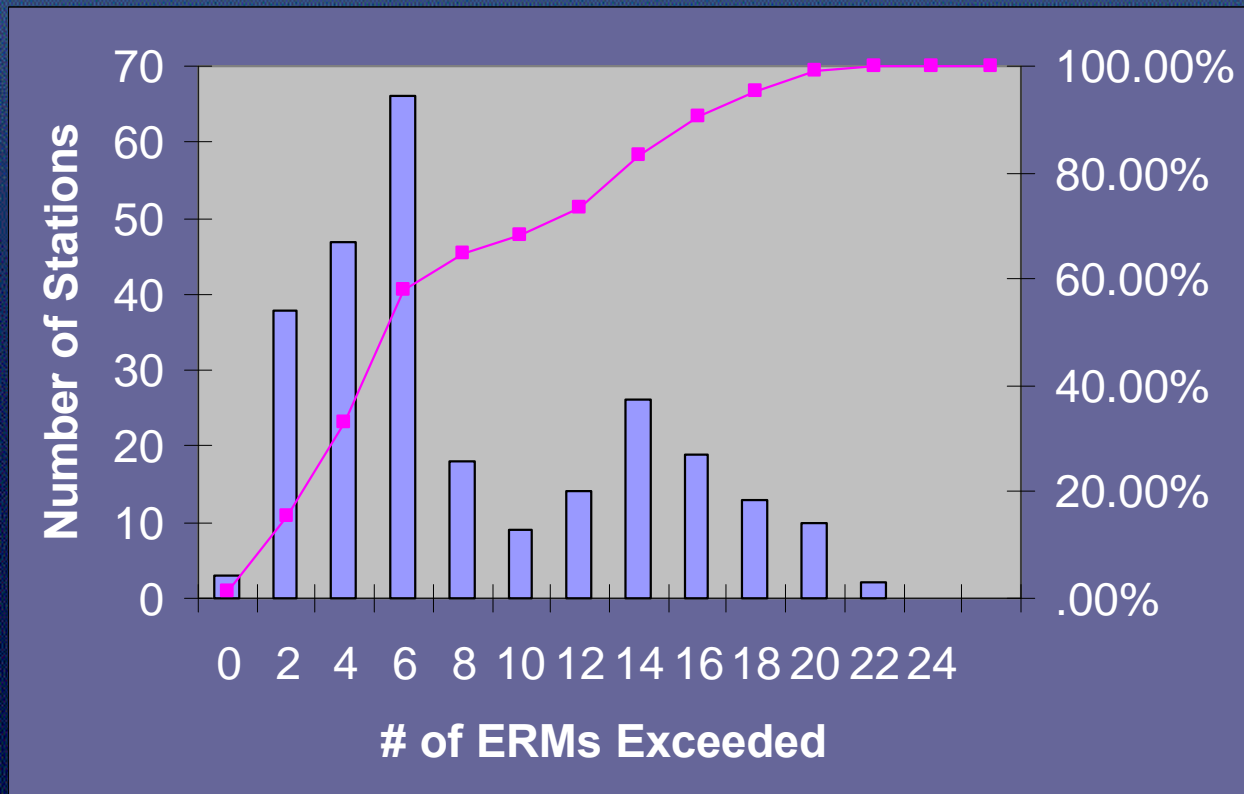
# Charles River
# Number of Chemicals Exceeding ERMs

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# Table 1. Number of Charles River stations with high probability of toxicity (*Long and MacDonald 1998)

|  |  | **Probability of toxicity\*\*** | **Lower Charles River (105 Stations)** |
|---|---|---|---|
| **Highest priority sites\*** | >10 ERMs Exceeded | 85% | 89 stations (85%) |
|  | Mean ERM quotient>1.5 | 74% | 80 stations (76%) |
| **Lowest priority sites\*** | No ERLs exceeded | 11% | No stations |
|  | Mean ERM quotient <0.1 | 12% | No stations |

\*\*amphipod survival tests (Long and MacDonald 1998)

# Planning Remediation and Monitoring

- Dredging
- Wetland Creation
- Anadromous Fish Restoration
- Fish Tissue Monitoring
- Sediment Chemistry Monitoring

Project Objectives

- Provide data management tools that
  - Simplify import of data into Query Manager relational database structure
  - Provide  a suite of tools for QA of imported data

What is the advantage of putting data into Query Manager database structure?

- template for data requirements for Grantees
- standardized database for GLNPO data
- incorporation into NSI database
- tools for data analysis, data extraction, and data sharing

## APPROACH

- Develop standard data template (Excel workbook)

- Create Access database using QM relational database structure

- Develop tools to improve efficiency of data import and automate QA process

- Manage database in Access and provide direct export to QM DBF file format