Beyond Data Download:

Gathering Information & Knowledge using Web Based Data Analysis and Visualization Tools from NOAA's National Status & Trends Program

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NOAA's National Status and Trends Data

- **Mussel Watch Project – since 1986**
  - the longest continuous contaminant monitoring program in U.S. coastal waters
  - chemical and biological contaminant trends in sediment and bivalve tissue

- **Bioeffects Assessment – since 1986**
  - identifies and assesses biological effects associated with contaminant exposure
  - 30 intensive regional studies, using the Sediment Quality Triad approach
  - sediment, tissue, and water chemistry for 80+ organic and inorganic contaminants; toxicity bioassays; biomarker assays; histopathology; and benthic community assessment.

- **Benthic Surveillance Project – 1984 to 1993**
  - chemical and biological contaminant trends in sediment and fish tissue
  - sediment, fish liver and fish bile chemistry for 100+ organic and inorganic contaminants, and associated diseases in the fish livers.

Are your customers looking for *Data*, *Information*, or *Knowledge*?

- *Information* comes from data analysis.
- *Knowledge* comes from the right quantity and quality of information.

NS&T Data Portal users can produce *Information* from *Data* using web based analysis and visualization tools. For example:

- Visual Analysis: e.g., mapping and graphing
- Numerical Analysis: e.g., statistics

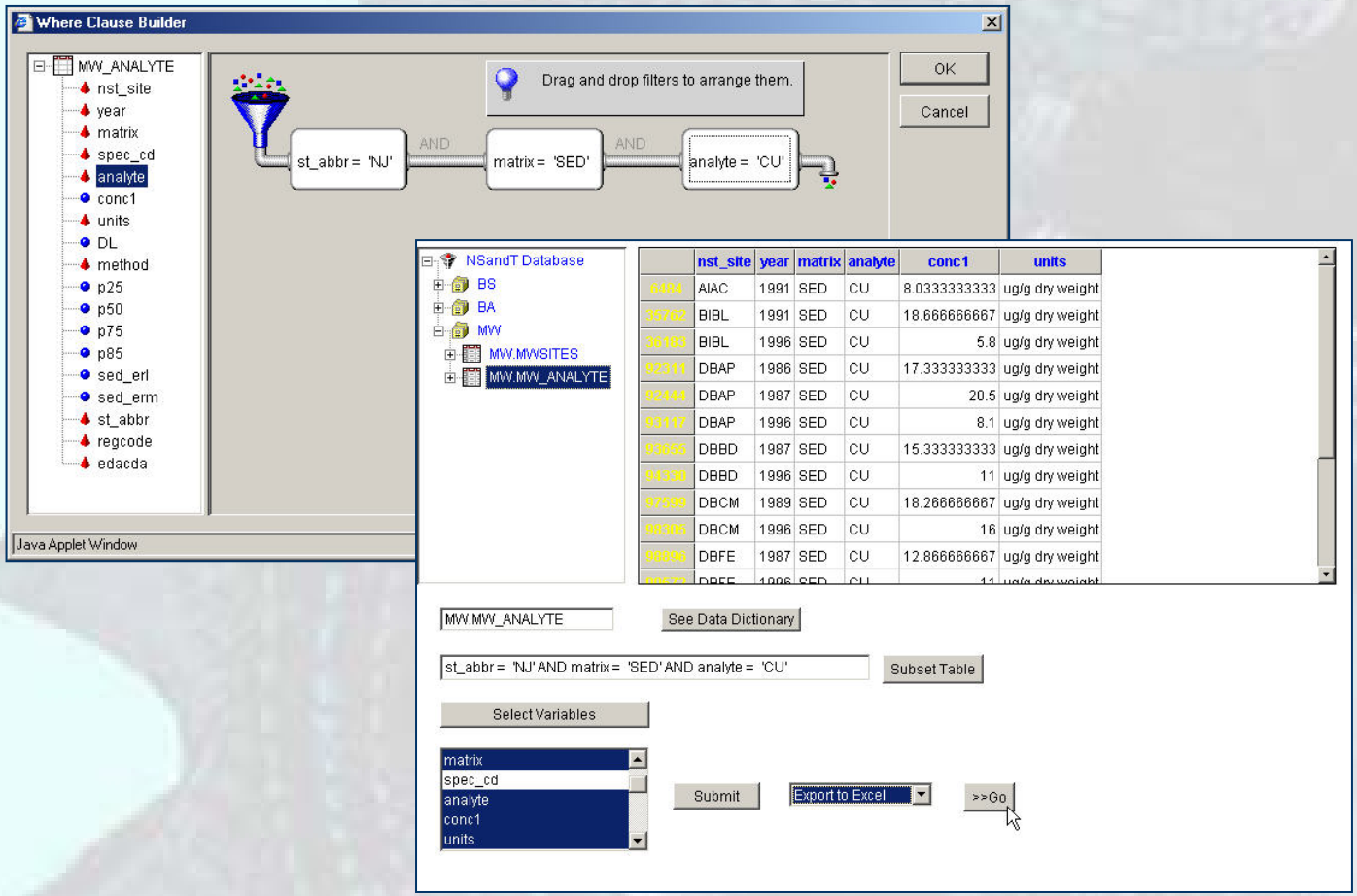
Downloading data can be one way to begin the process of data analysis but ….

Are you really sure you need to download the data?

- Some databases are large and getting larger.
- Downloading can take time (bandwidth).
- Some databases are updated frequently.
- Large effort to understand the structure of downloaded data before analysis can begin.

If you must download data …
limit what you download to your specific needs.

Example 1: Data access, with data query & download



Movie

If you must download data …
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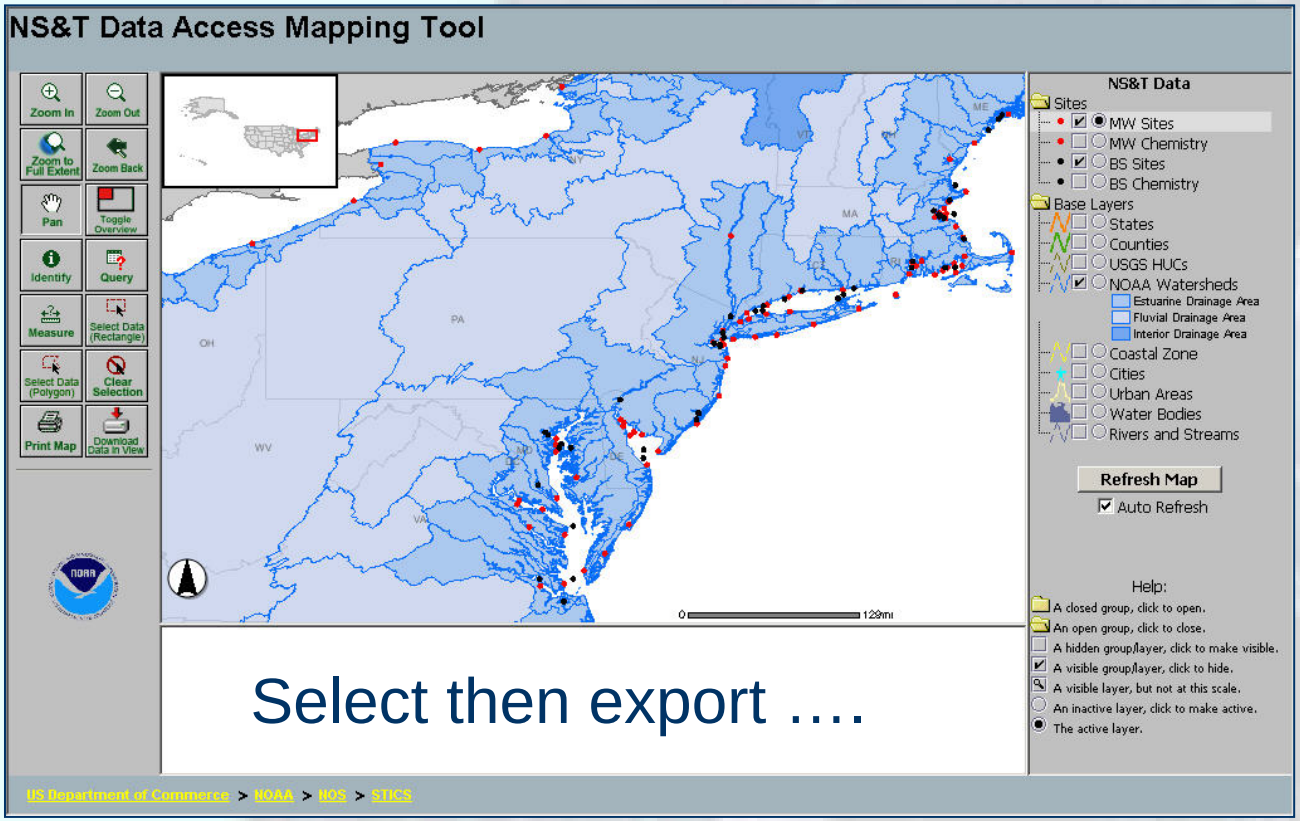
Example 2: Data access, query and download from a map



Movie

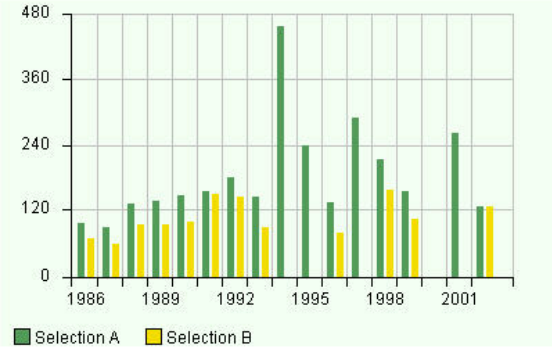
Beyond Data Download:

Examples of Web Tools

for data visualization and analysis

Suppose a Mussel Watch data user wants to view temporal trends in the mean copper (Cu) levels of the Tampa Bay Watershed relative to the mean level in for the entire state of Florida.

Trends Comparison State vs Watershed for Copper (Cu) (CU) concentration (ug/g dry weight)



Study Area Comparison Tool

State of FL

Selection A		
State Name	Year	Concentration
Florida	1986	100
Florida	1987	91
Florida	1988	136
Florida	1989	140
Florida	1990	150
Florida	1991	158
Florida	1992	184
Florida	1993	147
Florida	1994	459
Florida	1995	241
Florida	1996	137
Florida	1997	292

Tampa Bay Watershed

Selection B		
Sub-Watershed Name	Year	Concentration
Tampa Bay	1986	71
Tampa Bay	1987	62
Tampa Bay	1988	98
Tampa Bay	1989	97
Tampa Bay	[illegible]	102
Tampa Bay	1991	153
Tampa Bay	[illegible]	149
Tampa Bay	[illegible]	91
Tampa Bay	1996	82
Tampa Bay	1998	161
Tampa Bay	1999	107
Tampa Bay	2002	130

Movie

Where do Total PAH concentrations in Mussel Watch Tissue exceed the value of 2,500 ng/g dry wt (user selects value).

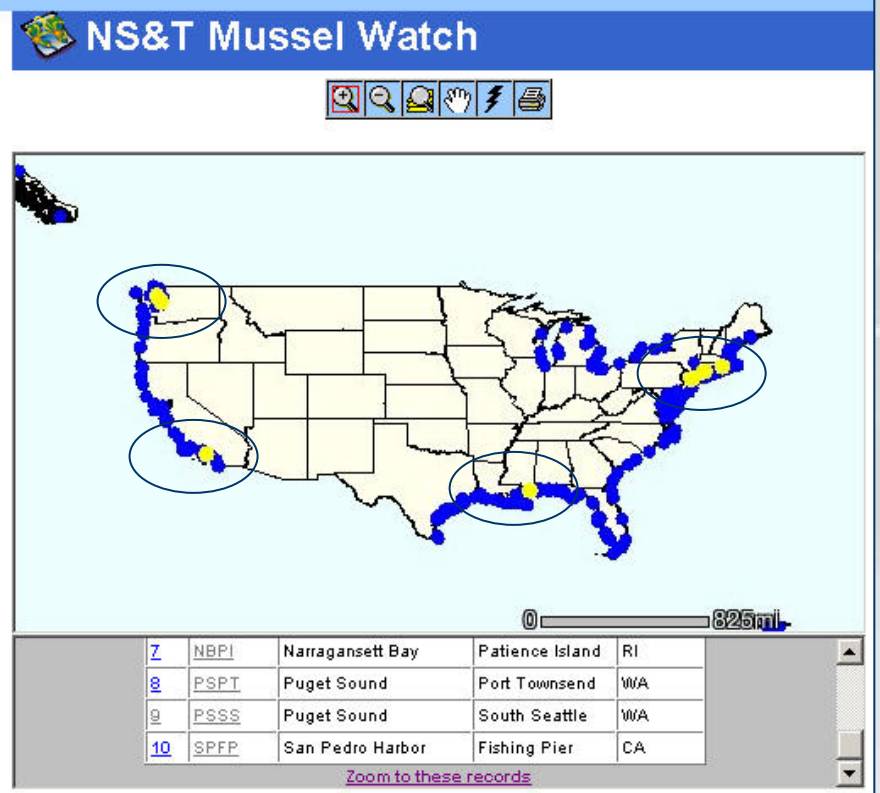
Home

Program	Analyte	Year	Help on Range	Operator	Enter Value
Mussel Watch	Total PAH	2002	Help on Range	Greater Than	2500

Query

Avg. conc. of Total PAH (ng/g dry weight) in 2002

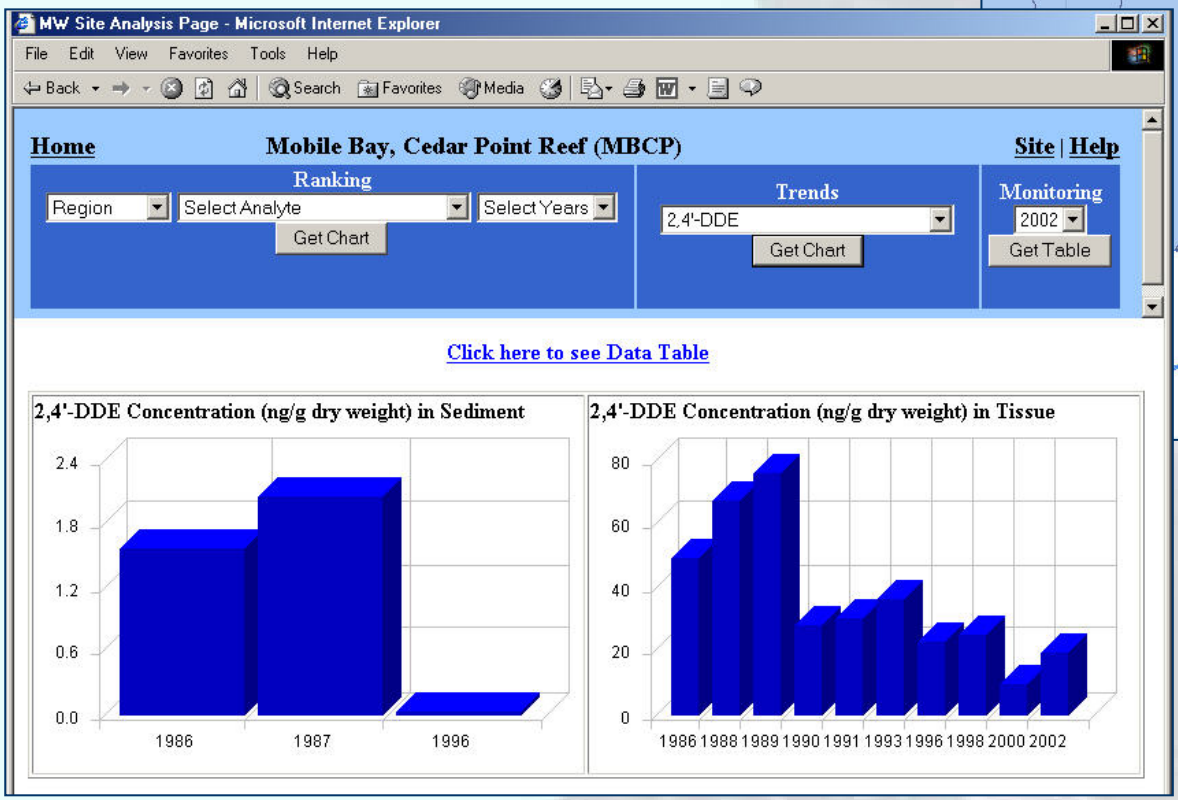
NST_SITE	GEN_LOCA	SPEC_LOC	Conc
HRLB	Hudson/Raritan Estuary	Lower Bay	6722.6
EBFR	Elliott Bay	Four-Mile Rock	5013.9
PSSS	Puget Sound	South Seattle	4581.1
HRRB	Hudson/Raritan Estuary	Raritan Bay	3490.1
SPFP	San Pedro Harbor	Fishing Pier	3404.7
LIHR	Long Island Sound	Housatonic River	3152.1
PSPT	Puget Sound	Port Townsend	2780.2
MSBB	Mississippi Sound	Biloxi Bay	2738
LINH	Long Island Sound	New Haven	2615.5
NBPI	Narragansett Bay	Patience Island	2581.7

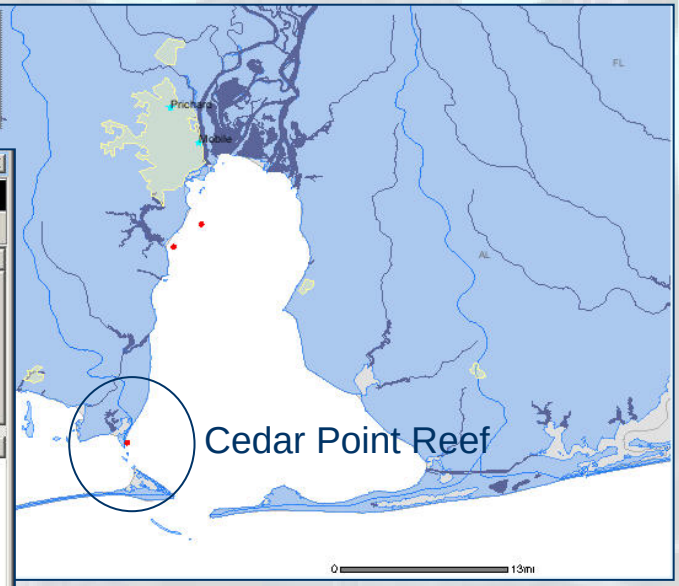


Analyte Conditional Search Tool

Movie

I live in the Mobile Bay Watershed of Alabama. What are the temporal trends of DDE in sediment and tissue in my area?

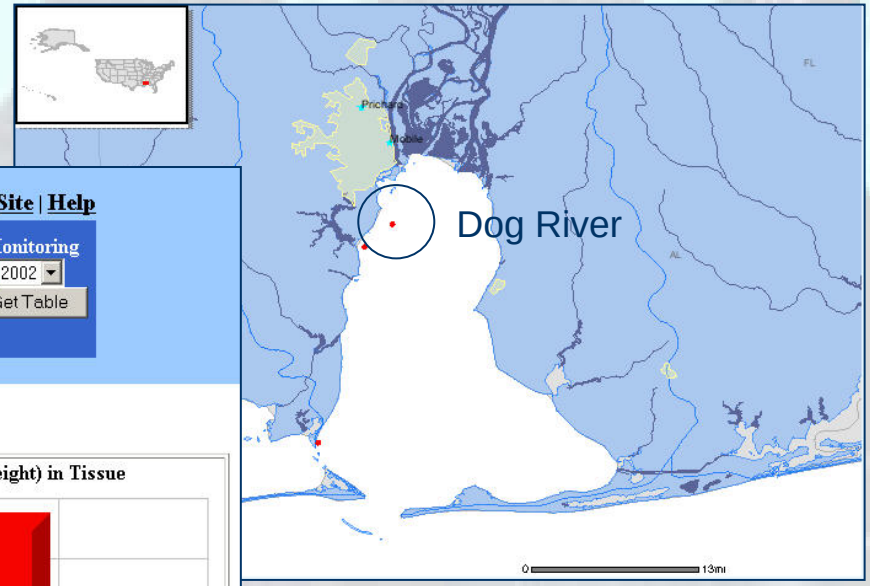




Site Profile Tool
(Temporal Trends)

Movie

I live in the Mobile Bay Watershed of Alabama. How do Total DDT level in sediment and tissue compare?



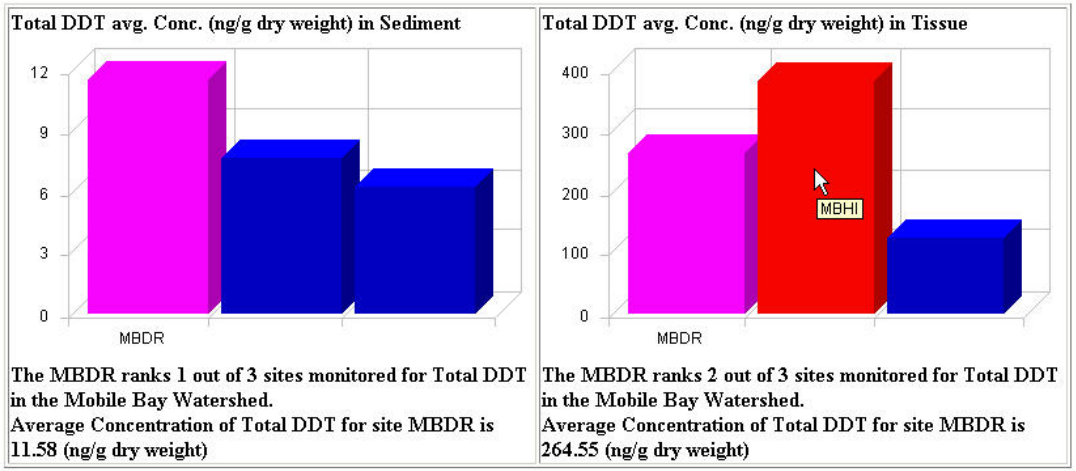
Home **Mobile Bay, Dog River (MBDR)** **Site | Help**

Ranking: Watershed | Total DDT | All Years — Get Chart

Trends: %_Lipid — Get Chart

Monitoring: 2002 — Get Table

Click here to see Site Names or Click here to see Data Table



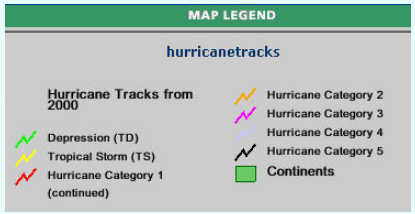
The MBDR ranks 1 out of 3 sites monitored for Total DDT in the Mobile Bay Watershed.
Average Concentration of Total DDT for site MBDR is 11.58 (ng/g dry weight)

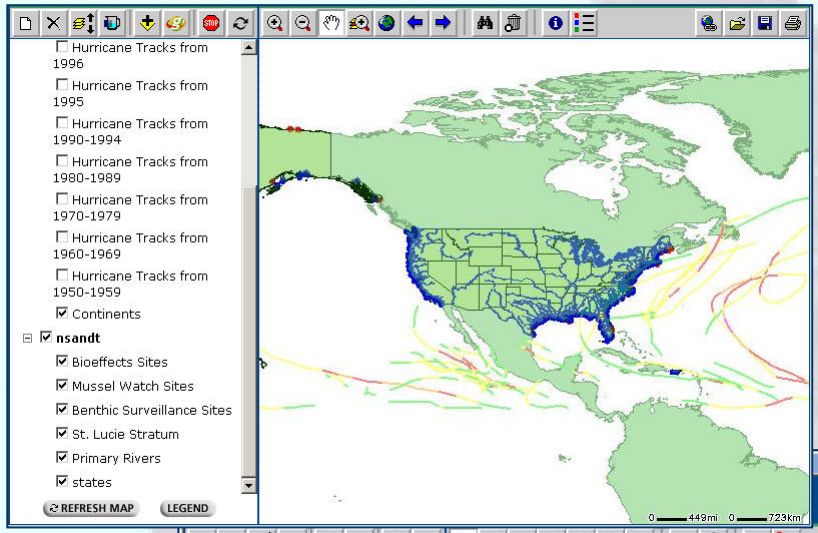
The MBDR ranks 2 out of 3 sites monitored for Total DDT in the Mobile Bay Watershed.
Average Concentration of Total DDT for site MBDR is 264.55 (ng/g dry weight)

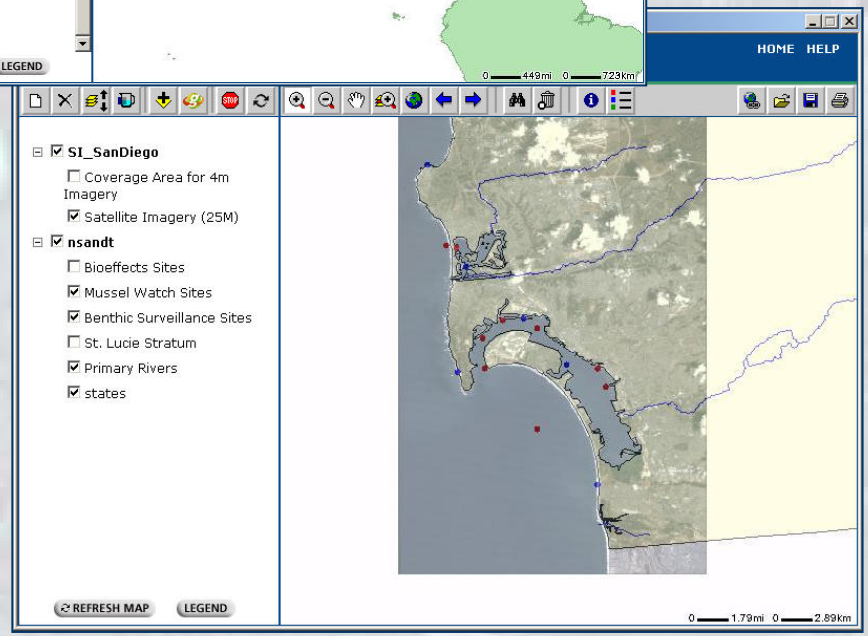
Site Profile Tool (Ranking)

Movie

Create maps using geographic data published on the web.





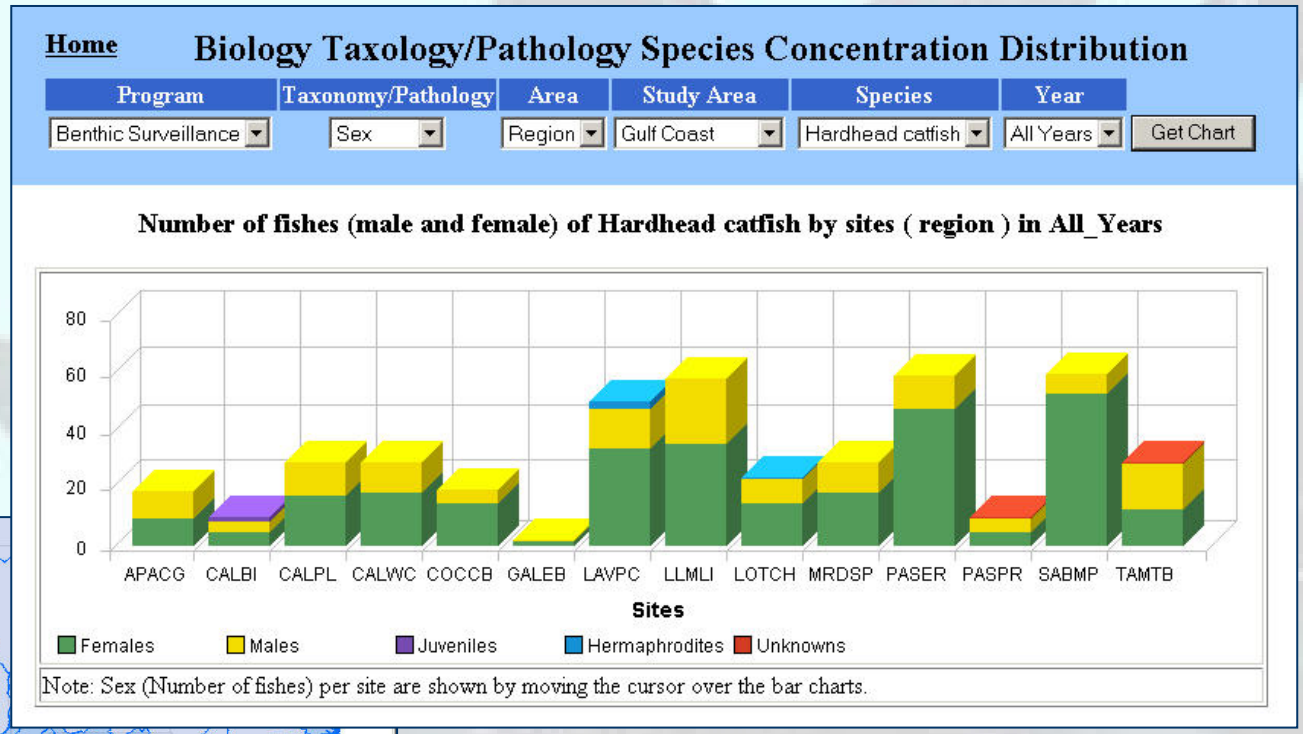


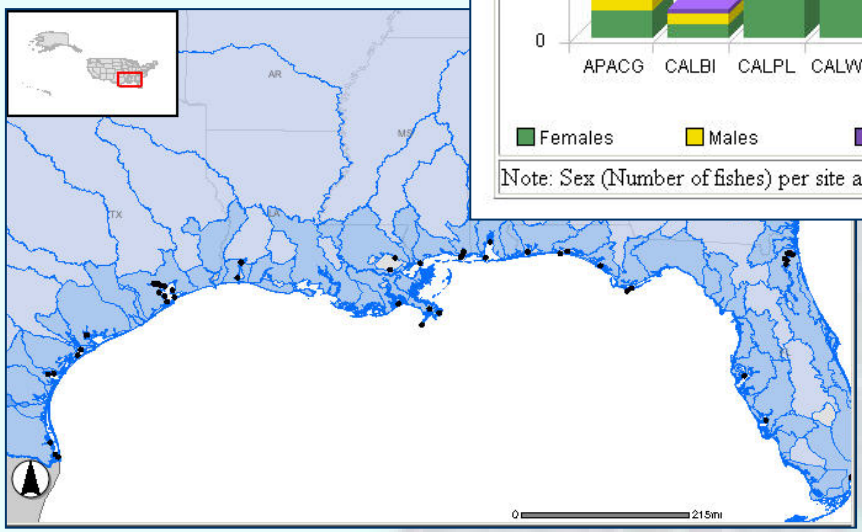
Such maps may provide a useful means to interpret water quality data

Movie

What was the sex distribution of hardhead catfish collected along the Gulf Coast for NOAA's Benthic Surveillance Project?

Taxonomy &Pathology Tool





Some Data Present Unique Challenges (i.e., opportunities) to Develop New Tools.

- e.g., NOAA's intensive estuary studies (similar to EMAP) based on the Sediment Quality Triad (SQT) approach.
- Data include contaminants; toxicity bioassays; biomarker assays; histopathology; and benthic community assessment.
- Data analysis tools are being design that will:
  - Perform selected statistical analyses
  - Analyze information across data types (SQT) to generate an index value based on all or selected chemical, physical, or biological indicators.

Summary

The NS&T Data Portal is an on going effort to build an enterprise system of automated data management & quality assured data dissemination.

- Management and security of raw data;
- Relational database development and associated metadata;
- Data analysis tools that encourage data use through browsing, analysis and visualization techniques;
- Deliver quality assured data and information products for timely decision making by coastal resource managers.