The National Aquarium in Baltimore's Commitment to the Chesapeake








Stewardship of Tidal Wetlands

Goal: To implement a science-based and community-based Chesapeake Bay conservation program

Objectives:

- Restoration and maintenance
- Data collection and monitoring
- Cultivation of environmental leaders
- Field guide for community-based wetlands stewardship

Chesapeake Timeline

1980-82:	Chesapeake Bay Biology booklets (1st printing)
1981- Present:	Conservation as an integral part of our mission
1982-Present:	Bay classroom and auditorium programs developed
1987:	Living in Water (1st printing)
1988:	The Changing Chesapeake (1st printing)
1990-94:	NAIB/UMD **e**nvironmental science graduate course for MD teachers
1993-1999:	Annual MSDE workshops on Chesapeake Bay biology
1995- Present:	*Bay on the Road* outreach programs offered
1996- Present:	*Aquarium on Wheels* program
1997:	**CELC designation**
1998:	**Chesapeake Bay Initiative**
2000:	*Coastal America* **Partnership Award**

Bay Conservation Messages

We all affect the Bay--
We can all help restore it.

The Chesapeake Bay is an amazingly productive and valuable ecosystem.

Human activities within the Bay's 64,000 sq. mile watershed threaten the health of this vital natural resource.

The Aquarium is taking steps to educate visitors about the Bay and to provide opportunities for conservation action.

Ft. McHenry Field Station

Fort McHenry Field Station

- 10 acre created tidal wetland
- Located at Fort McHenry National Monument in Baltimore, MD
- Receives waters from Gwynns Falls, Jones Falls and Patapsco River
- Created in 1985 as mitigation for impacts related to construction of the Fort McHenry tunnel

Ft. McHenry as Platform for Action

Watershed Awareness and Capacity Building

- Public awareness--600,000 Ft. McHenry visitors per year
- Website to host innovative GIS technology
- Cultivation of community environmental leaders

Wetlands/Watershed Health

- Evaluate functions of created wetlands
- Better wetland maintenance, management, and design
- Public participation models

Policy

- No net-loss, wetlands restoration
- Beneficial use debates

Policy Issues

Chesapeake Bay Program Restoration Goals

Maryland Wetland Restoration Steering Committee

- 60,000 acre goal
- Restoration challenges and opportunities

Beneficial Uses of Dredged Material

- 5.3 million cubic yards of maintenance dredging per year
- Wetlands creation as a disposal option

Regulatory Permit Conditions

- 5 years – long-term maintenance and monitoring
- Functional trajectory/performance standards

Community-Based Stewardship

- Improve ecological function at Ft. McHenry marsh through construction of hydrologic modification
- Limit *Phragmites* expansion
- Improve access for trash removal
- Establish model for long-term, community-based monitoring and maintenance
- Disseminate results through document and workshops to improve design in urban settings
- Increase awareness and public participation

Restoration, Maintenance & Monitoring

Ft. McHenry Field Station

Aquarium Conservation Team (ACT!)

- Volunteer workforce
  - restoration
  - monitoring
  - maintenance
- Public education and outreach

Public Field Days

Public Field Days

- Upcoming Dates:
  - Saturday, September 29, 2001
  - Saturday, December 1, 2001
  - Saturday, April 13, 2002
  - Saturday, June 7, 2002
  - Saturday, September 21, 2002
  - Saturday, December 7, 2002
- Introduction/briefing
- Restoration and maintenance
- Monitoring

When Debris Meets the Sea...

What the Aquarium is Doing

In partnership with the National Park Service, the National Aquarium in Baltimore is working to restore a created tidal wetland at Fort McHenry National Monument. Restoration and maintenance activities include regular debris removal, planting of native wetland grasses, and habitat enhancement for wildlife.

What YOU Can Do

Please send me a registration packet for

Saturday, April 1, 2000

Saturday, June 10, 2000

Saturday, September 16, 2000

Saturday, December 9, 2000

Name

Address

Phone

Email

NATIONAL AQUARIUM IN BALTIMORE

Maintenance Tasks

- Debris Removal
- Invasive Species Removal
- Habitat Structures
- Monitoring Paths
- Trees and Shrubs

Debris Removal

- Record type and amount
- Use Safety Equipment – boots, gloves, rakes
- Hundreds of syringes
- Studies needed on impact to vegetation

Debris Removal (Dec. 1998 – Sept. 2001)

Total Items Collected

Plastic: 61,140

Foamed Plastic: 32,271

Glass: 3527

Other: 3414

Invasive Species Removal

- Control growth and spread of *Phragmites australis*
  - Chemical and mechanical treatments
  - Cut and remove offsite
  - Test treatments
  - Monitor

Eagle Scout Project Partnership

- Evaluation of *Phragmites australis* management methods
  - Site division into management and control areas
  - Spraying methods and timing
  - Evaluation of cutting tools
- Identify level of effort required to manage *Phragmites australis* at various stages of invasion

Revegetation

- Native marsh species
- Native trees and shrubs along slope
- Monitor plant survival

Safety Tips

- Dress for the weather
- Drink lots of fluids
- Take breaks when necessary
- Use care when walking on rip-rap
- Use proper techniques
- Listen to your assigned ACT! team leader

Monitoring Activities

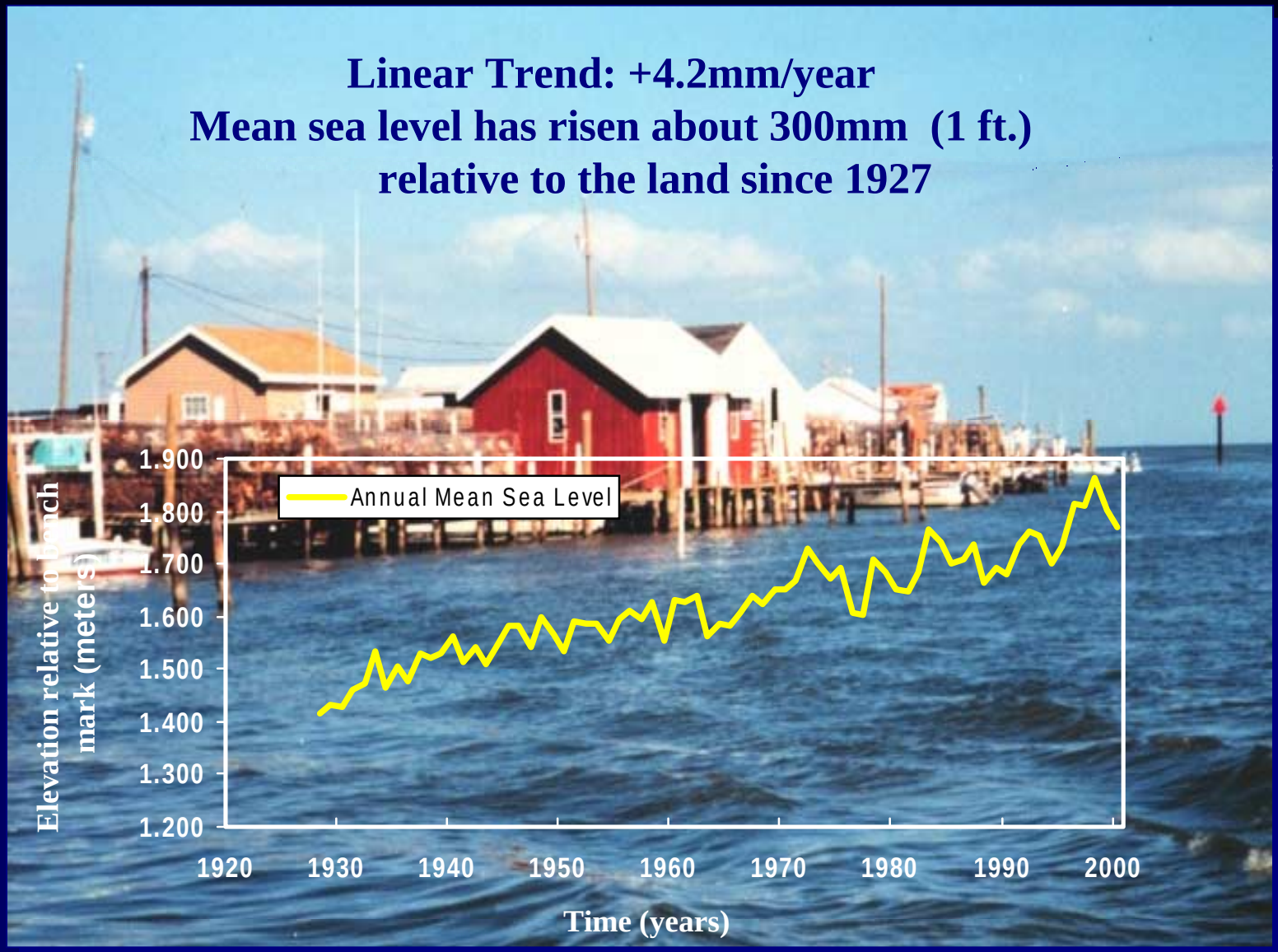
Goal: Functional Assessment

- Use local reference sites
- Hydrology: water budget inc. tidal inflow/outflow and storage
- Establish tidal datum with NOAA
- Detailed Topography
- Vegetation community structure
- Faunal utilization: avifauna

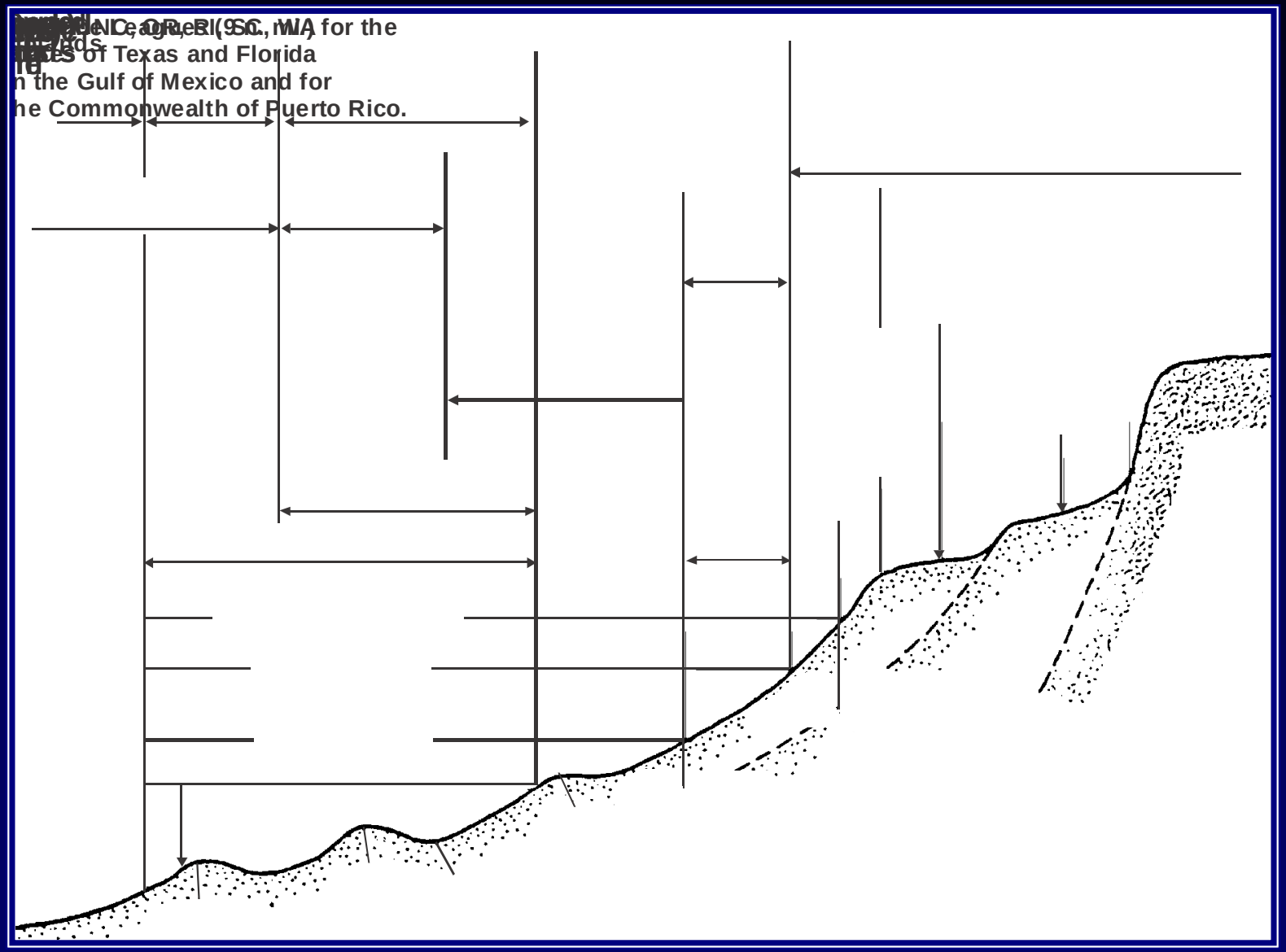
Goal: Improve Hydrology and Control of Trash and *Phragmites*

- Establish performance standards for tidal exchange to improve flushing
- Prepare detailed construction drawings
- Implement construction: breakwaters, spot elevation, dendridic channel patterns etc.
- Re-vegetate low marsh
- Post construction monitoring to ensure performance standards are met

Sea Level Rise: Lower Bay



TIDAL DATUMS



TYPICAL MARSH STUDY SITE

Water Quality and Weather Monitoring

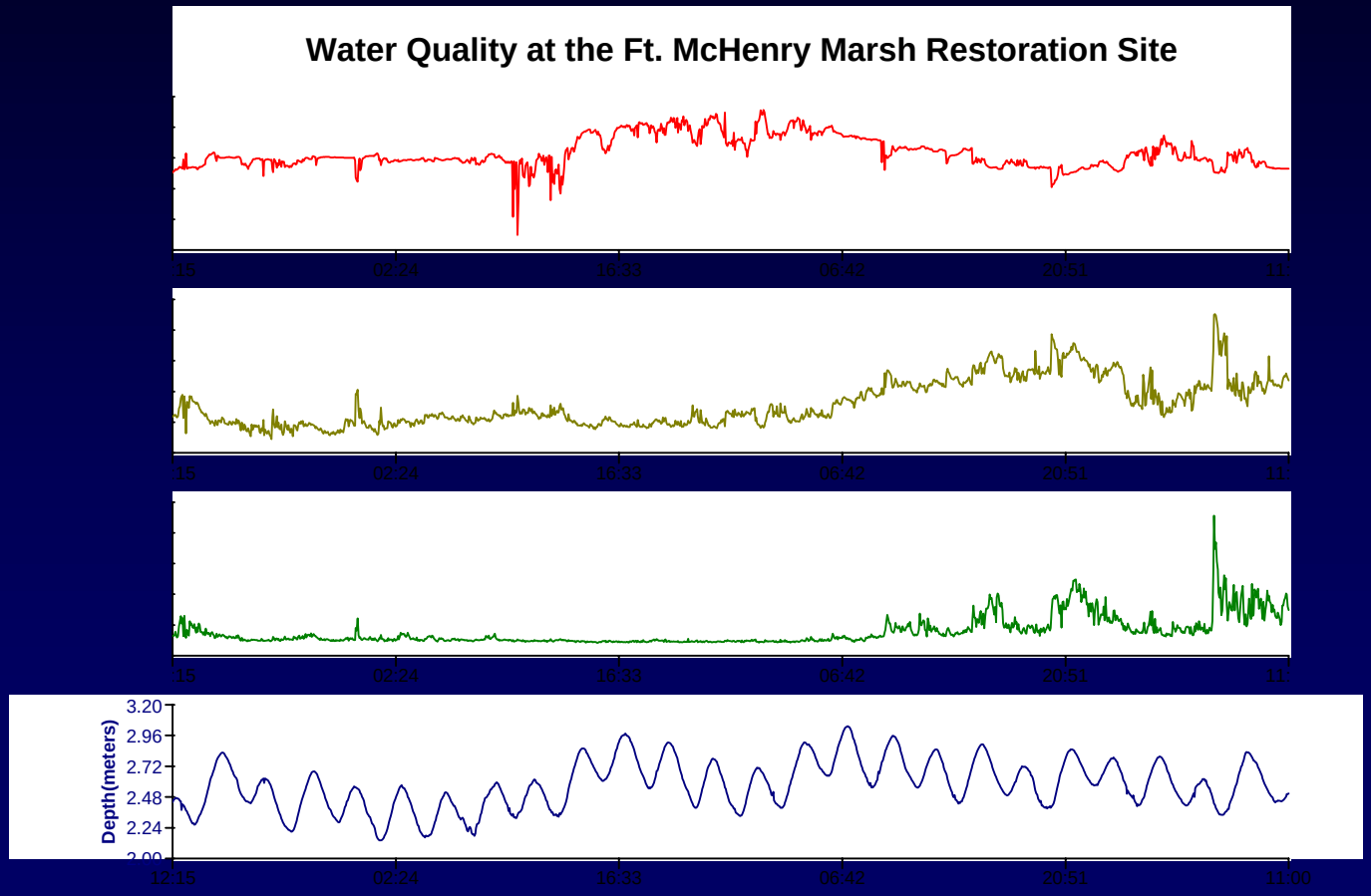
- Continuous Water Quality and Weather
- DO, pH, temp., Chl-a, salinity, conductivity…
- Nutrients/contaminants
- In collaboration with NOAA
- Training for students

Academic Partnerships

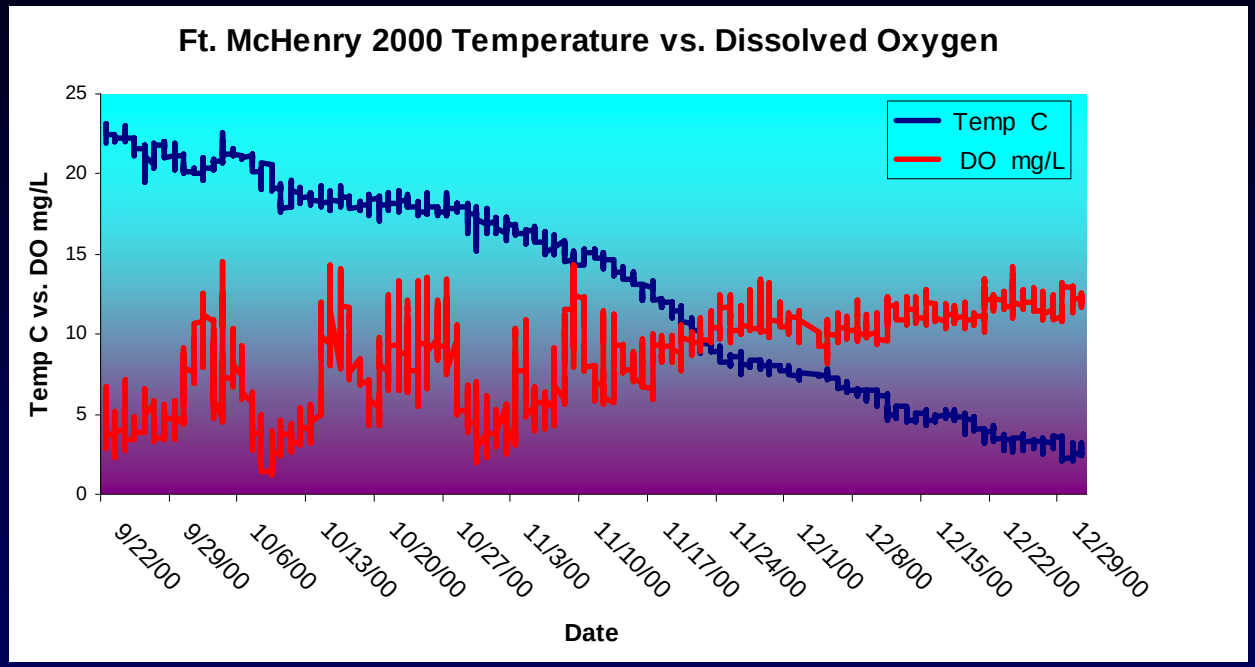
- Internships with regional universities
- Students follow same protocol as National Estuarine Research Reserve Program
- Students calibrate, download and analyze data
- Partnerships focus on minority serving institutions
- Candidate pool for internships and jobs

Ft. McHenry as Watershed Health Indicator

To be available at www.aqua.org

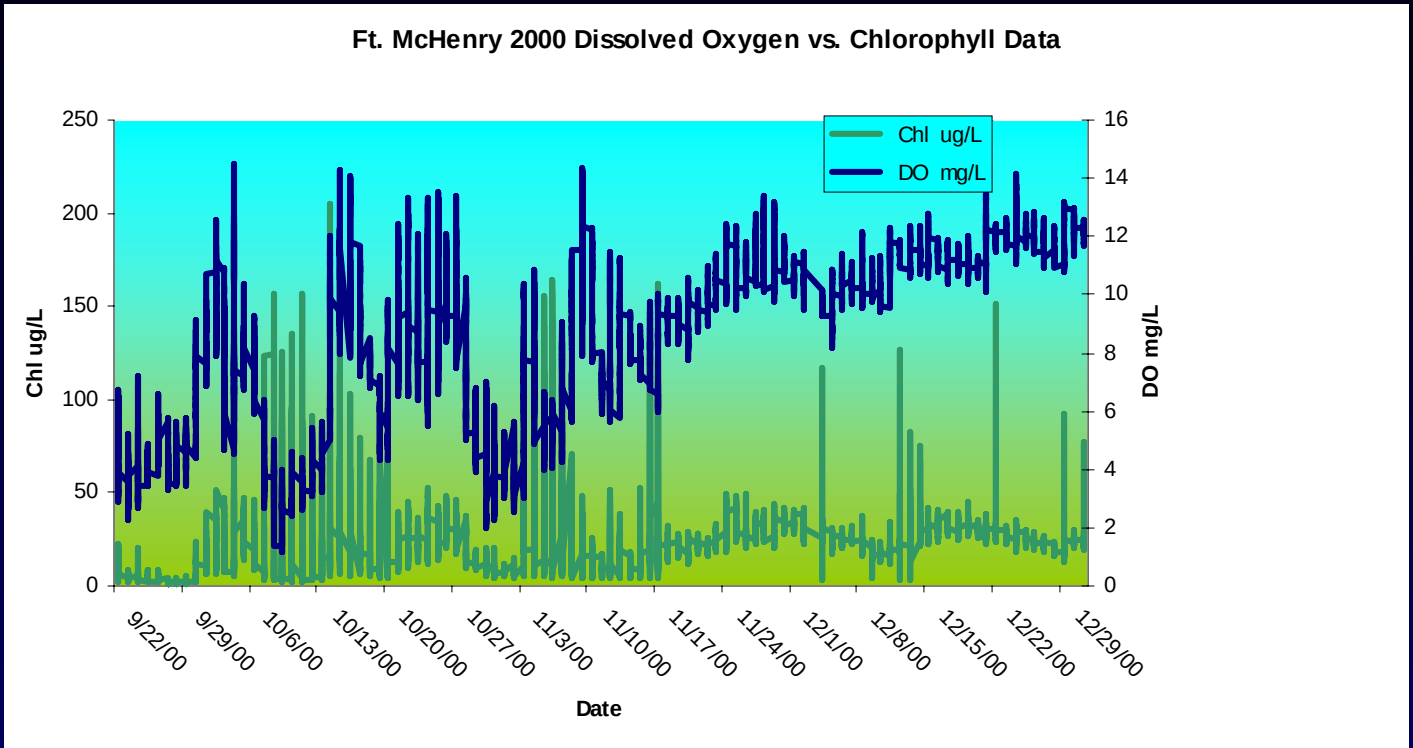


2000 Ft. McHenry Water Quality Data



- Warm temperatures combined with rain events which introduced excess nutrients, create hypoxic conditions (DO< 3mg/L).
- Hypoxia disappears during the colder months.

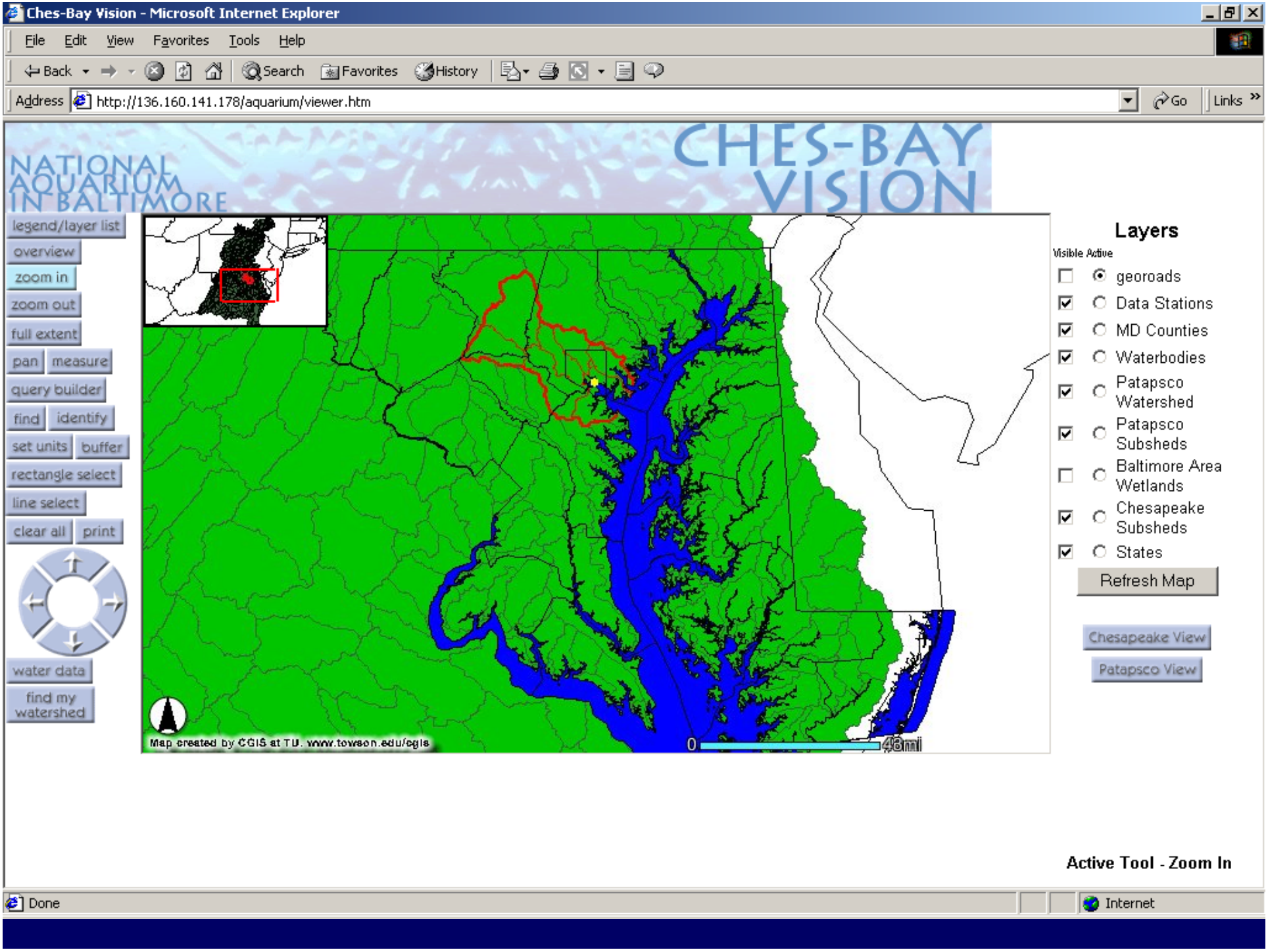
2000 Ft. McHenry Water Quality Data



- Periods of hypoxia (DO < 3mg/L) correspond to large increases in algal biomass indicating eutrophication.

Ft. McHenry as Watershed Health Indicator

- Use of GIS: ArcIMS to access multiple servers and interpret watershed information
- Multiple data layers – watershed 101
- Support watershed association's activities
- Multi-media CD Rom product
- Targets 6th grade reading level
- In partnership with EPA, CBP, MD DNR, NOAA, Morgan State University etc.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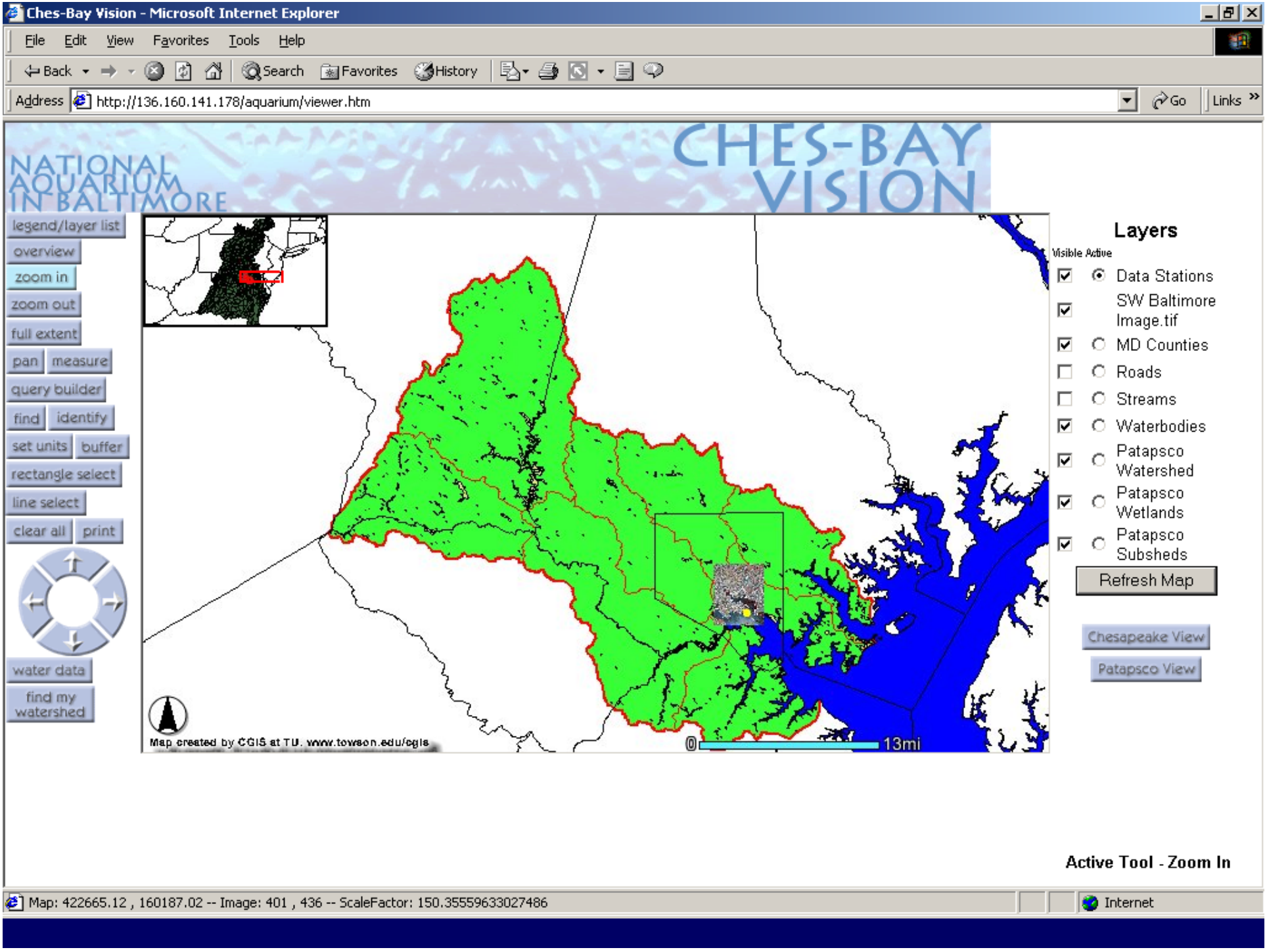
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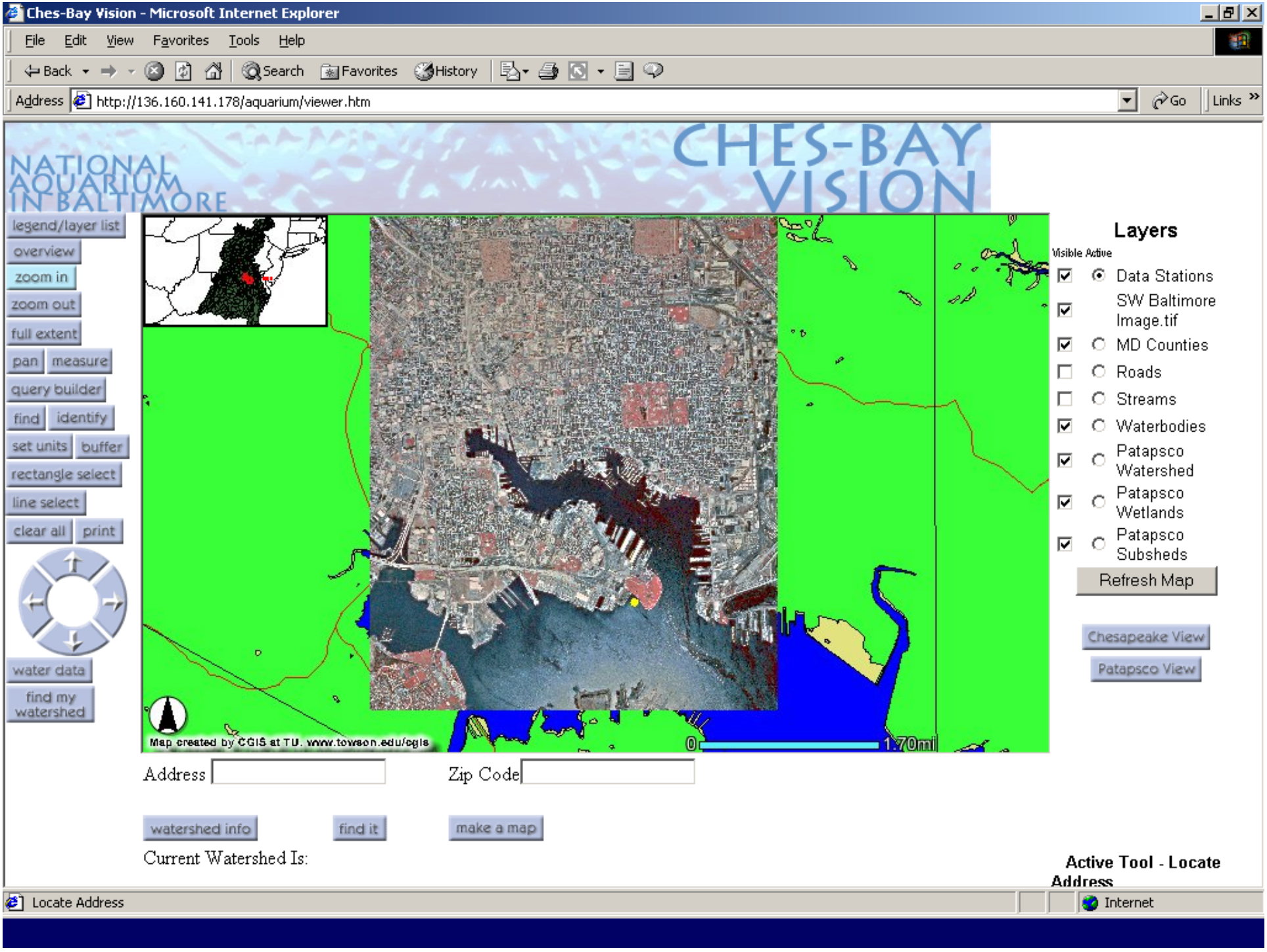
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Address
Zip Code
watershed info
find it
make a map
Current Watershed Is:
Active Tool - Locate Address
Locate Address
Internet

Watershed Data Viewer - Microsoft Internet Explorer

NATIONAL AQUARIUM IN BALTIMORE

Starting day

Day 25 Month May Year 2001

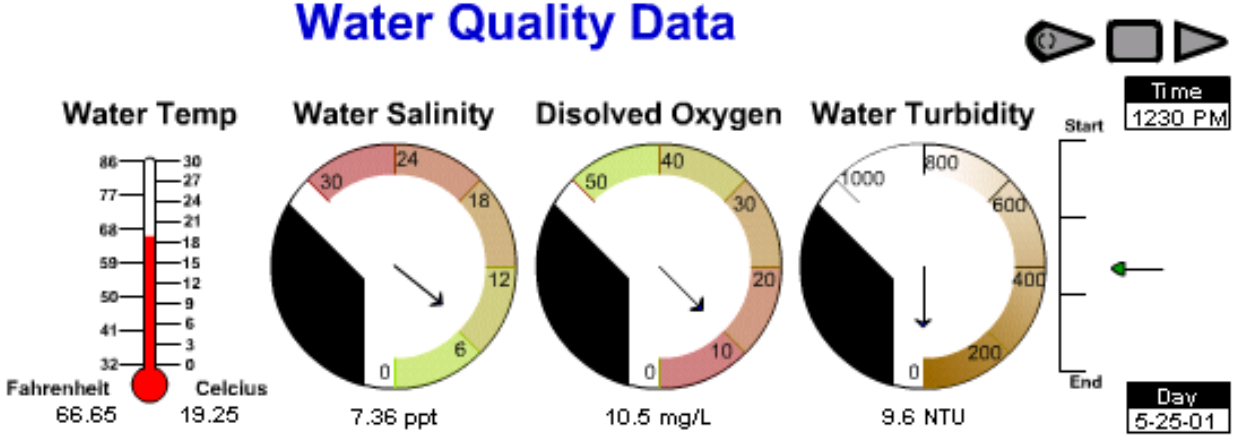
Finish day

Day 25 Month May Year 2001

Get Info

Current Dates 05-25-01 / 05-25-01

Water Quality Data



Text Version

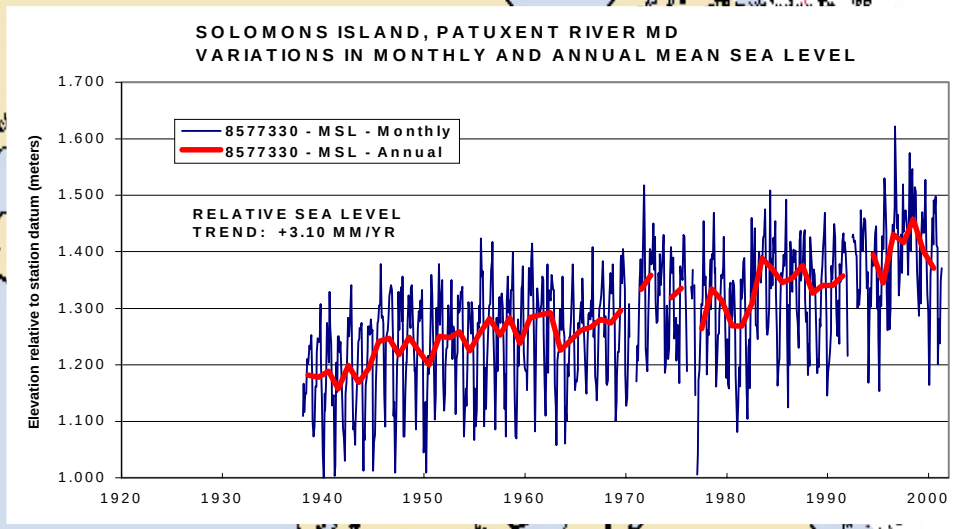
Bay Islands: Restoration Opportunities

- High shoreline erosion rate
- Sites on Governors list
- Demonstration of innovative technology
- Strong federal partnerships
- Community-based, science-based approach

Barren Island Restoration Project

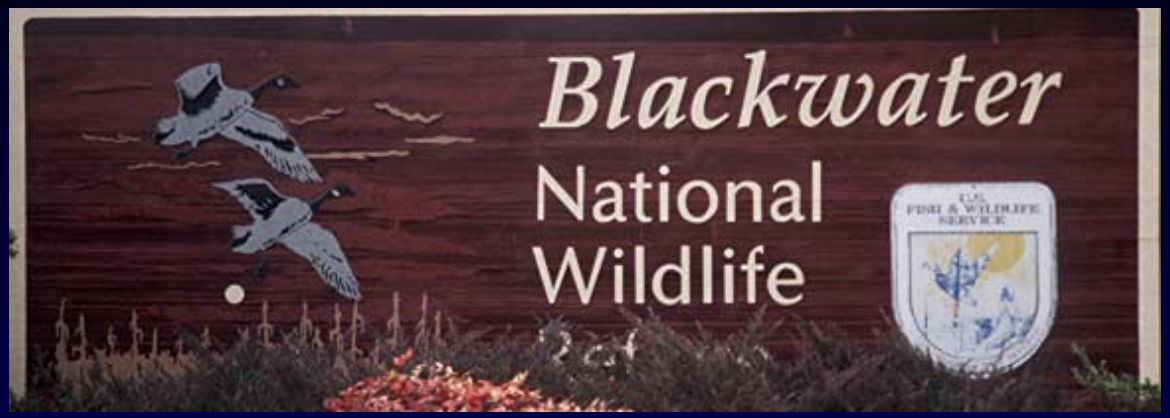
8571579 BARREN ISLAND

8577330 SOLOMONS ISLAND



Barren Island Restoration

Barren Island Restoration



Barren Island Restoration

Barren Island Restoration

Barren Island Restoration

Transferability

- Eastern Neck NWR
- Poplar Island
- Watts Island
- Bodkin Island
- Smith Island
- Patapsco River

Long-Term Monitoring and Maintenance

- Replanting of native vegetation
- Vegetative analysis
- Faunal observations
- Water quality measurements
- Detailed topography

Poplar Island

High profile example of

- Importance of Bay Islands to coastal ecosystem
- Results of long-term erosion due to accelerated sea level rise, land subsidence, storm events
- Large scale attempt at beneficial use of dredged material
- Wetlands creation on a large scale
- Test for long-term public involvement

Poplar Island: After Restoration

SAV Restoration – Langley, Virginia

Loss of submerged aquatic vegetation due to

- nutrient enrichment; sediment pollution; toxic contamination

Restoration Activities

- restore a two-acre eelgrass (*Zostera marina*) bed
- transplant 50,000 shoots of eelgrass
- routine water quality analysis

In Conjunction with

Seahorse Exhibit

Partnerships

Additional Project Partners

Federal Government

- National Oceanic and Atmosphere Administration
- National Park Service
- Environmental Protection Agency
- US Army Corps of Engineers
- US Coast Guard
- US Geological Survey
- US Fish and Wildlife Service
- Chesapeake Bay Program
- Coastal America

State Government

- Maryland Department of the Environment
- Maryland Port Administration
- Maryland Transportation Authority
- Maryland Department of Natural Resources

Local Government

- City of Baltimore

Non-Governmental Organizations

- Chesapeake Bay Trust
- Alliance Chesapeake Bay
- Chesapeake Bay Foundation

The local community makes the difference!

Connecting people to aquatic life, we make a better world for both.