

Potomac River Integrated Monitoring Project

Bruce Michael
Director, Tidewater Ecosystem Assessment Division



MWCOG Meeting, March 20, 2006

Why Implement Shallow Water Monitoring on the Potomac Estuary Now?

- § Assess the new water quality criteria for dissolved oxygen, water clarity and chlorophyll
- § Evaluate SAV habitat criteria and potential SAV restoration sites
- § Evaluate Harmful Algal Blooms - Microcystis
- § Determine potential impacts from the Woodrow Wilson Bridge expansion
- § Track the effects of nutrient removal at Blue Plains WWTP
- § Assess the effectiveness of the Tributary Strategies for nutrient and sediment reductions
- § Understand the Potomac ecosystem as a whole

Shipping Point, Potomac River

7/20/04

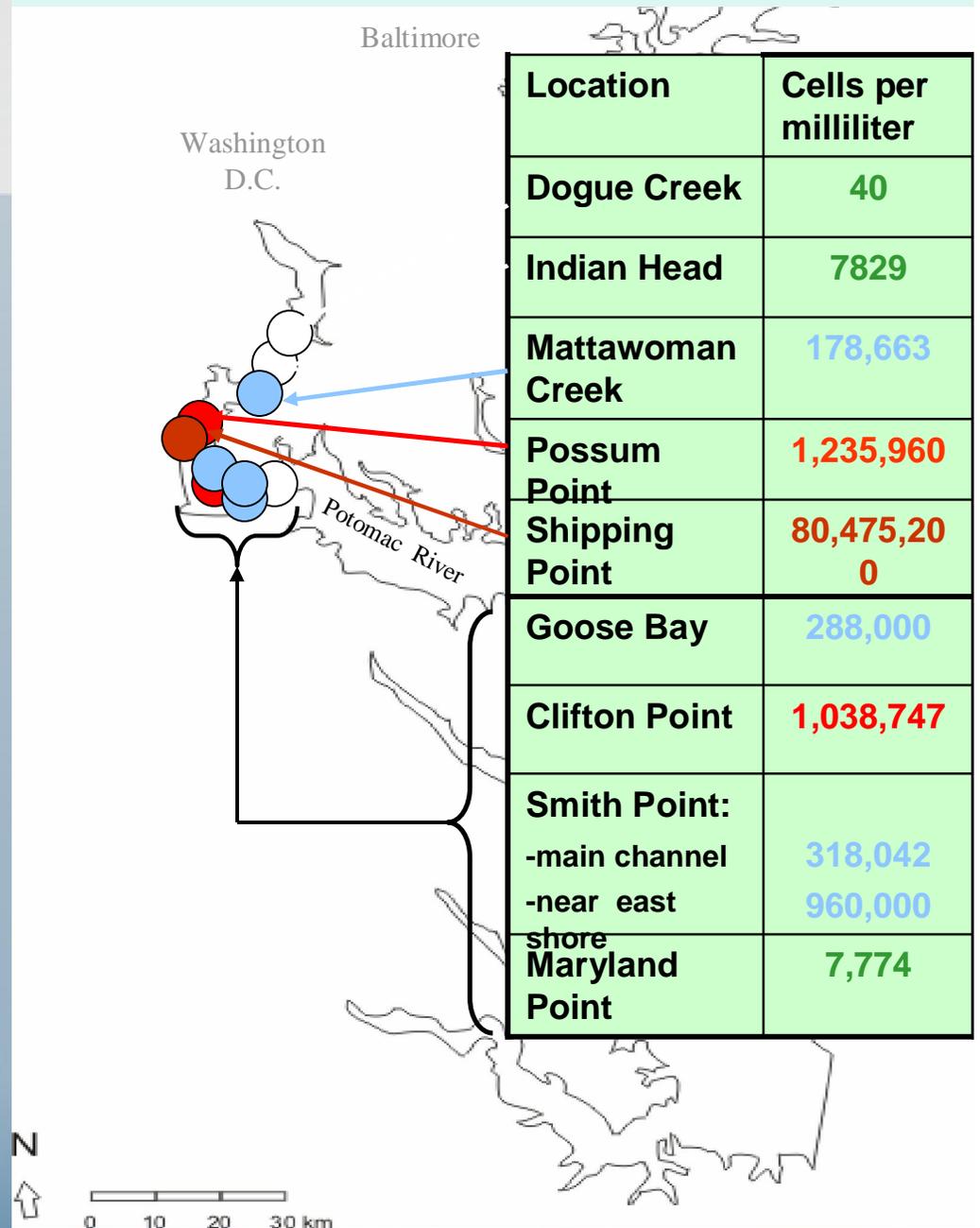


Shipping Point



Blue-green algal scum close-up

Figure 1. July 19-20 *Microcystis*-only results



Considerations For Incorporating New SWM Technologies in Existing Potomac Monitoring Program

- § Must help achieve primary monitoring objectives (assessing water quality criteria)
- § Cost-effective
- § Deployable near-term, sustainable long-term
- § Must help address areas of shallow water habitat
- § Measurements must be spatially and temporally integrated with other monitoring components for data analyses
- § Must meet needs of partners

Primary Shallow Water Monitoring Objectives

§ Primary SWM objective is to assess the new Chesapeake Bay water quality criteria for:

- Dissolved Oxygen – measured over various temporal resolutions in all habitats
- Water Clarity – shallow water only
- Chlorophyll – working on numeric criteria for next listing cycle

Dissolved Oxygen Criteria

Minimum Amount of Oxygen (mg/L) Needed to Survive by Species

Migratory Spawning & Nursery Areas

Shallow and Open Water Areas

Deep Water

Deep Channel

6
5
4
3
2
1
0



Striped Bass: 5-6



American Shad: 5



White Perch: 5



Yellow Perch: 5



Hard Clams: 5



Alewife: 3.6



Crabs: 3



Bay Anchovy: 3



Spot: 2

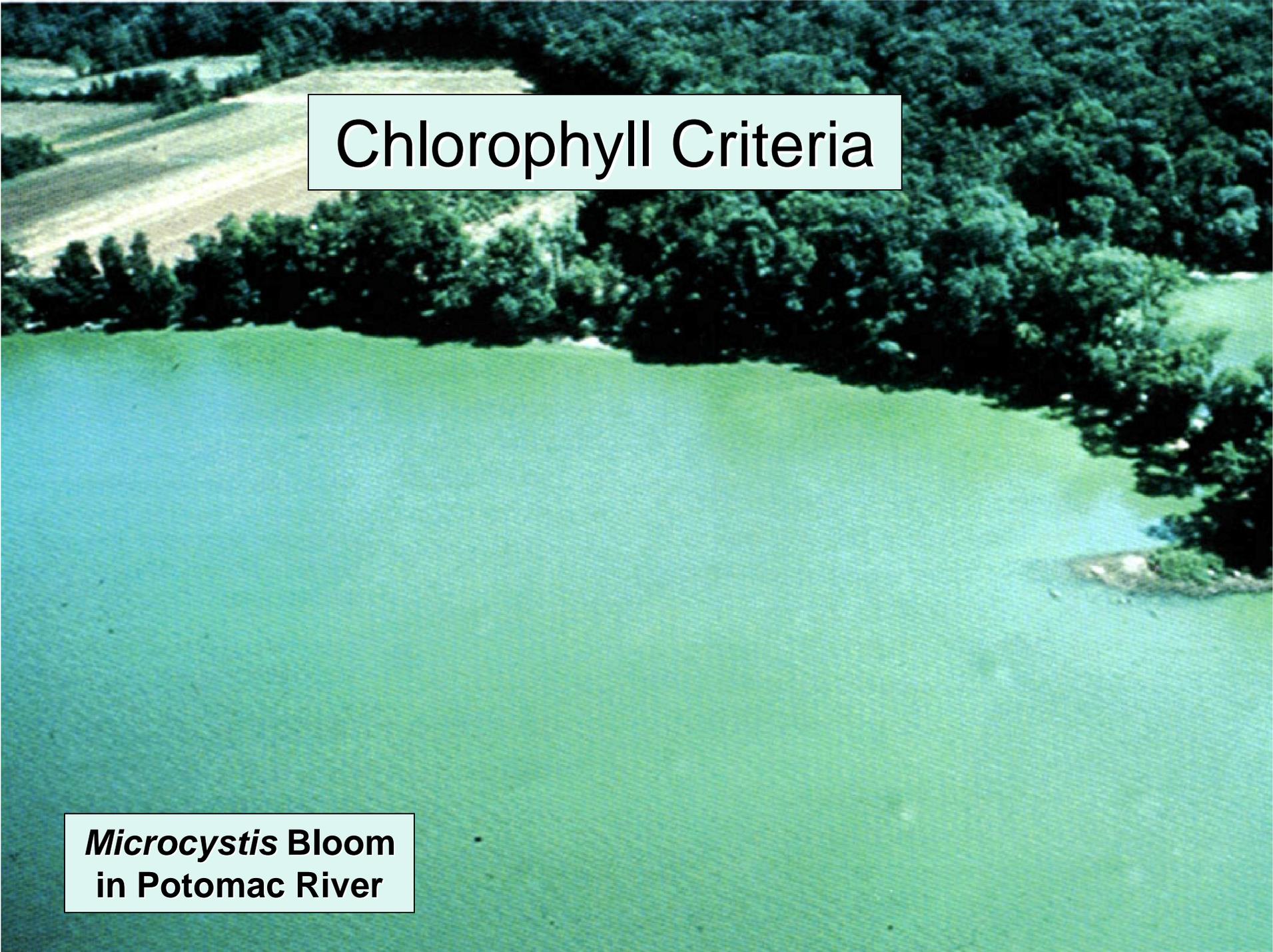


Worms: 1

Water Clarity Criteria



Photo Courtesy of VIMS

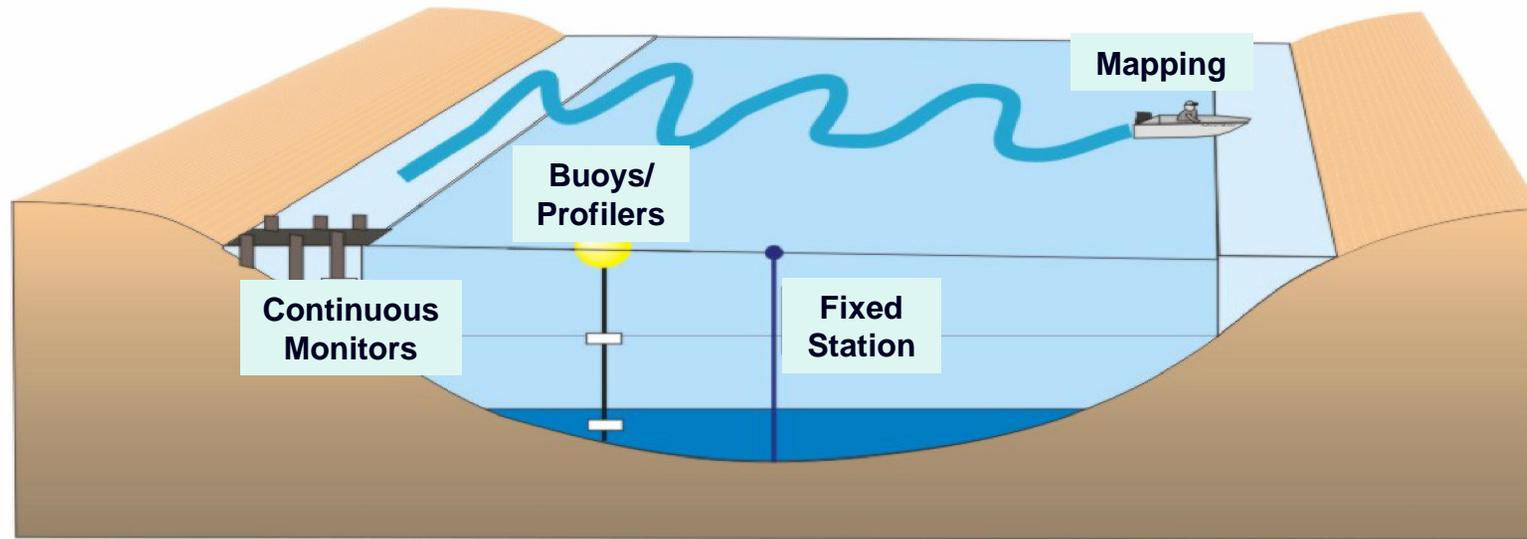
An aerial photograph showing a large body of water, likely a reservoir or a wide river, completely covered in a thick, vibrant green bloom of algae. The surrounding landscape includes a dense forest of green trees and a cleared, light-colored field in the upper left corner. The water's surface is a uniform, bright green color, indicating a high concentration of the bloom.

Chlorophyll Criteria

***Microcystis* Bloom
in Potomac River**

Chesapeake Bay Shallow Water Monitoring Design

Consists of 2 Components Integrated with Other Forms of Monitoring



- **Continuous Monitors**
 - All criteria
 - Shallow-water designated use
- **Water Quality Mapping**
 - All criteria
 - Shallow & open-water designated use
- **Existing Fixed Stations**
 - All criteria
 - All but shallow-water designated use

Continuous Monitors

- Generally, deployed April – October, over a 3-year period
- A subset of meters are telemetered real-time to website
- Measures water quality parameters every 15 minutes

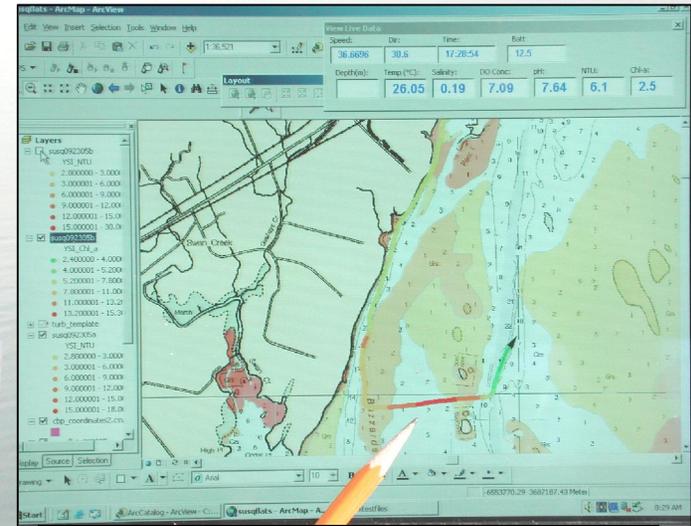


YSI 6600 EDS – Measures Dissolved Oxygen, Turbidity, Chlorophyll, Water Temperature, Salinity, pH

Water Quality Mapping

- Monthly cruises, April – October, over a 3-year period
- Measures water quality parameters every 4 seconds

YSI 6600 EDS – Measures Dissolved Oxygen, Turbidity, Chlorophyll, Water Temperature, Salinity, pH

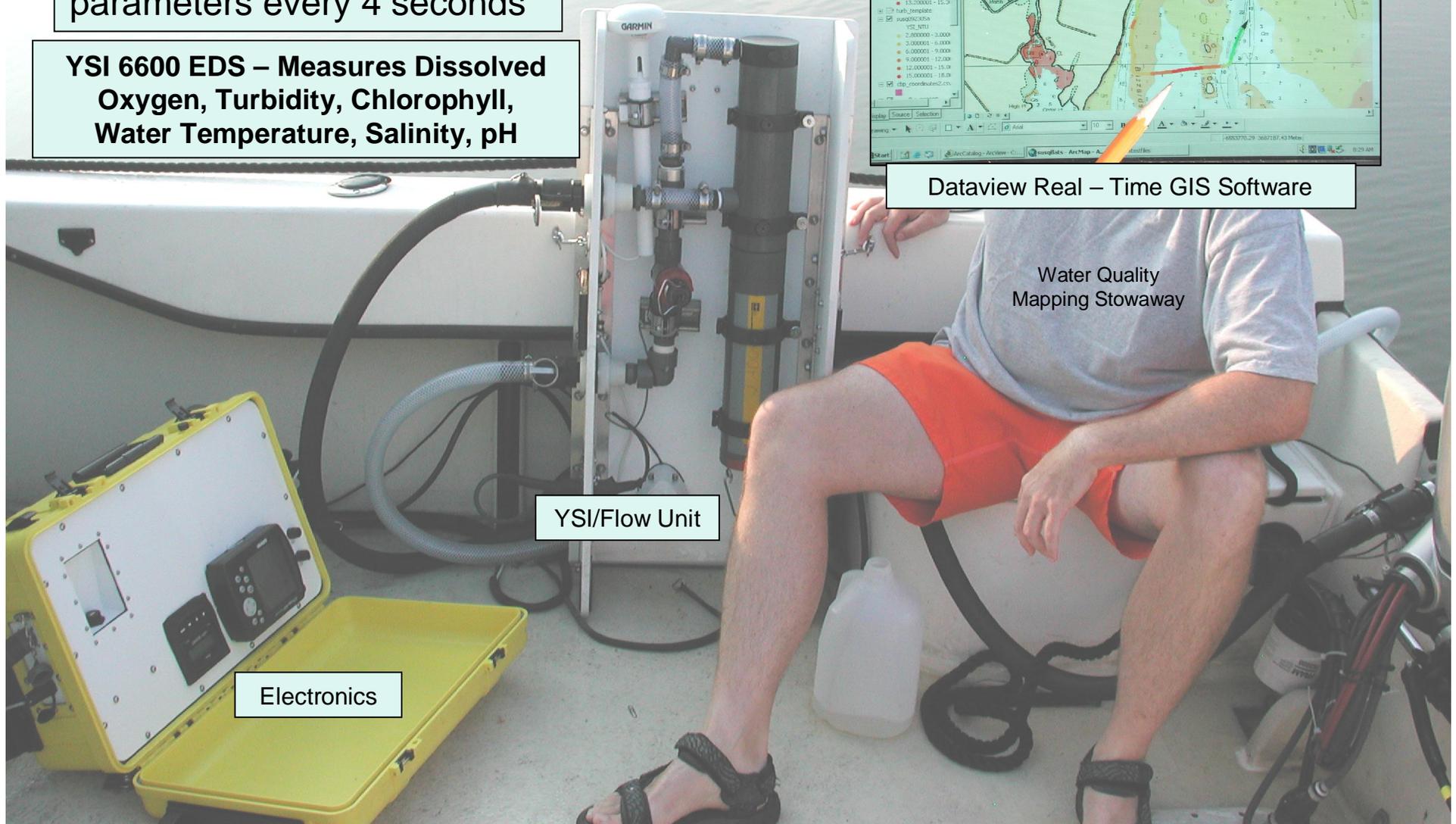


Dataview Real – Time GIS Software

Water Quality
Mapping Stowaway

YSI/Flow Unit

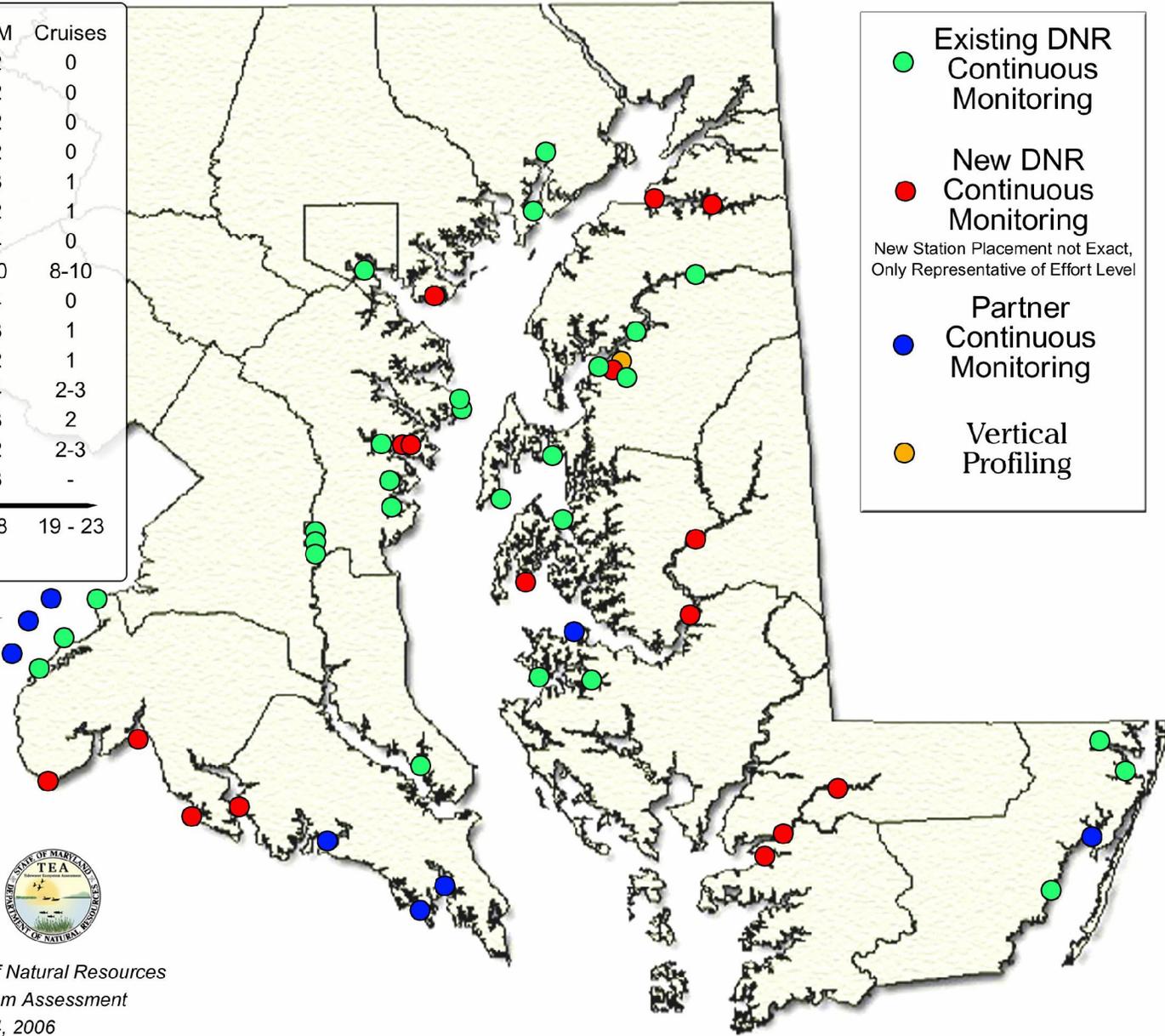
Electronics



Maryland DNR - 2006 Proposed Tidal Monitoring Sites

	CM	Cruises
Sassafras	2	0
Bush	2	0
Patapsco	2	0
Sandy Point	2	0
South	3	1
West/Rhode	2	1
Patuxent	4	0
Potomac	10	8-10
Coastal Bays	4	0
Wicomico/Monie	3	1
Little Choptank	2	1
Choptank	4	2-3
Eastern Bay	3	2
Chester	2	2-3
Corsica	3	-
<hr/>		
	48	19 - 23

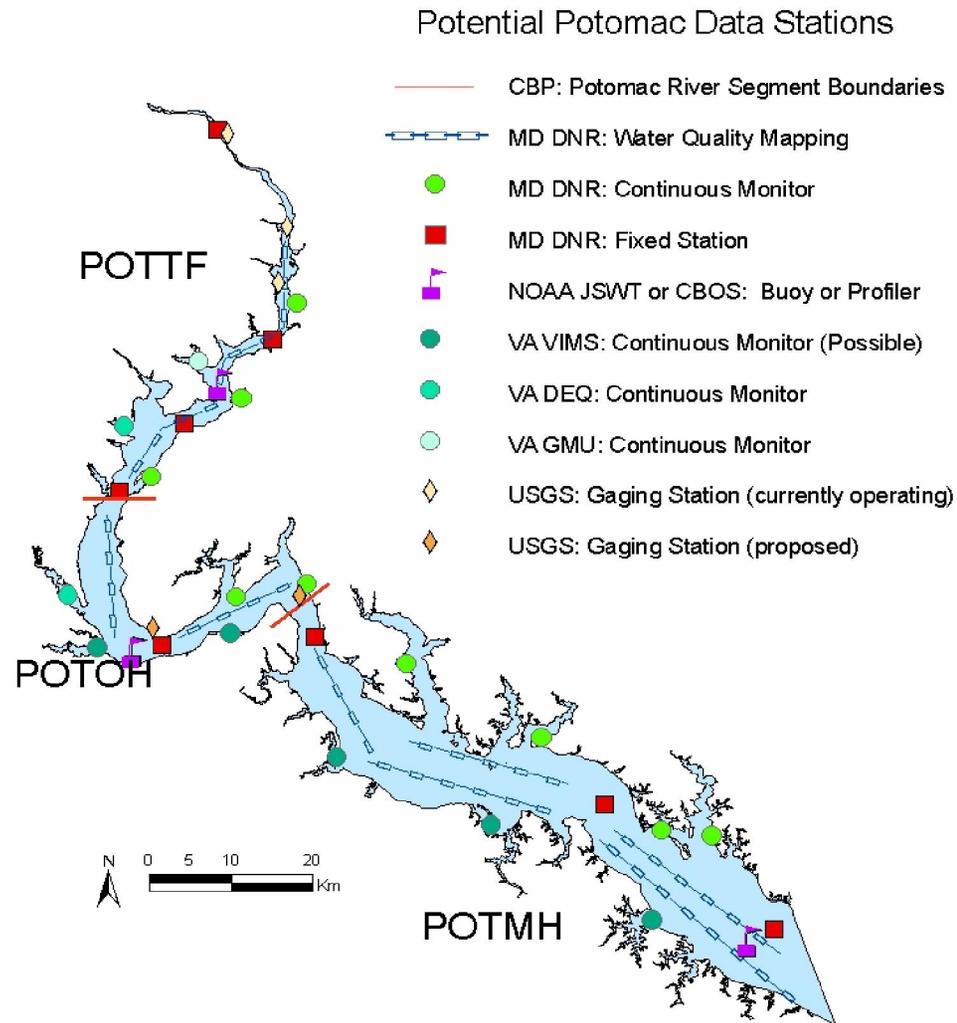
- Existing DNR Continuous Monitoring
- New DNR Continuous Monitoring
- New Station Placement not Exact, Only Representative of Effort Level
- Partner Continuous Monitoring
- Vertical Profiling



Virginia Managed Potomac Sites Expected to be in POTT



2006 Potomac Shallow Water Monitoring



Developing Potomac Partnerships

- § EPA Chesapeake Bay Program
- § NOAA Chesapeake Bay Office
- § USGS, Reston Office
- § U.S. Army Corps of Engineers
- § Virginia DEQ
- § Metropolitan Washington Council of Governments
- § Chesapeake Biological Laboratory
- § St. Mary's College
- § George Mason University
- § St. Mary's County
- § Mitretek Systems, Inc.



Potomac Monitoring Planning Activities

§ Open Planning Workshops to plan monitoring

- December 2004 – STAC Workshop
- March 28, 2005 – 1st Potomac Stakeholder meeting, MWCOCG
- May 2005 – Submission of CBP Potomac Monitoring proposal
- Feb 16, 2006 - Potomac Monitoring Organizational Meeting
- March 20, 2006 – Potomac Stakeholder meeting, MWCOCG
- January 31, 2006 - Remote Sensing symposium to explore integration of multiple monitoring programs – potential Potomac integration with U.S. Naval Academy
- On-going Criteria Assessment Protocol Workgroup
- TMAW June 2006 Workshop to review shallow water monitoring results



Eyes on the Bay – Web Portal

Chesapeake Bay Coastal Bays Rivers & Streams Watersheds



Eyes on the Bay
www.eyesonthebay.net

Presented By: Tidewater Ecosystem Assessment
Chesapeake Bay Satellite Images Now Available on Eyes on the Bay

Recent Water and Habitat Conditions in Maryland's Chesapeake Bay and Coastal Bays

Emerging new monitoring technologies coupled with traditional monitoring programs are allowing natural resource managers and the public to better understand, evaluate, preserve and restore the health of Maryland's water and living resources. The water and habitat quality monitoring data we collect are used to help us characterize existing conditions and long-term trends, detect water quality changes in response to management actions, protect living resources, and develop the most cost-effective solution to restore our Bays and tributaries.

Click the markers on the map below to see the latest Fixed Station Monthly Monitoring data, Continuous Monitoring data, and Water Quality Mapping data collected by Maryland's Chesapeake Bay & Coastal Bays Water Quality Monitoring Programs.

Click Stations for Data



Click Legend Symbols to Toggle Stations On/Off

- Fixed Monthly Stations - Current & Historical Data
- Real-Time Continuous Monitors
- Near-Real Time Continuous Monitors
- Continuous Monitors Coming Soon!
- Water Quality Mapping
- 2005 Current Algal Bloom Events

Stations: Bishopville Prong, Coastal Bays

Data Type: Continuous Monitoring Station

Data Updated Through: Current

Data Updates: Telemetered Hourly

Station News and Notes: 4/12-4/18 - Elevated Dissolved Oxygen values. Salinity increasing. Turbidity peak 4/12. Phytoplankton bloom peaked 4/13.

Return to Instructions

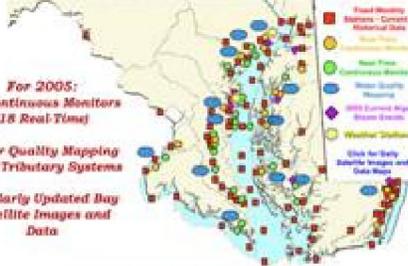
NEW! Click to View Recent Bay Satellite Images

Optional Views:
Full Screen Map
Text Only Station Menu

Note: Fixed Monthly Monitoring stations depicted on map are representative of Maryland's Water Quality Monitoring Program and do not include all monitored stations.

Chesapeake and Coastal Bays Water Quality and Habitat Conditions Are One Click Away...

<http://www.eyesonthebay.net>



For 2005:
39 Continuous Monitors (18 Real-Time)
Water Quality Mapping in 17 Tributary Systems
Regularly Updated Bay Satellite Images and Data

DOWNLOAD WATER QUALITY INFORMATION:

- Current and Historical Monthly Data
- Water Quality Status and Trends
- Watershed Statistics
- Teacher Lesson Plans
- "Ask an Expert" Your Questions
- Real and Near-Real Time Continuous Data
- Mapped Spatial Data
- Algal Bloom Updates
- Recent Bay Satellite Photos
- Water Quality News Stories

Click for Daily Satellite Images and Data News

For further information call Tidewater Ecosystem Assessment 410-260-8630

Maryland Department of Natural Resources
Robert L. Ehrlich, Jr., Governor
C. Ronald Franke, Secretary

Eyes on the Bay

www.eyesonthebay.net

Access the Maryland Department of Natural Resources' Chesapeake and Coastal Bays Water Quality Data

Real-Time, Mapped, & Monthly Conditions at 131 Statewide Monitoring Locations

Who benefits from visiting www.eyesonthebay.net?



SPORTSMEN
Check for water temperature, salinity, or dissolved oxygen levels near your favorite fishing spot.

STUDENTS and TEACHERS
Learn about the Chesapeake Bay and how water quality affects fish, birds, and plants and other Bay life.

CITIZENS
Explore the water quality conditions in your local waterways.

SCIENTISTS and MANAGERS
Obtain water temperature, salinity, dissolved oxygen, pH, and turbidity data for your work site or local jurisdiction.

Maryland Department of Natural Resources
www.dnr.state.md.us
410-260-8630

<http://www.eyesonthebay.net>



Next Actions for Potomac Integrated Monitoring Project

- § Finalize continuous monitoring and calibration site selections and cruise water quality mapping tracks
- § Protocol training for partners – Shallow Water Monitoring QAPP on DNR “EyesontheBay” website
- § Distribution of data forms
- § Resolve coordination issues
- § DNR data management and dissemination
- § Identify additional resources/develop new partnerships