Potomac Shallow Water Monitoring Program

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MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Regional Monitoring Subcommittee Meeting
October 17, 2006

Goals for Shallow Water Monitoring on the Potomac Estuary

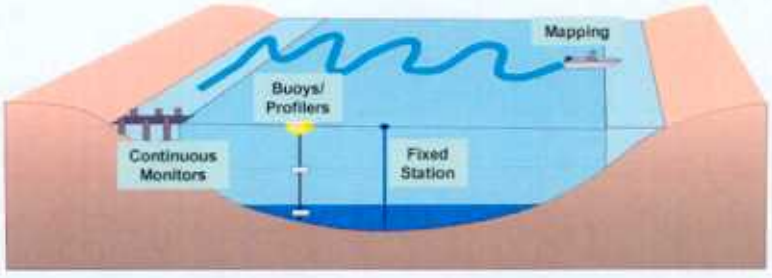
- Assess the new water quality criteria for dissolved oxygen, water clarity and chlorophyll
- Evaluate SAV habitat criteria and potential SAV restoration sites
- Evaluate Harmful Algal Blooms - Microcystis
- Track the effects of nutrient removal at Blue Plains WWTP
- Assess the effectiveness of the Tributary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

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 – supplement SAV acreage goal
  - Chlorophyll – working on numeric criteria for next listing cycle

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

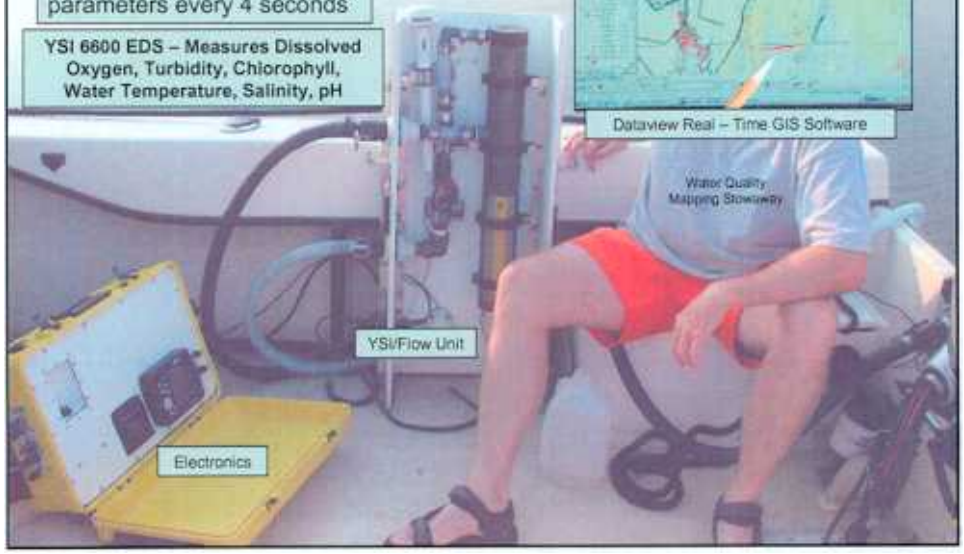
YSI 6600 EDS – Measures Dissolved Oxygen, Turbidity, Chlorophyll, Water Temperature,Salinity, pH

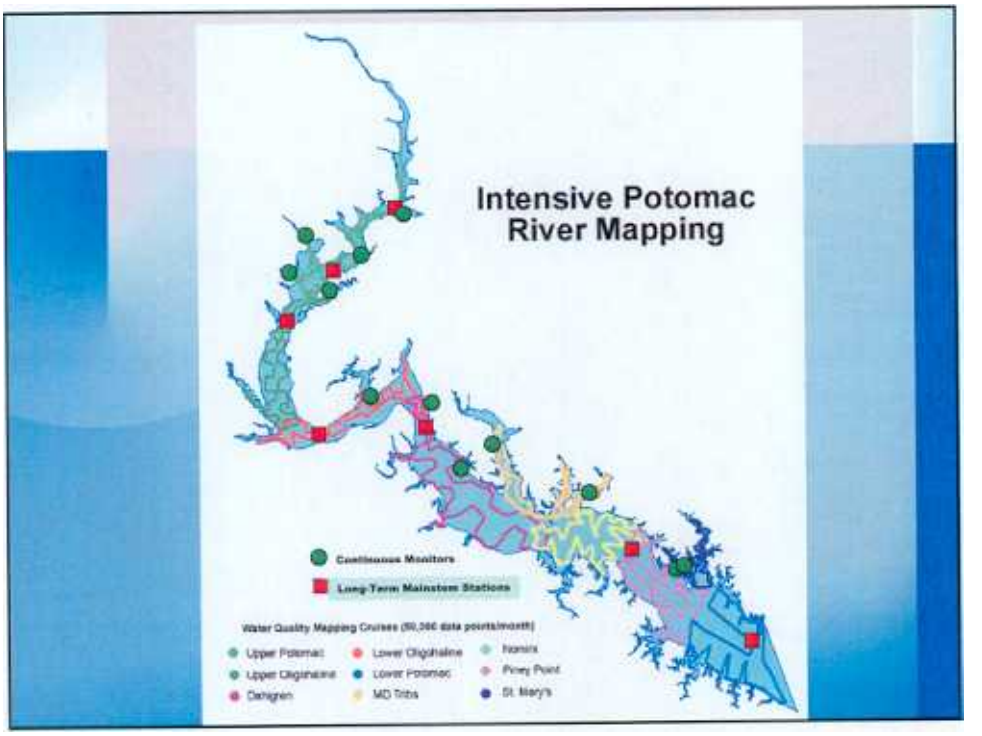
Water Quality Mapping

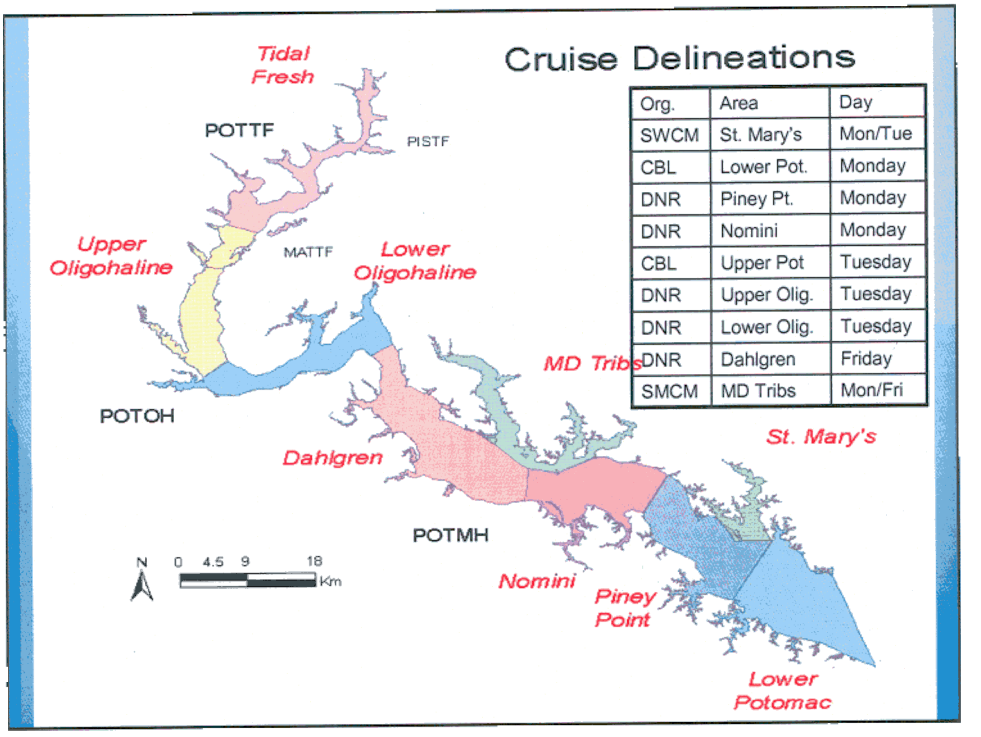
- Monthly cruises, April – October, over a 3-year period
- Measures water quality parameters every 4 seconds

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

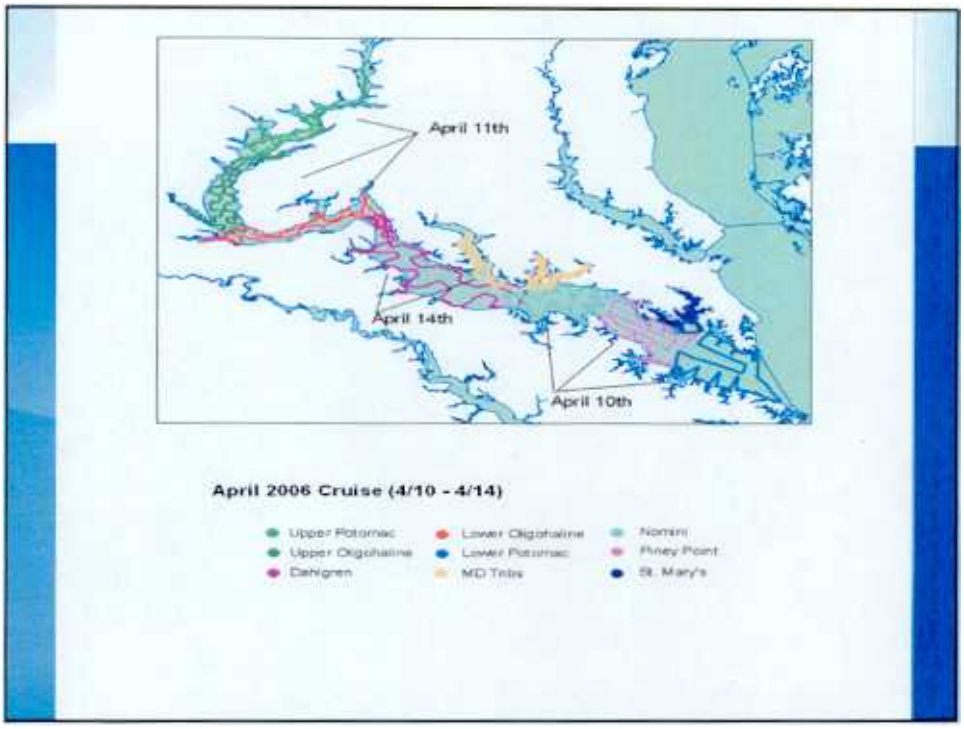
Dataview Real – Time GIS Software

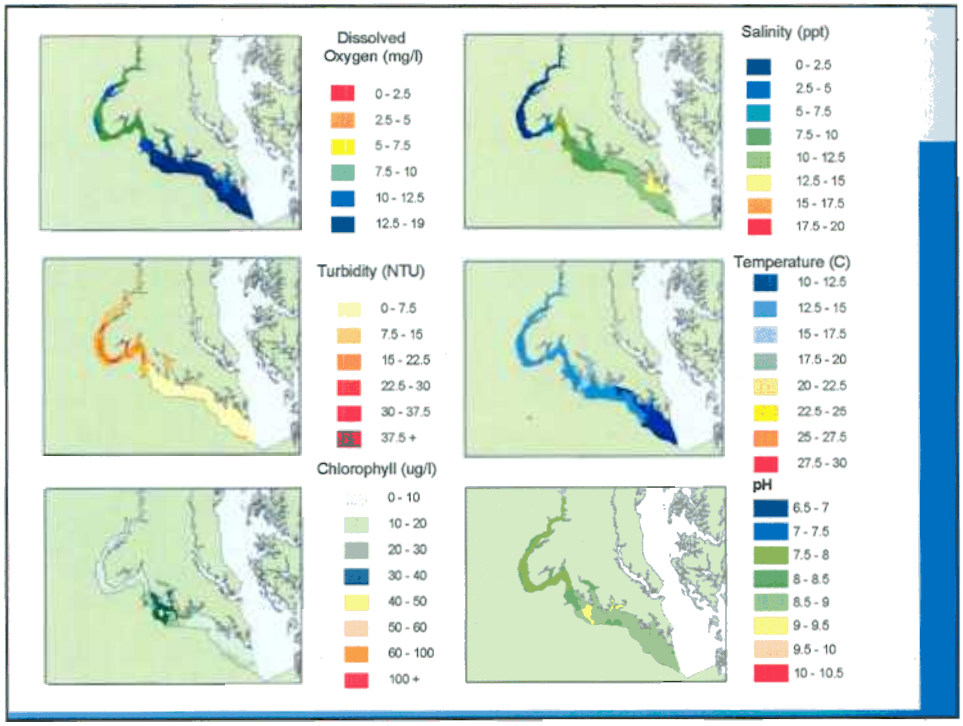


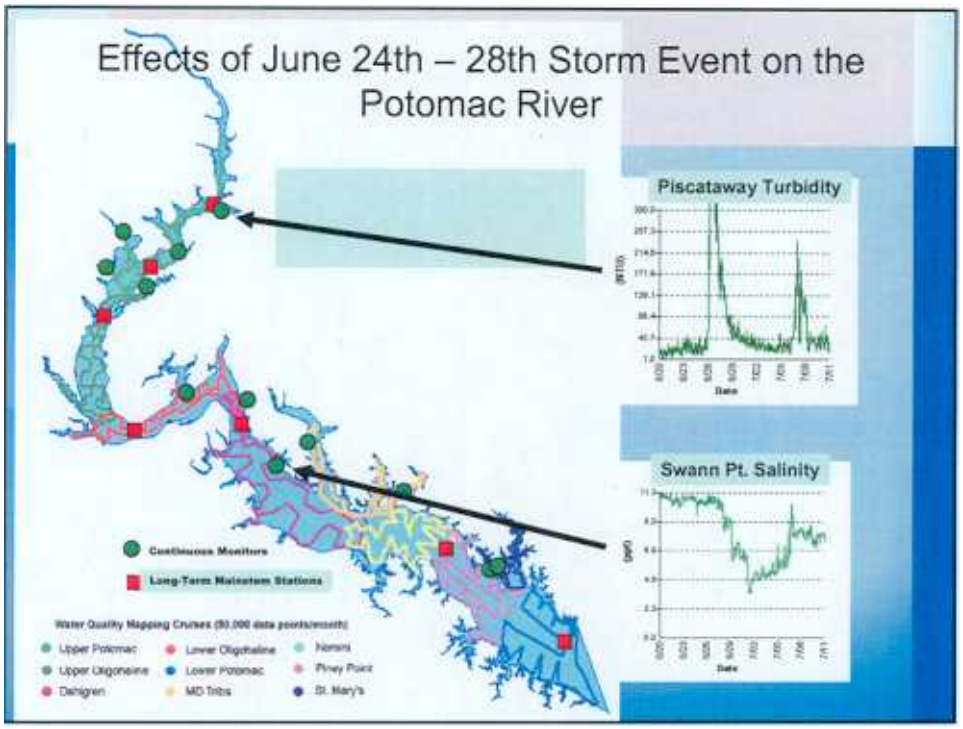


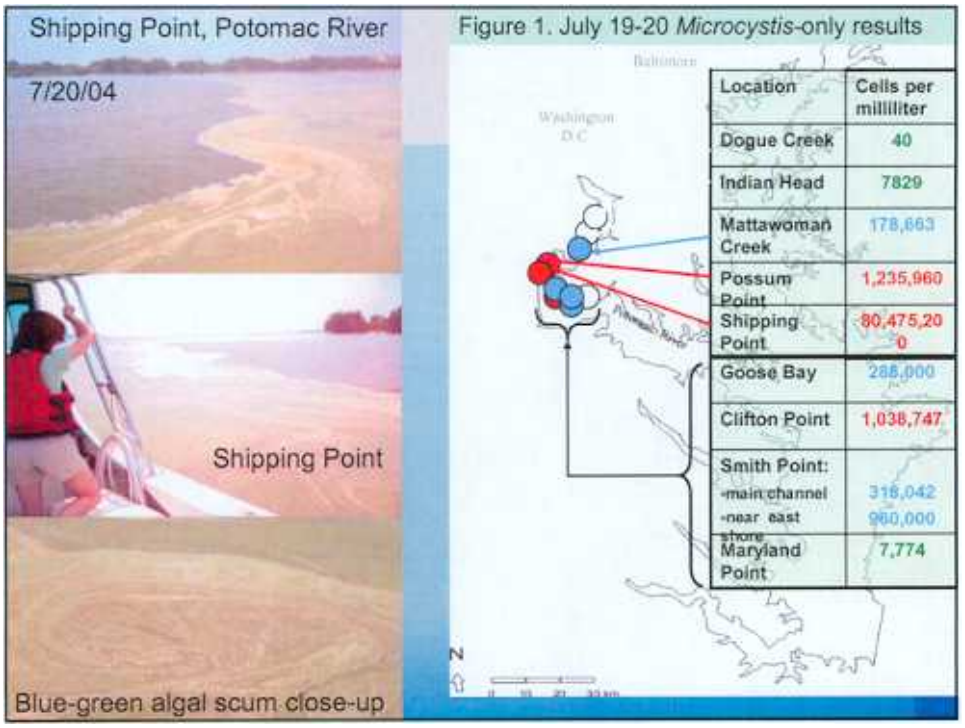


Org.	Area	Day
SWCM	St. Mary's	Mon/Tue
CBL	Lower Pot.	Monday
DNR	Piney Pt.	Monday
DNR	Nomini	Monday
CBL	Upper Pot	Tuesday
DNR	Upper Olig.	Tuesday
DNR	Lower Olig.	Tuesday
DNR	Dahlgren	Friday
SMCM	MD Tribs	Mon/Fri


April 11th
April 14th
April 10th
April 2006 Cruise (4/10 - 4/14)
Upper Potomac
Upper Oligohaline
Dahlgren
Lower Oligohaline
Lower Potomac
MD Tribs
Nomini
Piney Point
St. Mary's


Dissolved Oxygen (mg/l)
0 - 2.5
2.5 - 5
5 - 7.5
7.5 - 10
10 - 12.5
12.5 - 19
Salinity (ppt)
0 - 2.5
2.5 - 5
5 - 7.5
7.5 - 10
10 - 12.5
12.5 - 15
15 - 17.5
17.5 - 20
Turbidity (NTU)
0 - 7.5
7.5 - 15
15 - 22.5
22.5 - 30
30 - 37.5
37.5 +
Temperature (C)
10 - 12.5
12.5 - 15
15 - 17.5
17.5 - 20
20 - 22.5
22.5 - 25
25 - 27.5
27.5 - 30
Chlorophyll (ug/l)
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 100
100 +
pH
6.5 - 7
7 - 7.5
7.5 - 8
8 - 8.5
8.5 - 9
9 - 9.5
9.5 - 10
10 - 10.5



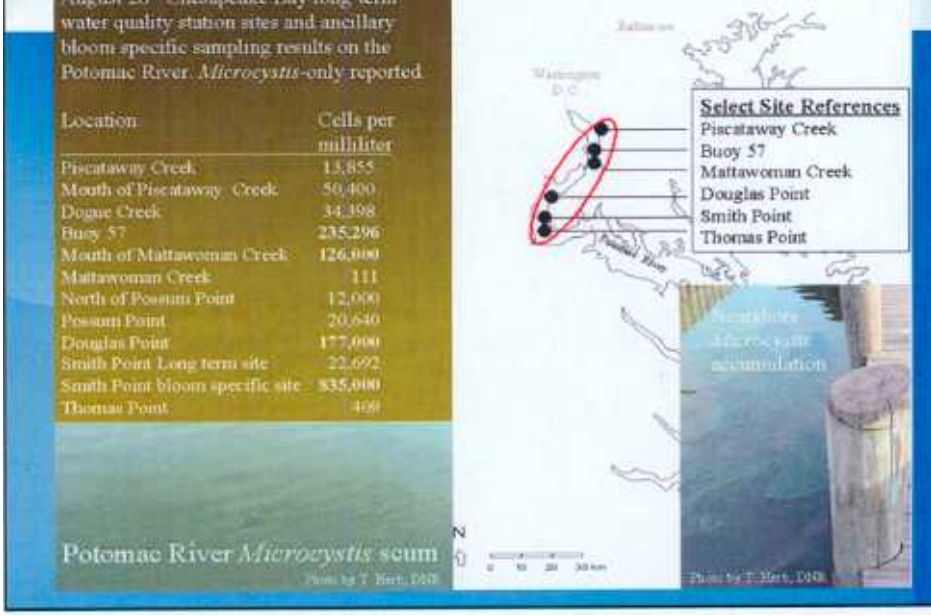


Location	Cells per milliliter
Dogue Creek	40
Indian Head	7829
Mattawoman Creek	178,663
Possum Point	1,235,960
Shipping Point	80,475,200
Goose Bay	288,000
Clifton Point	1,038,747
Smith Point: -main channel	318,042
-near east shore	960,000
Maryland Point	7,774

2006 Microcystis Bloom

August 28th Chesapeake Bay long-term water quality station sites and ancillary bloom specific sampling results on the Potomac River. *Microcystis*-only reported.

Location	Cells per milliliter
Piscataway Creek	13,855
Mouth of Piscataway Creek	50,400
Dogue Creek	34,398
Buoy 57	235,296
Mouth of Mattawoman Creek	126,000
Mattawoman Creek	111
North of Possum Point	12,000
Possum Point	20,640
Douglas Point	177,000
Smith Point Long term site	22,692
Smith Point bloom specific site	835,000
Thomas Point	400



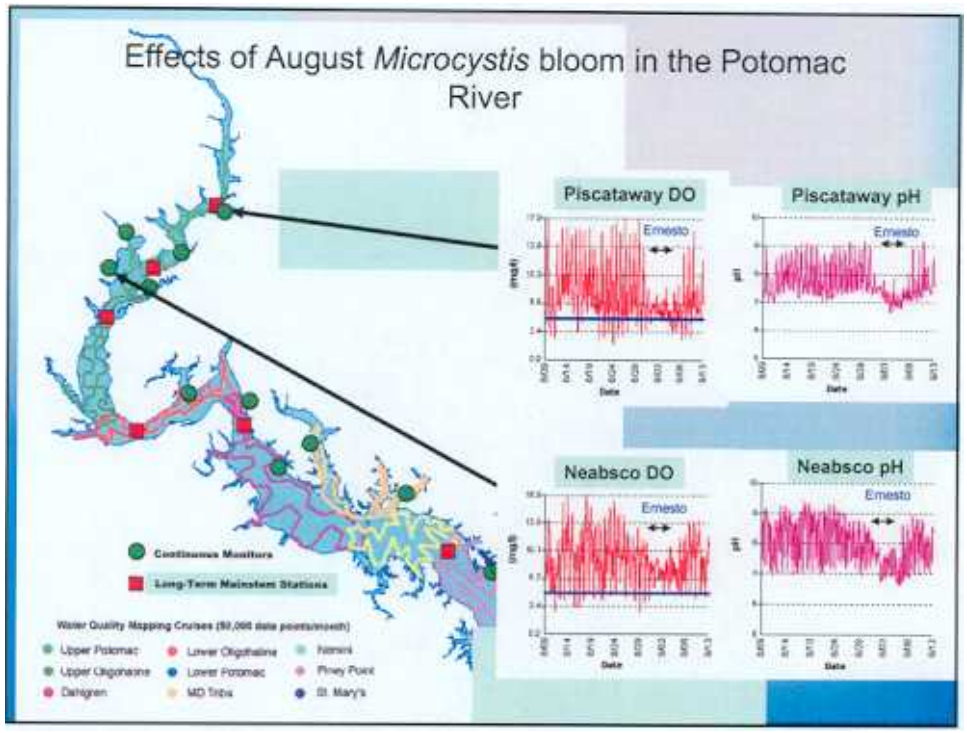
Spatial Extent of 2006 Bloom

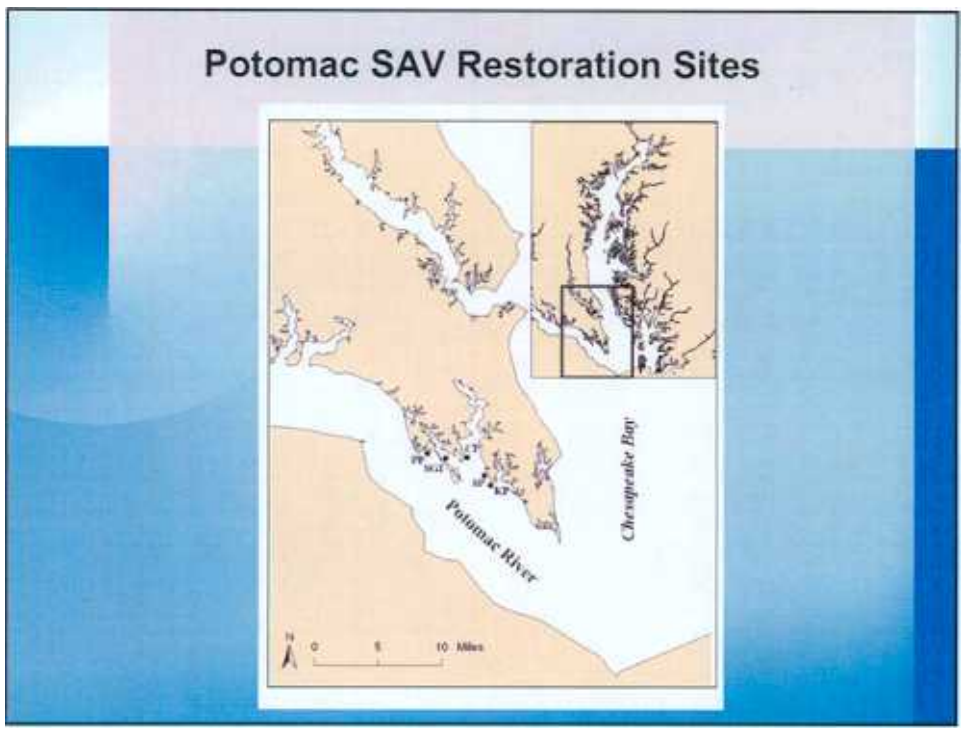
August 14
Smith Point

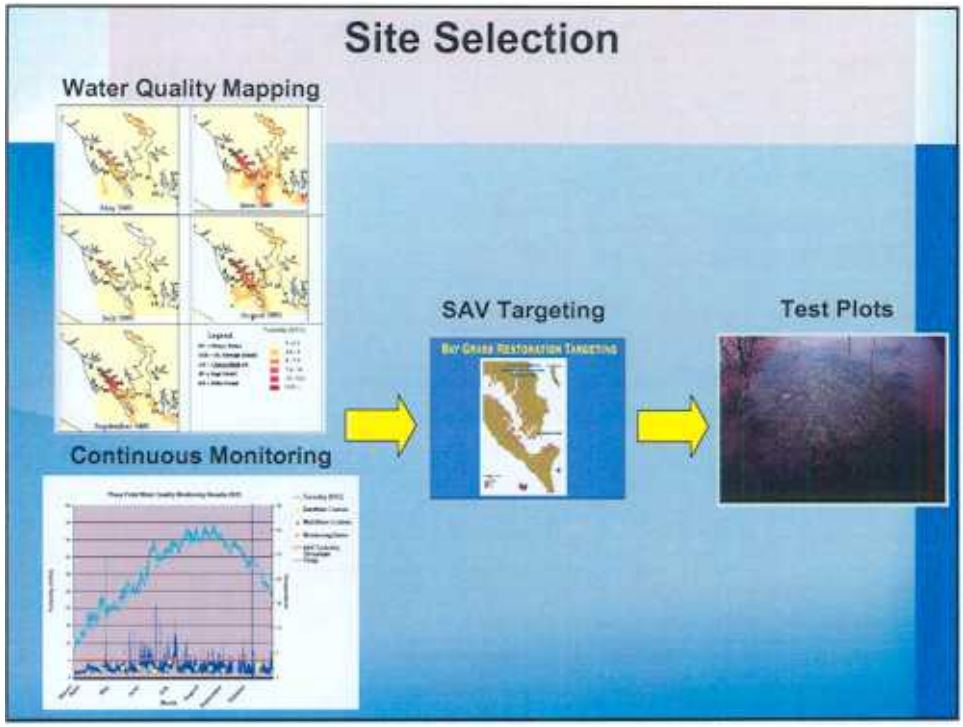
August 28
26 miles of river

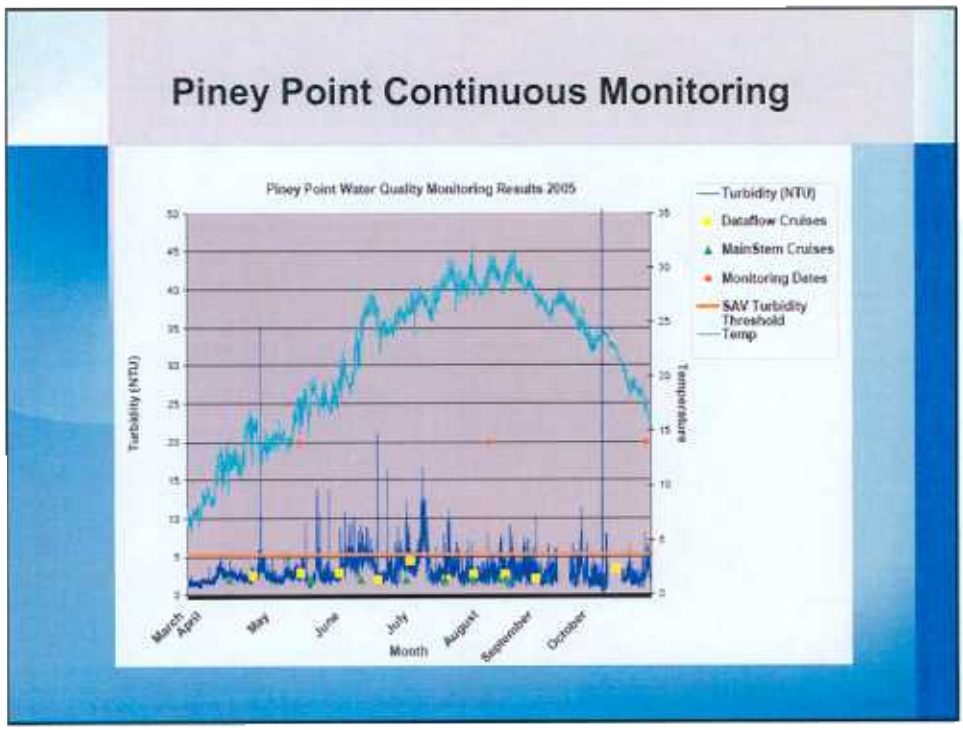
September 5
17.5 miles

Figure 1. Regions of the Potomac River where *Microcystis* exceeded 10,000 cells per milliliter based on Chesapeake Bay Longterm Monitoring station results.

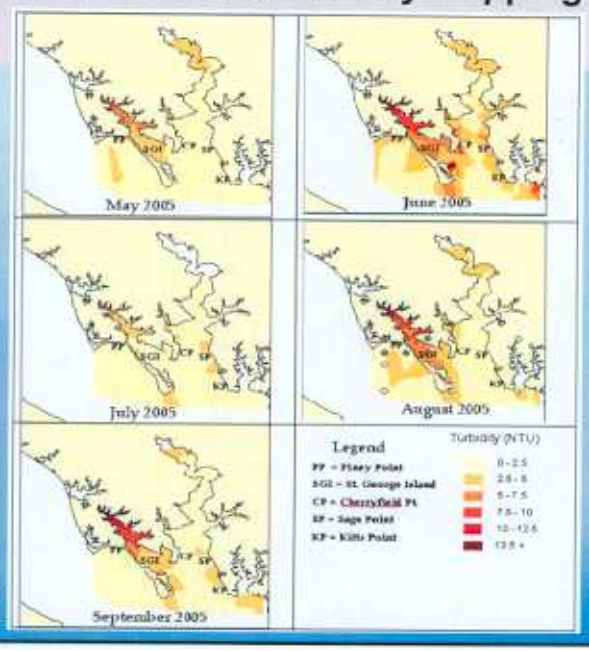

Effects of August *Microcystis* bloom in the Potomac River
Piscataway DO
Ernesto
Piscataway pH
Ernesto
Neabsco DO
Ernesto
Neabsco pH
Ernesto
Continuous Monitors
Long-Term Mainstem Stations
Water Quality Mapping Cruises ($0,000 data points/month)
Upper Potomac
Upper Oligohaline
Dahlgren
Lower Oligohaline
Lower Potomac
MD Tribs
Nanjemoy
Piney Point
St. Mary's


Potomac SAV Restoration Sites
Potomac River
Chesapeake Bay
0
5
10 Miles


Site Selection
Water Quality Mapping
SAV Targeting
Test Plots
Continuous Monitoring


Piney Point Continuous Monitoring
Piney Point Water Quality Monitoring Results 2005
Turbidity (NTU)
Dataflow Cruises
MainStem Cruises
Monitoring Dates
SAV Turbidity Threshold
Temp
Turbidity (NTU)
Temperature
March
April
May
June
July
August
September
October
Month

Potomac Water Quality Mapping



St. Georges Island
Test Plots
July 18, 2006 MD-DNR

St. Georges Island
Test Plots
July 27, 2006
Chris Tanner, SMC

Potomac SAV Restoration Activities

- DNR staff completed eelgrass seed counts for the 2006 seed harvest
- Approximately 350,000 eelgrass seeds will be available for restoration use in the high salinity waters of the Lower Potomac and Patuxent Rivers this fall
- New storage techniques at Piney Point have improved eelgrass seed survival from 20% to 80%.
- Seeds will be dispersed in October on the Potomac and Patuxent Rivers
- We are working with VIMS to coordinate seeding activities

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.

Eyes on the Bay – Web Portal

http://www.eyesonthebay.net

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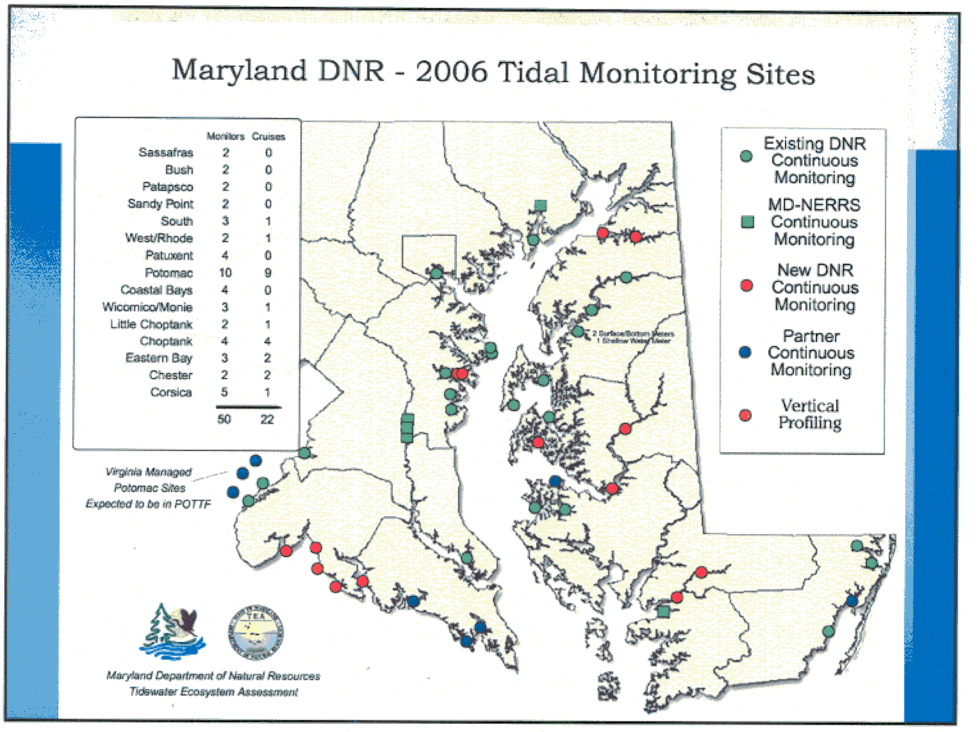
Next Steps for Potomac Integrated Monitoring Project

- Complete 2006 monitoring efforts
- Continue data processing, verification and data management
- Data is available on the DNR website; will submit data to CBP
- Conduct 2006 Potomac water quality assessments
- Coordinate with Virginia DEQ for continuous monitoring expansion in oligohaline and mesohaline tributaries and embayments (potential for 4 or more new sites)
- Identify additional resources/develop new partnerships


Maryland DNR - 2006 Tidal Monitoring Sites
Monitors 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 9
Coastal Bays 4 0
Wicomico/Monie 3 1
Little Choptank 2 1
Choptank 4 4
Eastern Bay 3 2
Chester 2 2
Corsica 5 1
50 22
Existing DNR Continuous Monitoring
MD-NERRS Continuous Monitoring
New DNR Continuous Monitoring
Partner Continuous Monitoring
Vertical Profiling
Virginia Managed Potomac Sites Expected to be in POTTF
Maryland Department of Natural Resources
Tidewater Ecosystem Assessment