



Integrated Approaches for Coastal Monitoring

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NJDEP

Water Monitoring & Standards

Developments in Coastal Water Quality Monitoring

- Increasing use of automated sensors and new monitoring platforms is producing a wealth of water quality data on coastal waters.
- New and traditional monitoring systems produce data at widely varying frequencies and geographic scales using very different data formats

Data Sources

Traditional Fixed-Station Boat Sampling

Microbial



Phytoplankton
Species ID



Bacterial
Viral

Macroscopic Biota for
measuring Ecosystem Health



Data Sources

Real-time & Near Real-time Monitoring



Real-time
Monitoring Buoy



Slocum Glider



Remus AUV

Data Sources

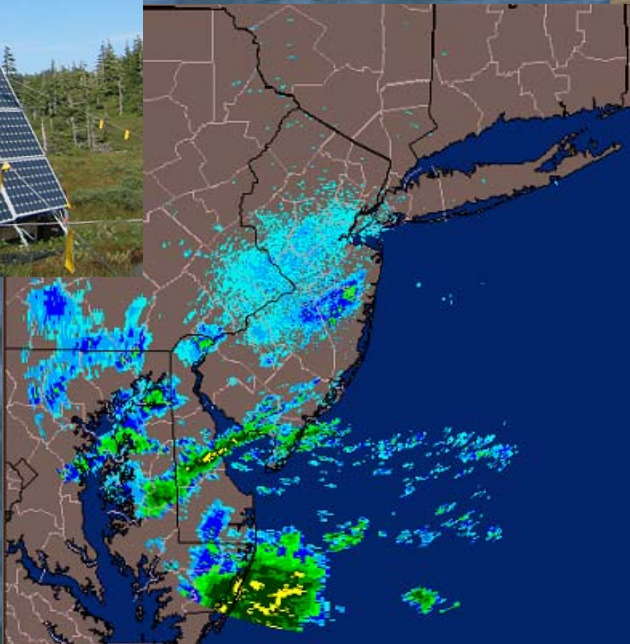
Remote Sensing

Land-Based



Surface
Currents
(CODAR)

Weather Radar



Aircraft



Satellite

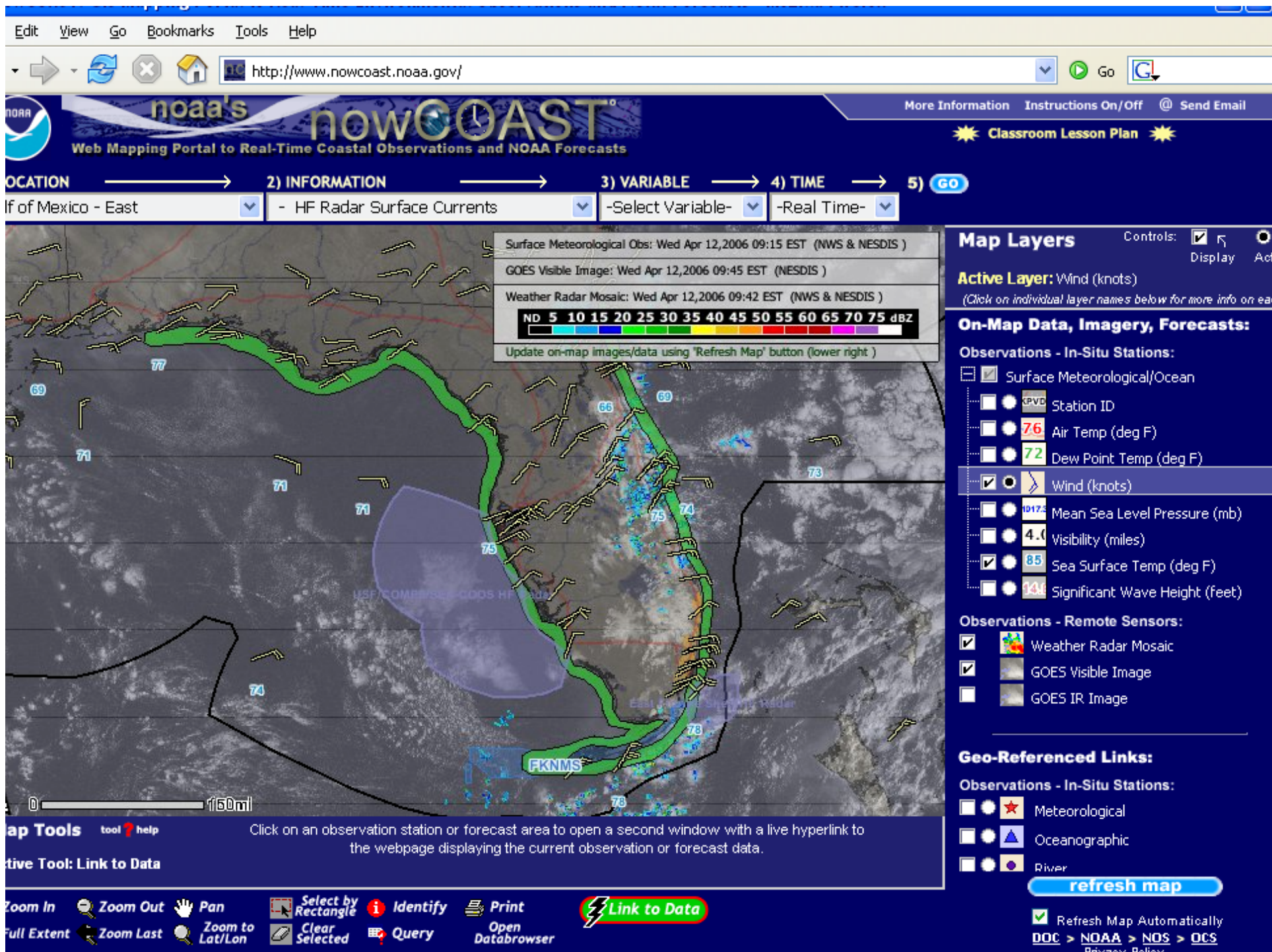


The Challenge...

- To integrate these various data sources at the regional, national and global level to translate this wealth of data into readily accessible information for short-term and long-term management decisions on coastal water quality.

Examples of Data Integration

- National - NOAA's NowCoast
- Regional - Chesapeake's Eyes on the Bay



Edit View Go Bookmarks Tools Help

http://www.nowcoast.noaa.gov/dataBrowser.jsp

nowCOAST Databrowser: Browse nowCOAST Record History

[Previous Record](#)
[Next Record](#)
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[Back to Map](#)
[Open Link](#)

Record: 1 / 1 Map Layer: Surface Forecasts: Harmful Algae Blooms Bulletins

Feature Name: Gulf Coast

Attention: The Hyperlink Below May Originate from a non-NOAA Site.

Save a Copy Search Select 125% Create Adobe PDF online free!



Gulf of Mexico Harmful Algal Bloom Bulletin

27 March 2006

NOAA Ocean Service

NOAA Satellites and Information Service

Last bulletin: March 20, 2006

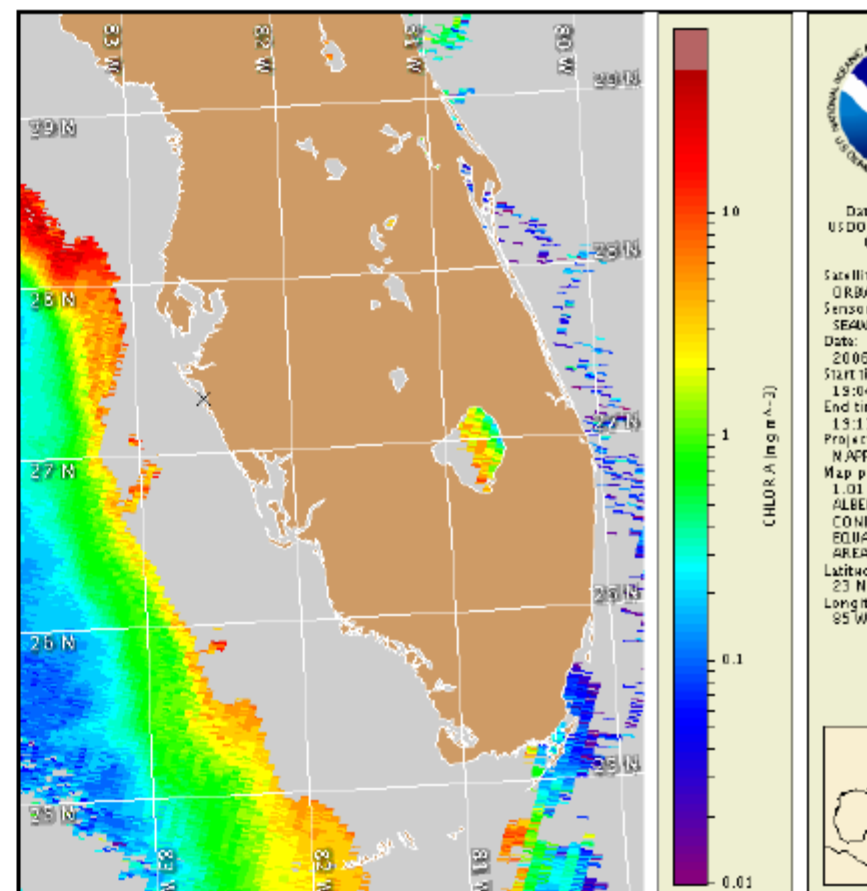
Conditions Report

No impacts are expected in any Florida Counties this week. Due to current harmful algal bloom inactivity, bulletins are issued each Monday, until conditions warrant continuance of twice weekly bulletins.

Analysis

No *K. brevis* was detected last week in any samples from Citrus to Monroe County, or in offshore samples collected south of the Keys. Chlorophyll levels remain elevated (approximately 3-5 $\mu\text{g/L}$) in a band along the Gulf coast of the lower Keys. Samples for the past few weeks have not indicated the presence of *K. brevis* in this area, and conditions are not favorable for new bloom formation. Reports of discolored water are possible north of Marathon.

There is currently a satellite navigation issue that is resulting in a shift



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Record: 2 / 2 **Map Layer:** HF Radar Surface Currents

Feature Name: USF/COMPS/SEA-COOS HF Radar

Attention: The Hyperlink Below May Originate from a non-NOAA Site.



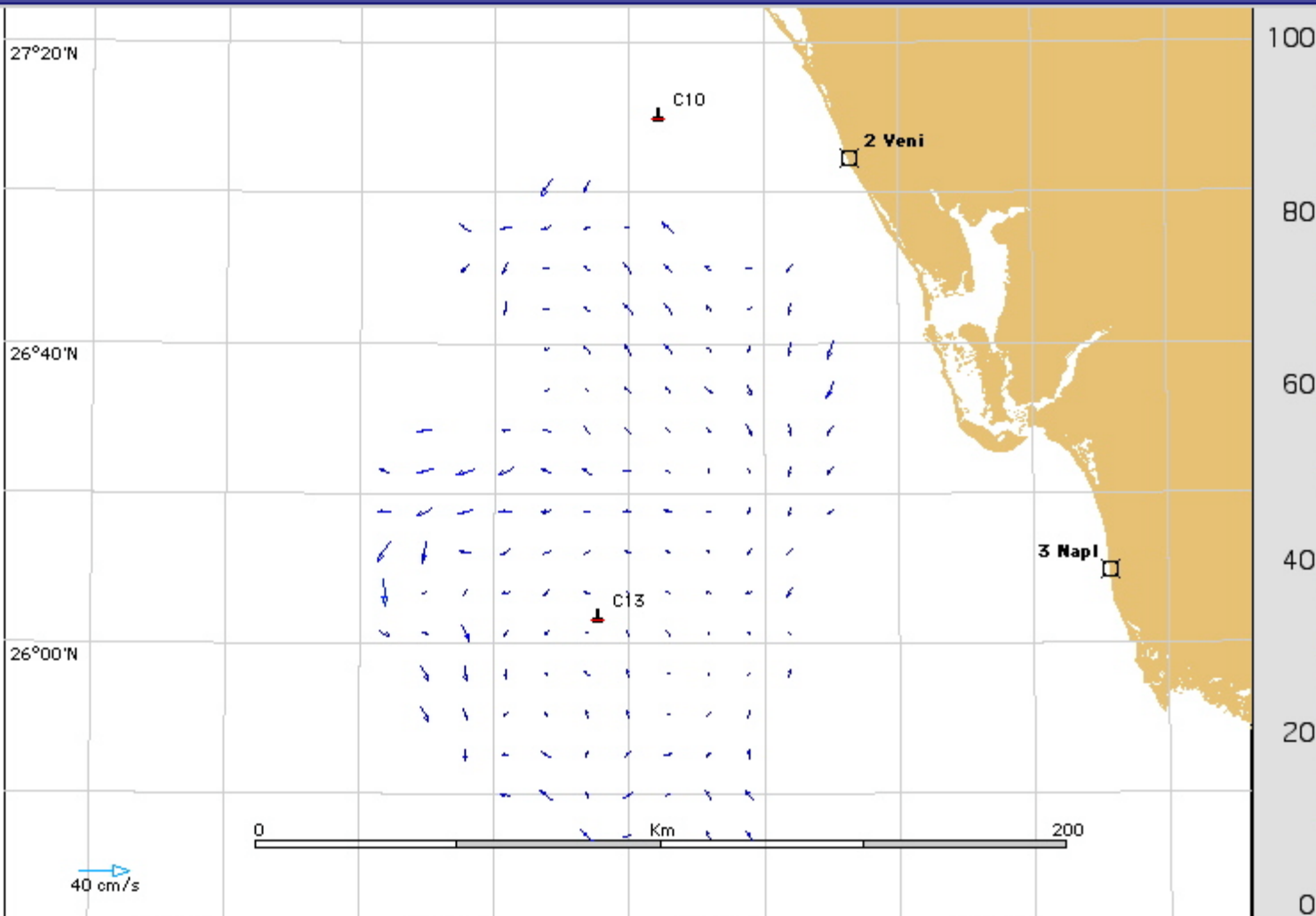
COMPS HF Radar

[Radar Coverage Map](#)
[Shore Site Notes](#)
[Shore Site Photos](#)
[Rals from Rd. Shores Site](#)
[ce Site Notes](#)
[ce Site Photos](#)
[als from Venice Site](#)
[es Site Notes](#)
[es Site Photos](#)
[als from Naples Site](#)

[ge of Marine Science](#)
[PS Home](#)

[L](#)
[-Time Stations Database](#)

[S](#)
[ed Links](#)



Edit View Go Bookmarks Tools Help

http://www.nowcoast.noaa.gov/

noaa's

nowCOAST
Web Mapping Portal to Real-Time Coastal Observations and NOAA Forecasts

[More Information](#)
[Instructions On/Off](#)
[Send Email](#)

Classroom Lesson Plan

LOCATION → 2) INFORMATION → 3) VARIABLE → 4) TIME → 5) **GO**

1-Atlantic
- HF Radar Surface Currents
-Select Variable-
-Real Time-

Surface Meteorological Obs: Wed Apr 12, 2006 10:15 EST (NWS & NESDIS)
GOES Visible Image: Wed Apr 12, 2006 09:45 EST (NESDIS)
Weather Radar Mosaic: Wed Apr 12, 2006 10:01 EST (NWS & NESDIS)
ND 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 dBZ
Update on-map images/data using "Refresh Map" button (lower right)

Map Layers
Controls: ☒ Display

Active Layer: HF Radar Surface Currents
(Click on individual layer names below for more info on e

On-Map Data, Imagery, Forecasts:

Observations - In-Situ Stations:
☒ Surface Meteorological/Ocean

- ☐ Station ID
- ☐ 76 Air Temp (deg F)
- ☐ 72 Dew Point Temp (deg F)
- ☐ Wind (knots)
- ☐ 1012.2 Mean Sea Level Pressure (mb)
- ☐ 4.0 Visibility (miles)
- ☒ 85 Sea Surface Temp (deg F)
- ☐ 134 Significant Wave Height (feet)

Observations - Remote Sensors:
☒ Weather Radar Mosaic
☒ GOES Visible Image
☐ GOES IR Image

Geo-Referenced Links:

Observations - In-Situ Stations:
☐ Meteorological
☐ Oceanographic
☐ River

☒ Refresh Map Automatically
[DOC](#) > [NOAA](#) > [NDS](#) > [OCS](#)
[Privacy Policy](#)

Map Tools
[tool ? help](#)

Click on an observation station or forecast area to open a second window with a live hyperlink to the webpage displaying the current observation or forecast data.

Active Tool: Link to Data

Zoom In Zoom Out Pan Select by Rectangle Identify Print Full Extent Zoom Last Zoom to Lat/Lon Clear Selected Query Open Databrowser Link to Data

nowCOAST Databrowser: Browse nowCOAST Record History

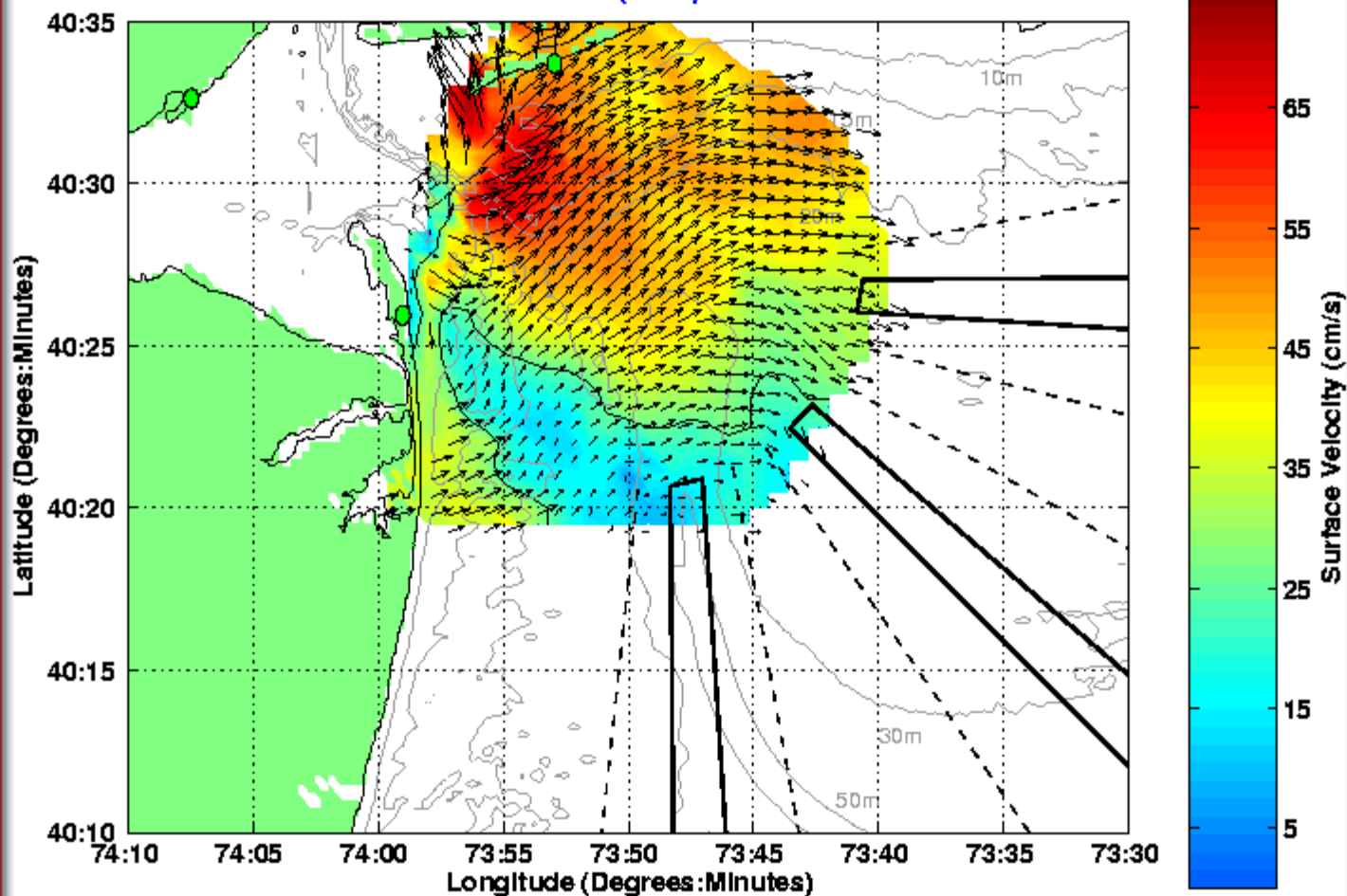
Previous Record Next Record Delete Record Back to Map Open Link

Record: 5 / 5 Map Layer: HF Radar Surface Currents
Feature Name: RU Short Range Codar

Attention: The Hyperlink Below May Originate from a non-NOAA Site.

<< Play < Back Stop Forward > Play >> Faster Slower

RU COOL Raw Velocities (HFR) 2005/04/12 0200 GMT



Archived Data
CODAR/Satellite
Overlays

Standard-Range

York Harbor

Real-time Currents

Real-time Waves

Archived Data

CODAR/Satellite

Overlays

Standard-Range

Porton (LEO-15)

Archived Data

CODAR/Satellite

Overlays

CODAR Home

COOL Home

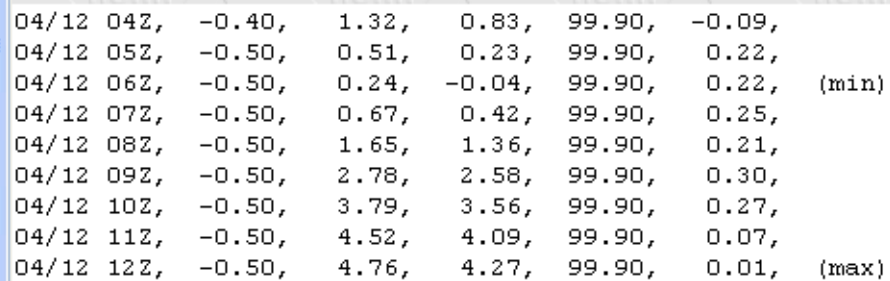
UNIVERSITY OF NEW JERSEY
RUTGERS
Return to RU Main Page

SURGE LIST

East Coast

HISTORY

Sandy Hook, NJ : 04/12/2006 9:08 AM EDT



```
#-----#
#Date (GMT), Surge, Tide, Obs, Pred, Anom, Comment
#-----#
```

nowCOAST Databrowser: Browse nowCOAST Record History

[Previous Record](#)
[Next Record](#)
[Delete Record](#)
[Back to Map](#)
[Open Link](#)

Record: 1 / 1 Map Layer: Observations: Water Quality

Feature Name: Absecon Channel

Attention: The Hyperlink Below May Originate from a non-NOAA Site.

Marine Water Monitoring

[njdep home](#) | [about dep](#) | [index by topic](#) | [programs/units](#) | [de](#)

[home](#) | [news](#) | [links](#) | [co](#)

Marine Water Home

About the Bureau

News

Information

Reports

Data

Automated Sensor - Absecon Channel

Location: Just north of the Vincent Haneman Bridge in Absecon Channel
 Coordinates: 39° 23' 15" N 74° 25' 34" W
 Sensors: Temperature salinity dissolved oxygen pH turbidity chlorophyll a
 Status: Operational

CURRENT CONDITIONS

As of 12/14/2005 2:02:01 AM

Temperature	11.87 °C	Chart
Salinity	22.80 PPT	Chart
Dissolved Oxygen	7.31 mg/L	Chart
pH	7.83	Chart
Turbidity	3.20 JTU	Chart
Chlorophyll a	1.80 µg/L	Chart



nowCOAST Databrowser: Browse nowCOAST Record History

[Previous Record](#)
[Next Record](#)
[Delete Record](#)
[Back to Map](#)
[Open Link](#)

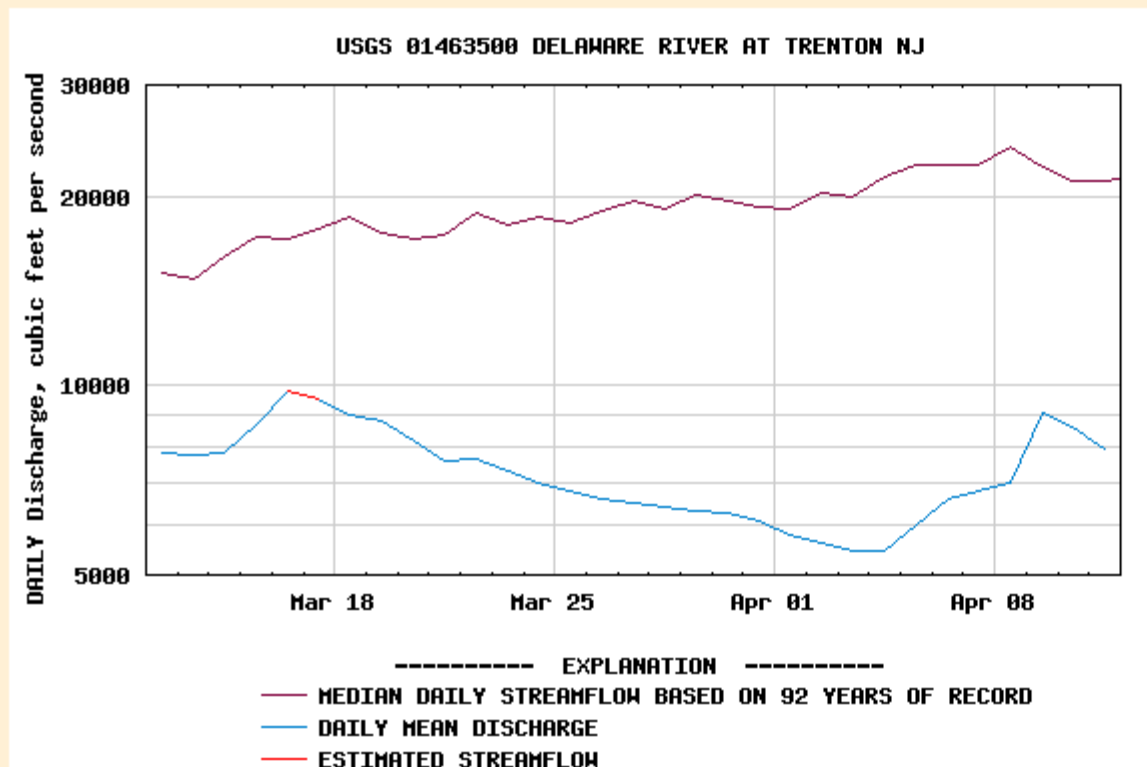
Record: 1 / 1 **Map Layer:** Observations: Water Quality

Feature Name: DELAWARE RIVER AT TRENTON NJ

Attention: The Hyperlink Below May Originate from a non-NOAA Site.

Discharge, cubic feet per second

Most recent value: 7,340 04-12-2006 11:45

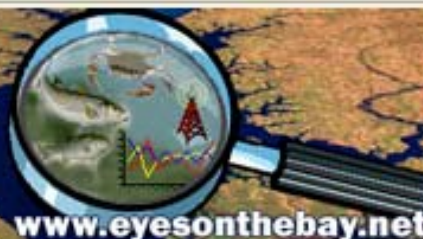


Download a [presentation-quality graph](#)

Parameter Code 00060; DD 05

Daily mean flow statistics for 4/12 based on 92 years of record in ft^3/sec

**Eyes
on the
Bay**



Presented By:

Tidewater Ecosystem Assessment



Revised Lesson Plans Now
Available

Maryland DNR Teams with

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

Monitoring Type:

Continuous Monitoring Stations

Data Variables:

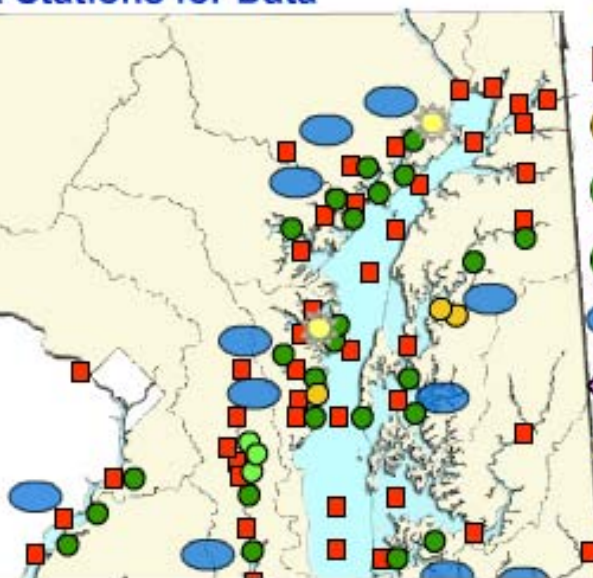
Water Temperature, Salinity,
Dissolved Oxygen, Water Clarity
(Turbidity), Chlorophyll, pH

Data Frequency:

Data Collected Every 15 Minutes

Data Geographical Distribution:

Data Collected Throughout
Maryland's Chesapeake and



Click Legend Symbols to
Toggle Stations On/Off

- Fixed Monthly Stations
- Real-Time Continuous Monitors
- Near-Time Continuous Monitors
- Near-Time Continuous Monitors (Offline)
- Water Quality Mapping
- 2005 Current Algal Bloom Events
- Weather Stations

Click for Daily
Satellite Images and
Data Maps

[Contact Us](#)

Corsica River - Cedar Point



Meter Depth:
Suspended, 1 meter Below the Surface

Station Depth:
1.9 meters (MLW: Mean Low Water)

Coordinates (NAD83):
Latitude: 39.0832°
Longitude: -76.1073°

[Return to the Station Map](#)



More Data Options:

Download Data

Data Table	Full Year Graphs	Full Year Data Table	Date Selection	Station Selection
------------	------------------	----------------------	----------------	-------------------

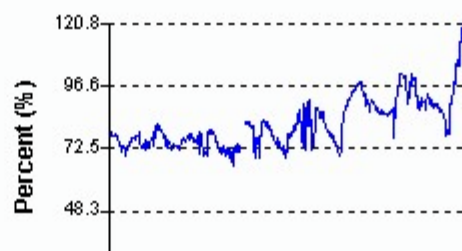
Water Quality Data

Note: Missing data may result from equipment malfunctions or the rejection of "bad" data during quality assurance and quality control checks.

Dissolved Oxygen (DO) Concentration



Dissolved Oxygen (DO) Percent Saturation



Choose Other Parameters:

[Return to the Station Map](#)

[Dissolved
Oxygen](#)

[Water
Temperature](#)

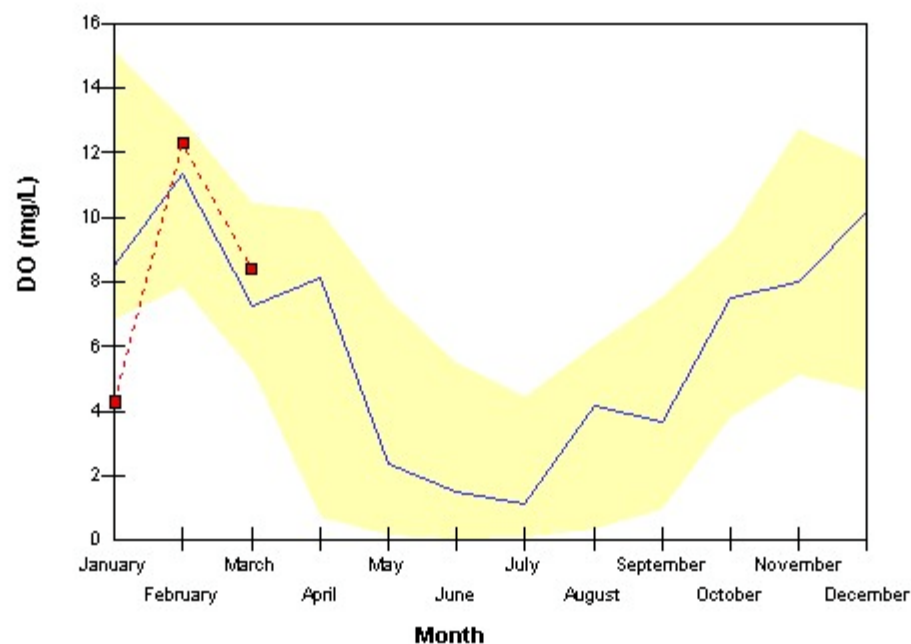
[Salinity](#)

[pH](#)

[Water
Clarity](#)

The yellow shaded area represents the range of monthly mean values that have occurred from 1985 to 2004. The blue line shows the monthly mean values for each month over that same time period. The red line shows what the current years conditions are and how they compare to the range and the average values we've seen.

2006 [Bottom Water Dissolved Oxygen](#) Upper Eastern Shore / Lower Chester River (ET4.2)



Legend



Range 1985 to 2004

---■--- 2006

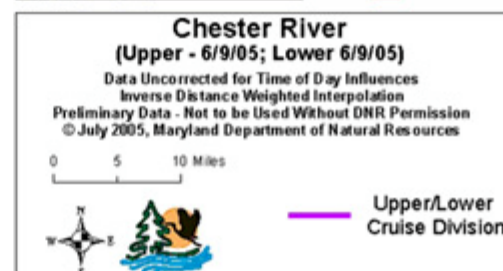
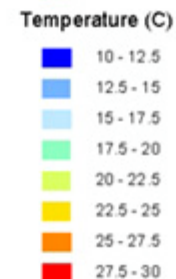
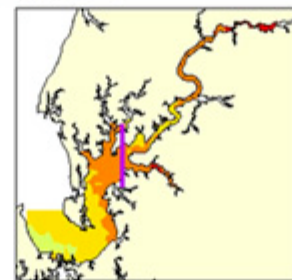
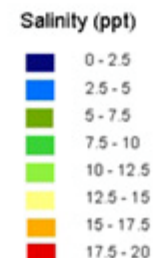
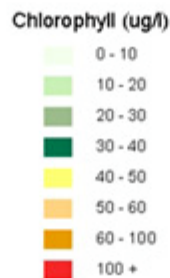
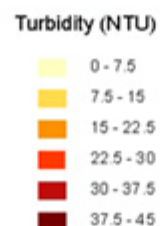
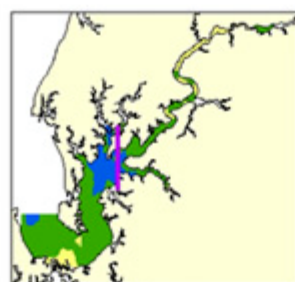
— Mean

Water Quality Mapping

More Info:
[WQM Home](#)
[WQM Instrumentation](#)
[WQM Data and Maps](#)
[Continuous Monitoring](#)
[Eyes on the Bay](#)

Map Query Results

Chester River - 6/9/2005





Real Time Weather Station Data
Available from Otter Pt. Creek,
Bush River

MODIS - Satellite Imagery

Apr-11-2006

Choose a
True Color Image:

04/11/2006
04/10/2006
04/09/2006
04/08/2006
04/07/2006
04/05/2006
04/04/2006

or a Data Map:

04/11/2006 - Turbidity
04/11/2006 - Temperature
04/11/2006 - Chlorophyll
04/10/2006 - Turbidity
04/10/2006 - Temperature
04/10/2006 - Chlorophyll
04/09/2006 - Turbidity

View Selected

Clear Selections



April 11, 2006

This Image is Available at
Maryland DNR's
www.eyesonthebay.net

Image courtesy of
MODIS Aqua

New Feature! 25 Jan 06

MODIS - Satellite Imagery

Choose a
True Color Image:

04/11/2006
04/10/2006
04/09/2006
04/08/2006
04/07/2006
04/05/2006
04/04/2006

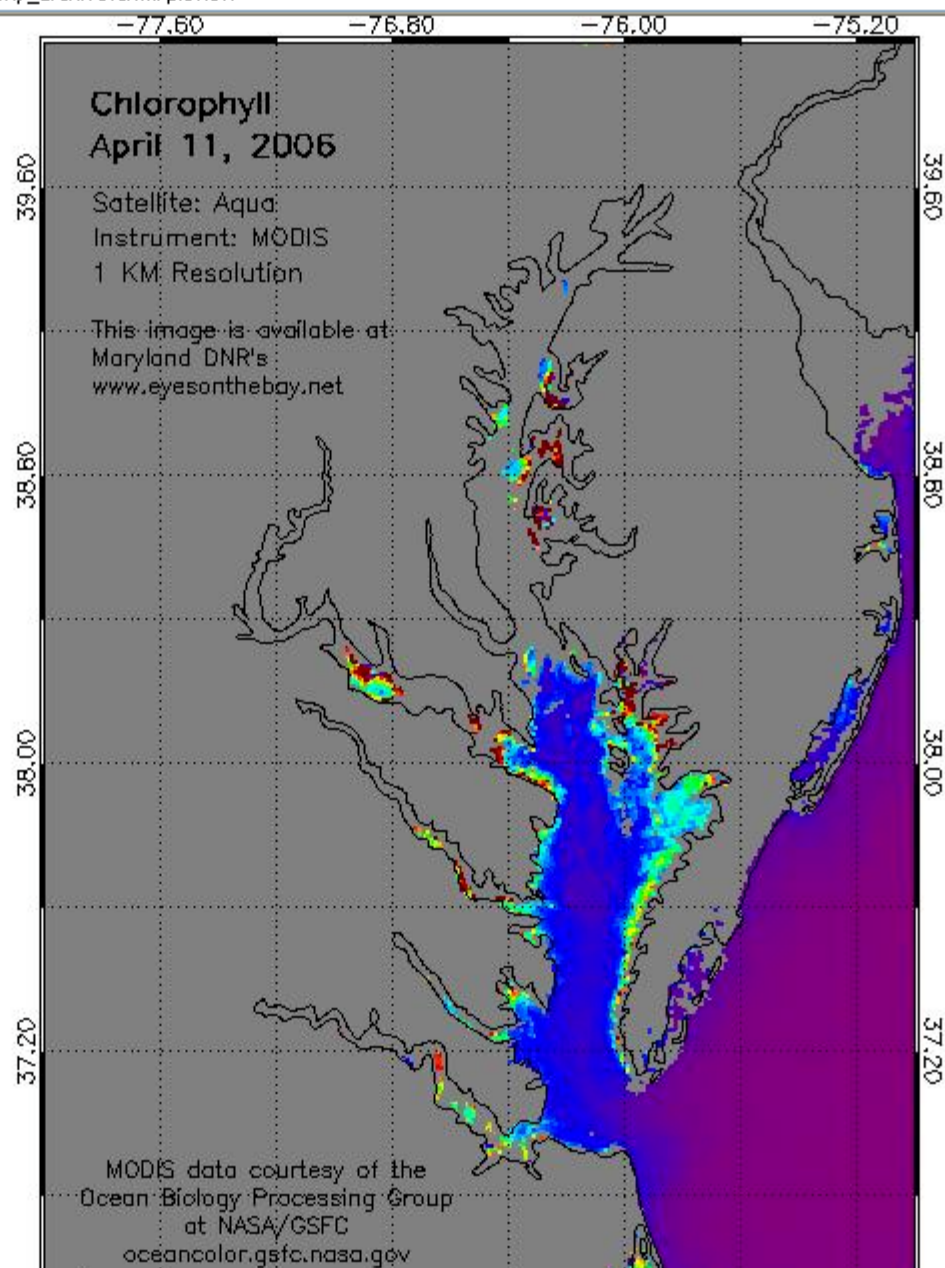
or a Data Map:

04/11/2006 - Turbidity
04/11/2006 - Temperature
04/11/2006 - Chlorophyll
04/10/2006 - Turbidity
04/10/2006 - Temperature
04/10/2006 - Chlorophyll
04/09/2006 - Turbidity

View Selected

Clear Selections

Images from days when the Bay was



Integrated Systems for the Mid-Atlantic

- Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA)
 - This recently formed organization is planning to integrate coastal ocean observing for the Mass - Va. Region.
 - Pilot projects and user surveys are being planned.
 - Handouts on MACOORA are available at this workshop

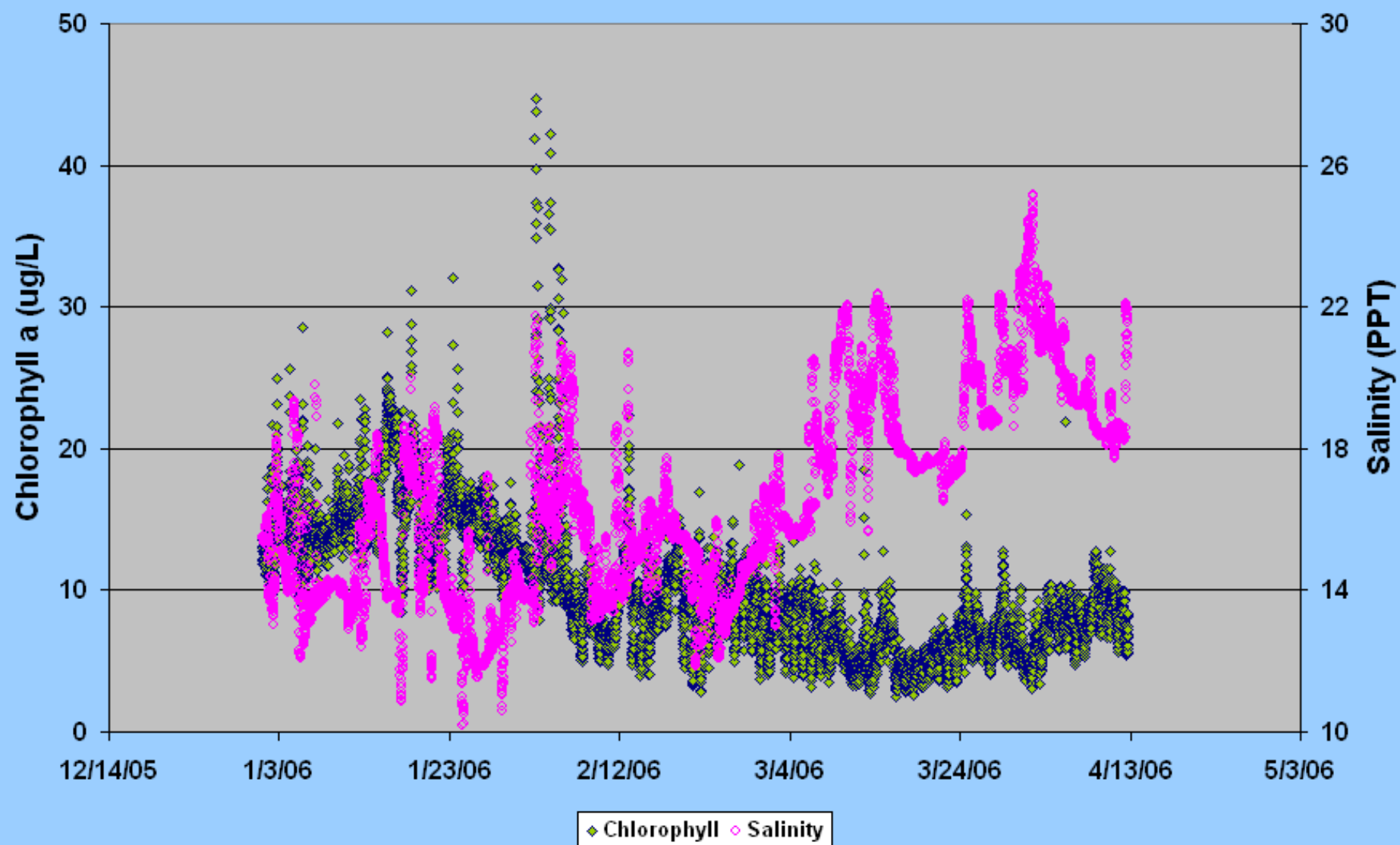


Benefits for NJ coastal waters

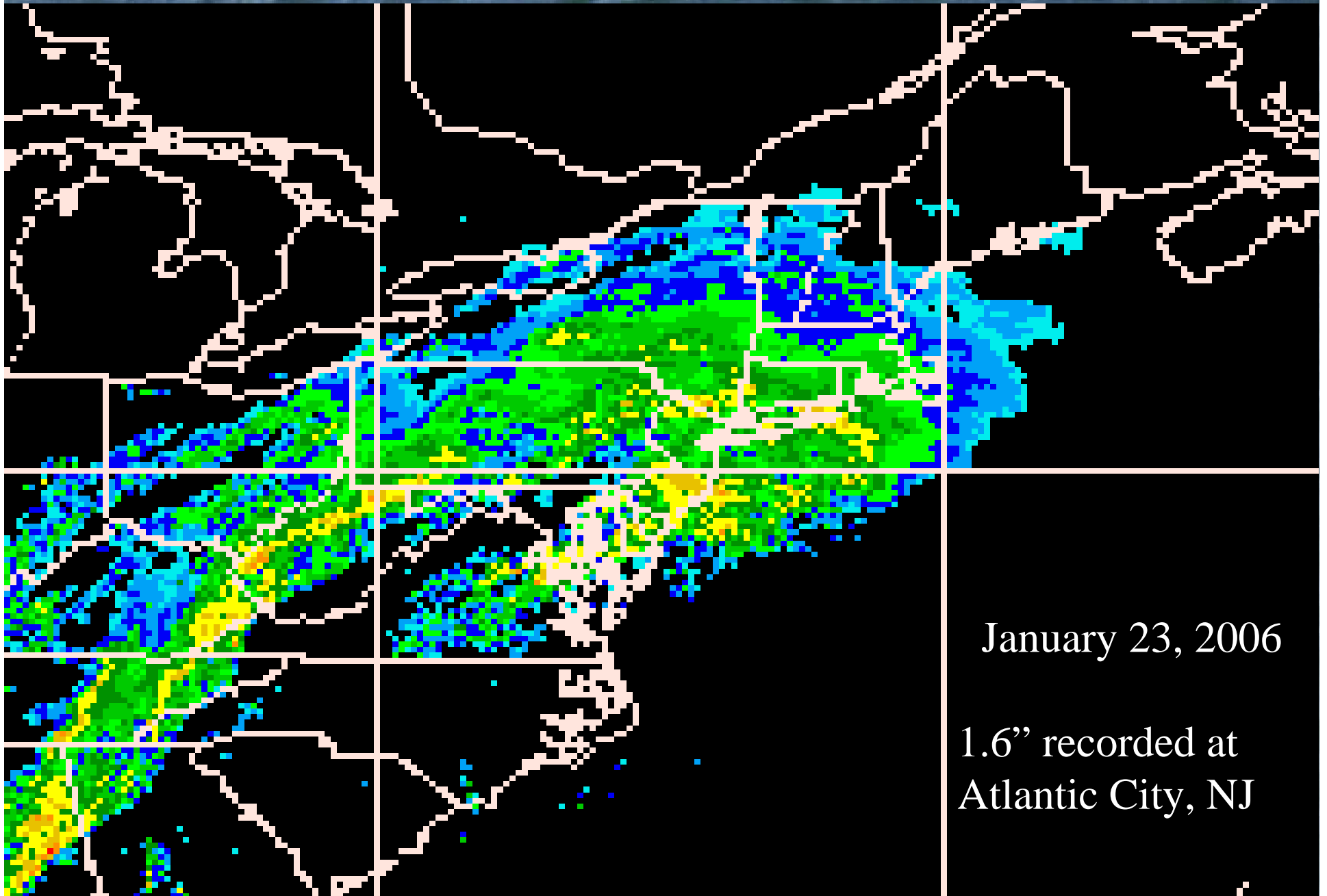
Example: Better characterization and
understanding of phytoplankton
blooms

Real-time Sensor

Barnegat Bay @ Seaside Park



Weather Radar

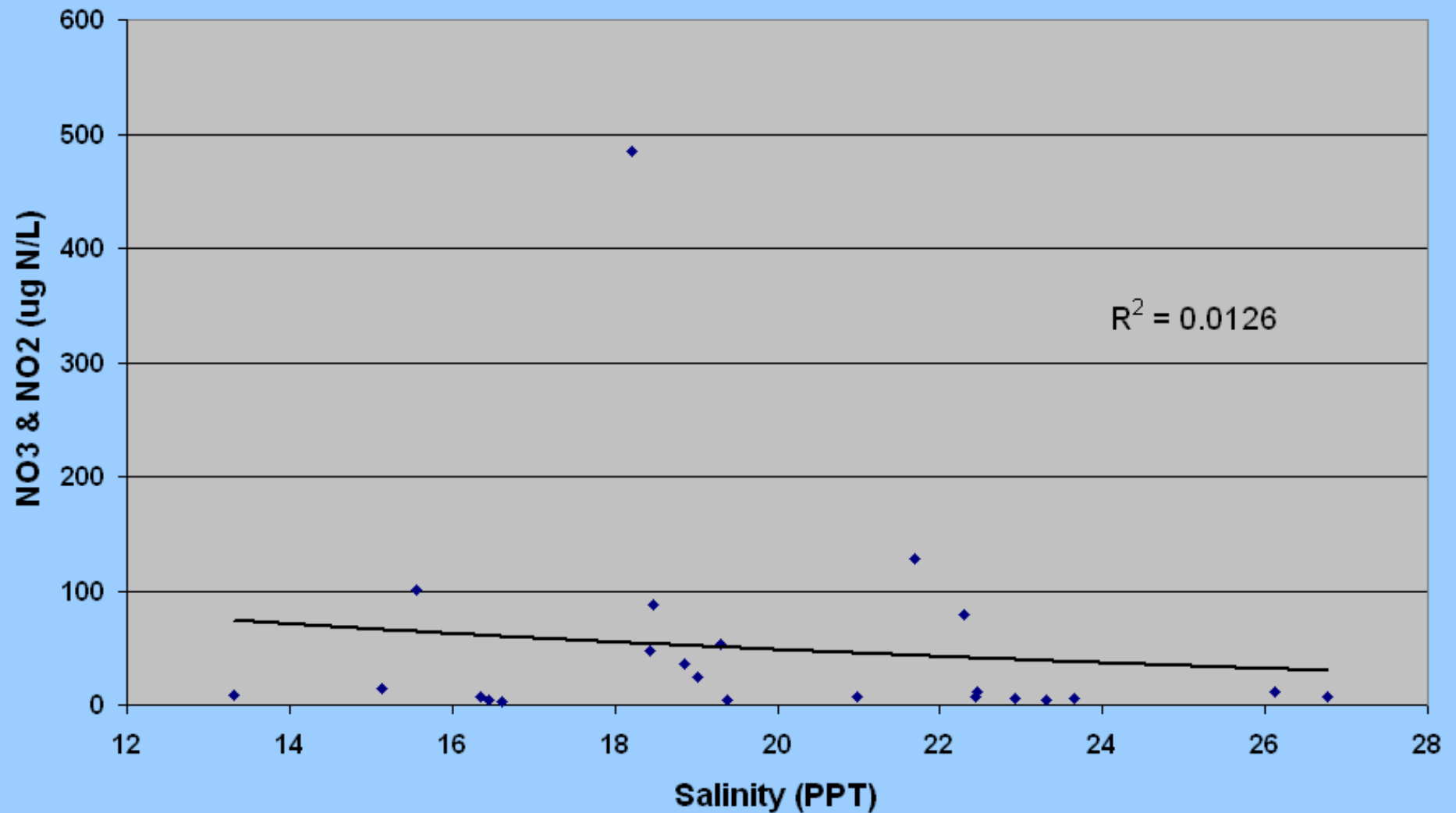


January 23, 2006

1.6" recorded at
Atlantic City, NJ

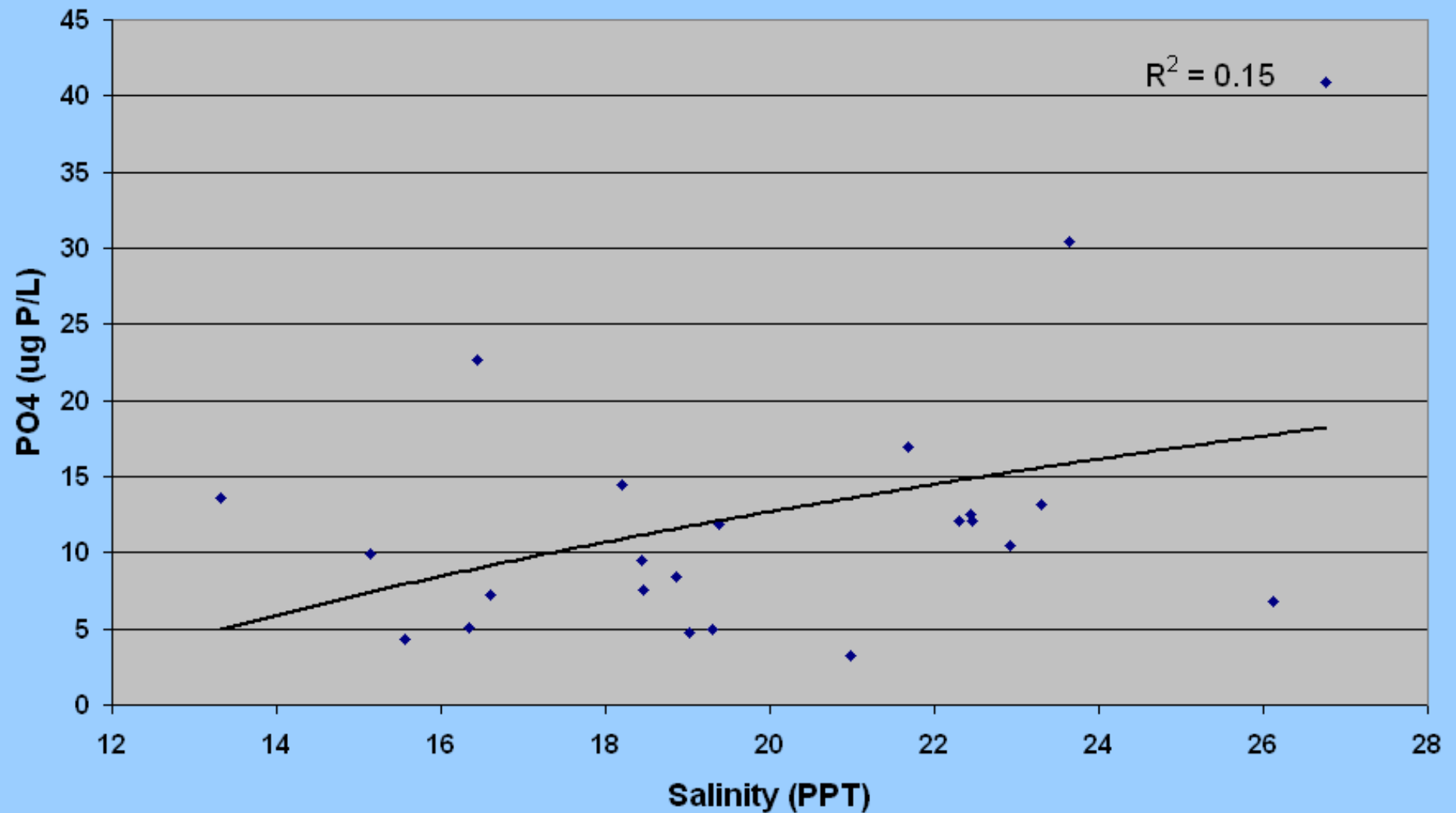
Routine Boat Sampling

**Nitrate & Nitrite vs Salinity
Barnegat Bay @ Seaside Park**



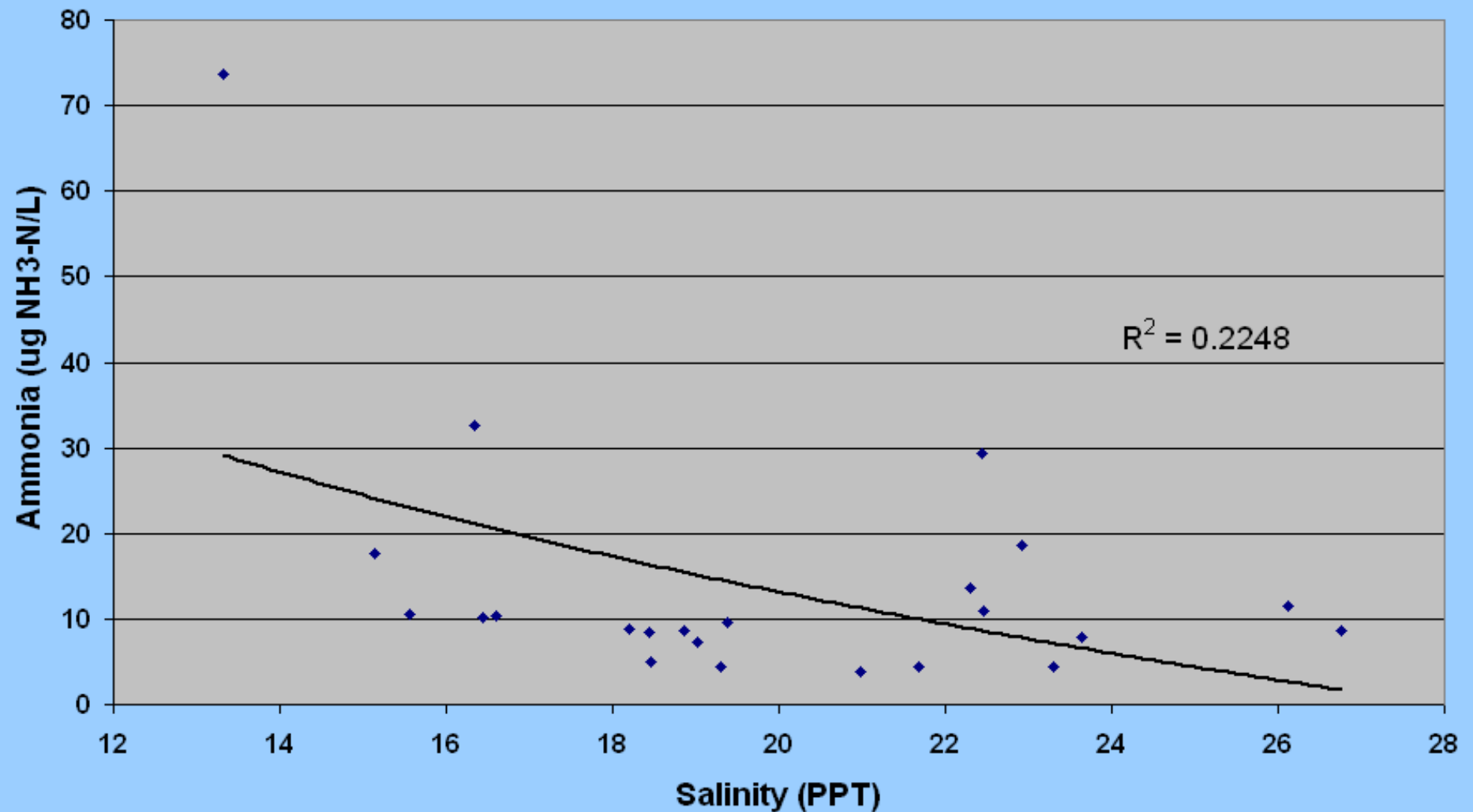
Routine Boat Sampling

**Orthophosphate vs Salinity
Barnegat Bay @ Seaside Park**



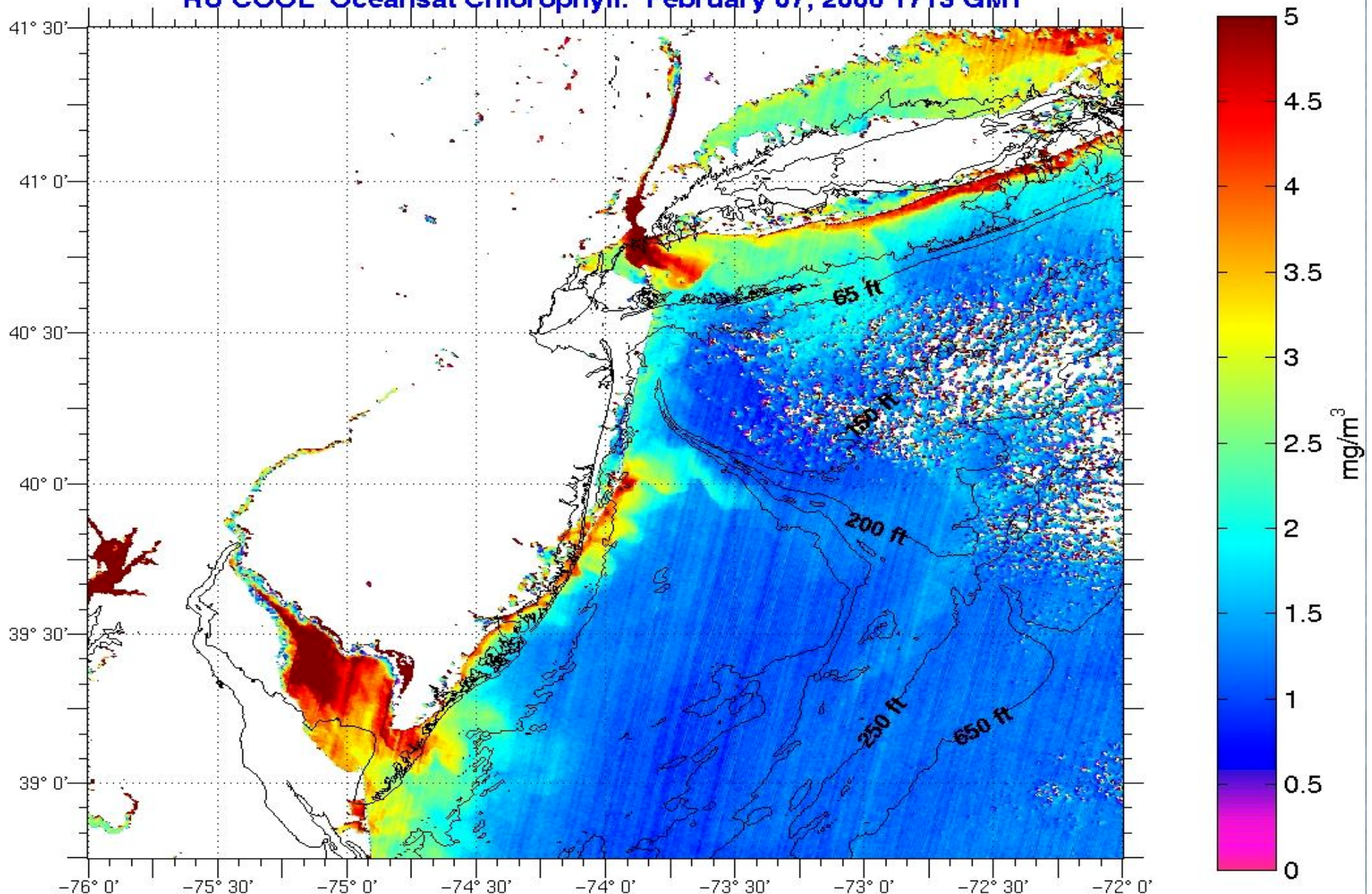
Routine Boat Sampling

Ammonia vs Salinity
Barnegat Bay @ Seaside Park



Satellite Remote Sensing

RU COOL Oceansat Chlorophyll: February 07, 2006 1713 GMT

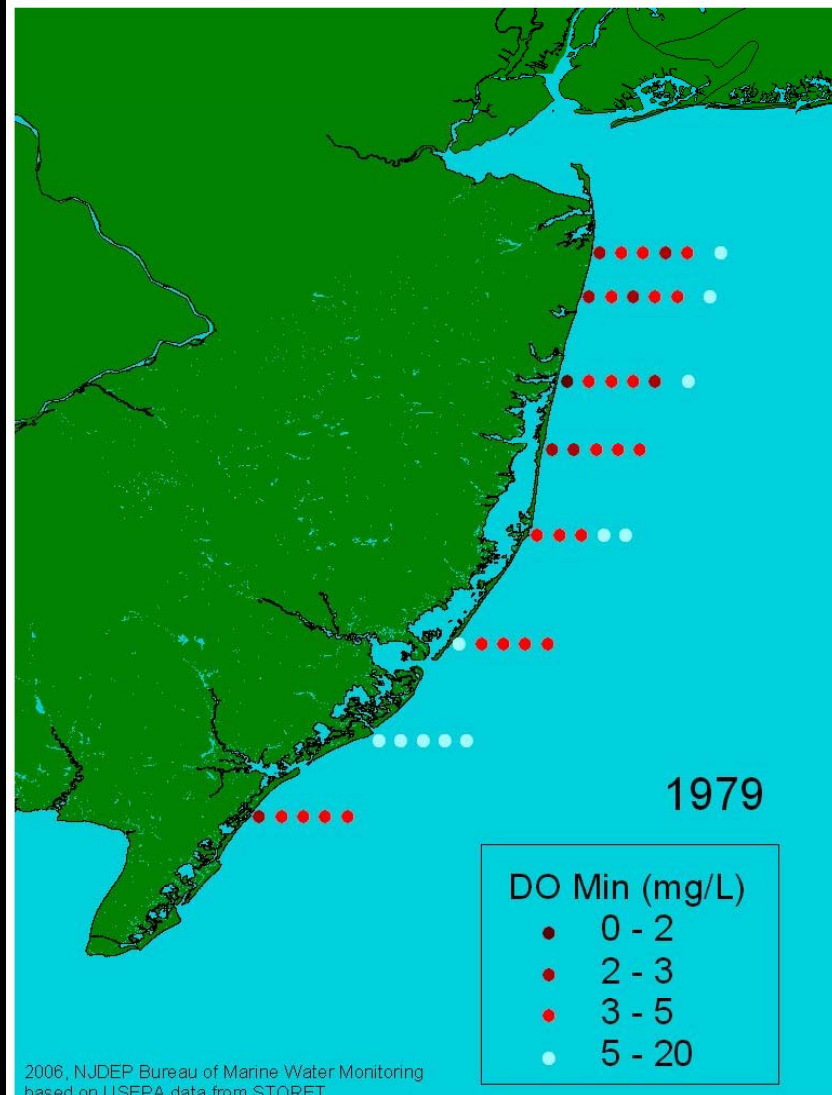




Benefits for NJ coastal waters

Example: Better characterization and understanding of important ecosystem measures such as dissolved oxygen

Dissolved Oxygen Trends & Patterns



Need better understanding of DO and its relation to ecosystem health in ocean waters

- What is the duration of low DO levels?
- What is the geographical extent of areas of low DO?
- What measurable impacts are there to the biota?
- New technologies and methods now being developed will help us to answer these questions.

The background of the slide is a photograph of ocean waves, showing white foam and deep blue water. The text is overlaid on this image.

Integrating coastal monitoring systems helps us to better manage our coastal waters by:

- By providing more complete monitoring coverage (temporal and spatial)
- By providing the means to better assess cause and effect relationships
- By allowing us to develop better models of coastal water quality conditions

Average Dissolved Oxygen Levels 1995 - 2000

Ave. DO (mg/L)

- 0 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 12

Coast

