New York Bight
Sub-Regional Ocean Observing System

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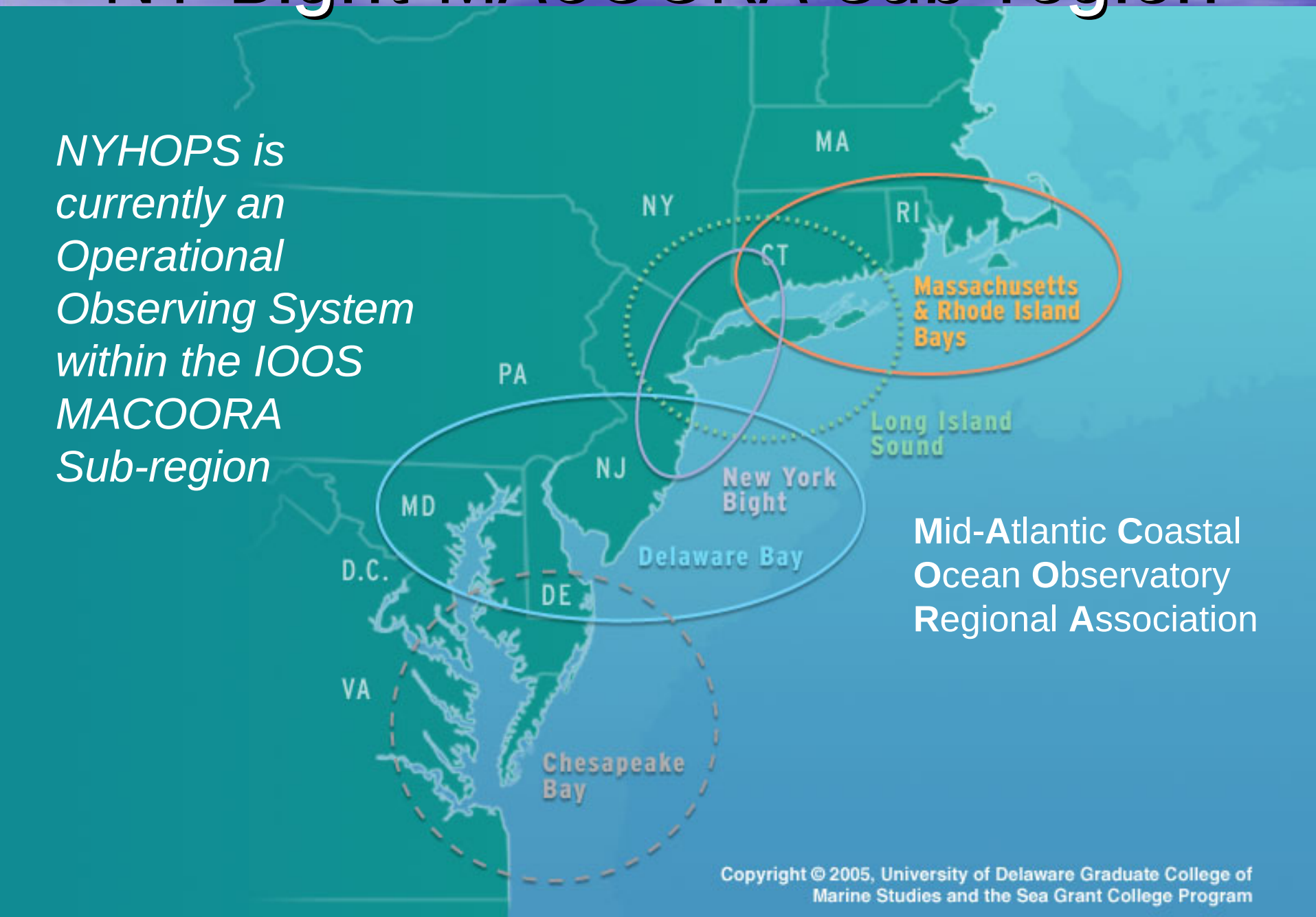
Center for Maritime Systems

NWQMC
6th Annual Monitoring Conference
May 20, 2008

NY Bight MACOORA Sub-region

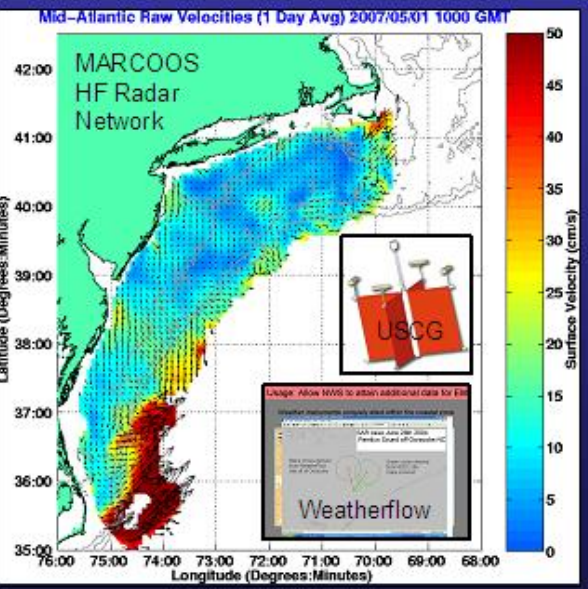
NYHOPS is currently an Operational Observing System within the IOOS MACOORA Sub-region

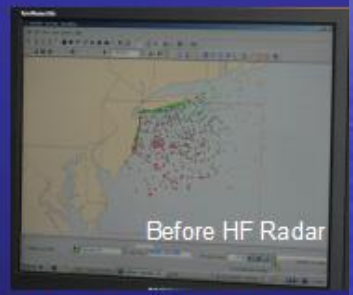


Mid-**A**tlantic **C**oastal **O**cean **O**bservatory **R**egional **A**ssociation

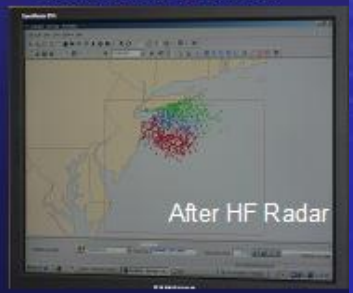
Supports MACOORA Regional Themes

Regional Theme 1: Maritime Safety – Search And Rescue

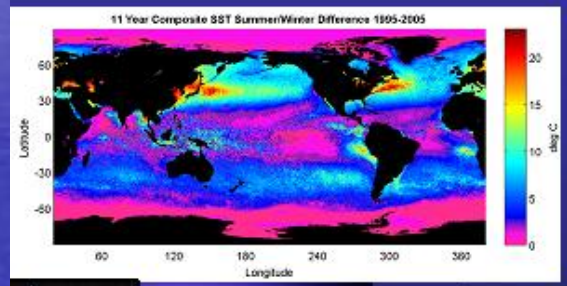


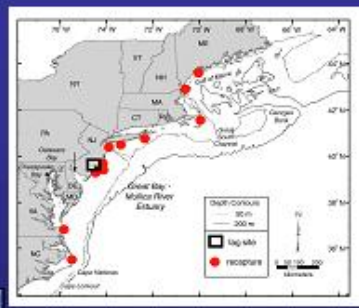


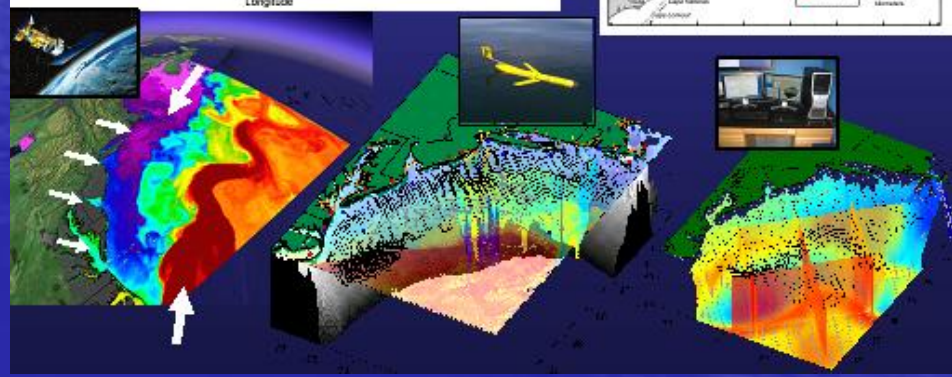
Coast Guard SAROPS



Regional Theme 2: Ecological Decision Support - Fisheries





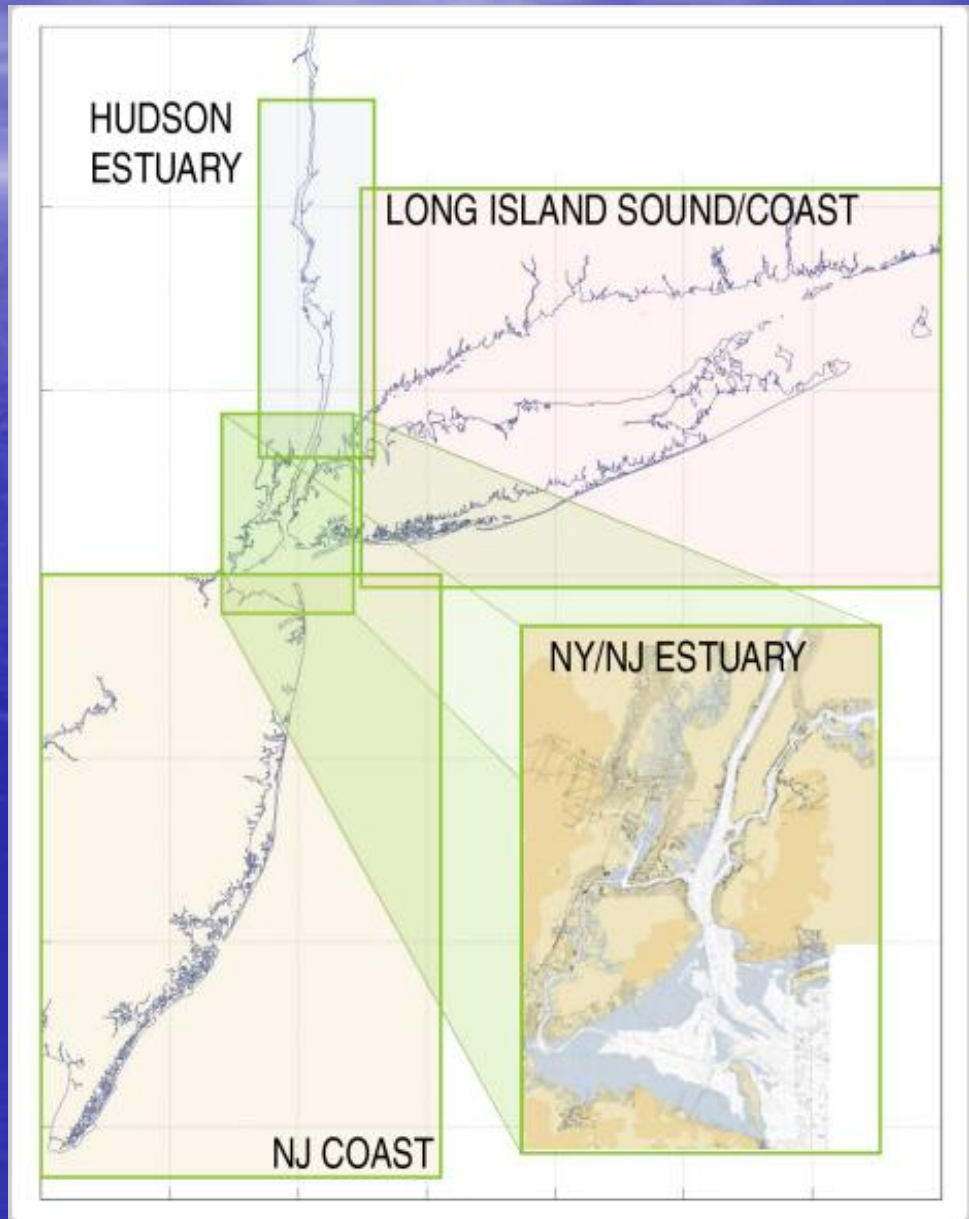


Sub-regional Backbone

NY Harbor Observation and Prediction System (NYHOS)

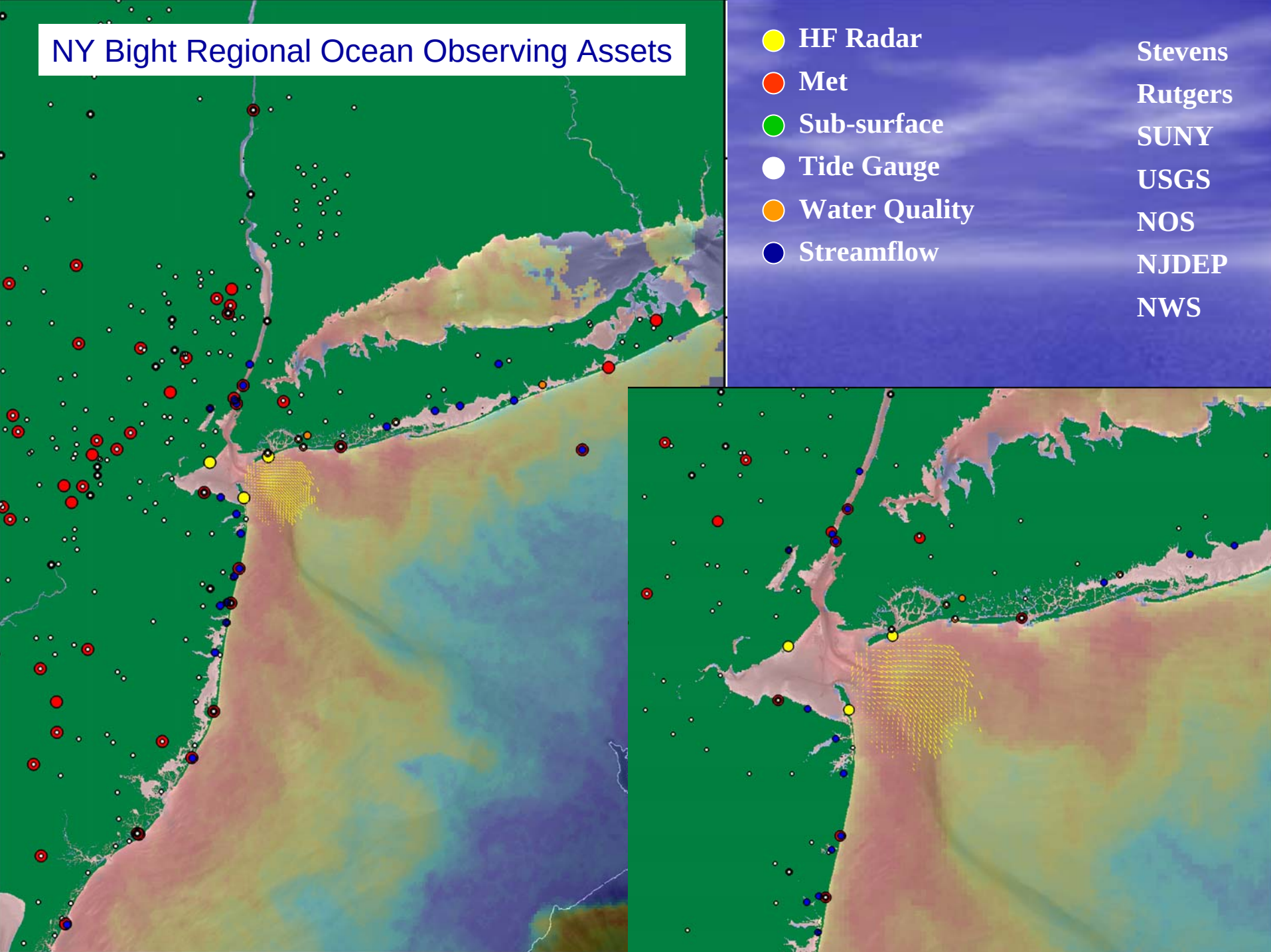
Operational Coupled Heterogeneous Sensor and Modeling System for the Urban Coast

Initiated with funding from ONR in 2003

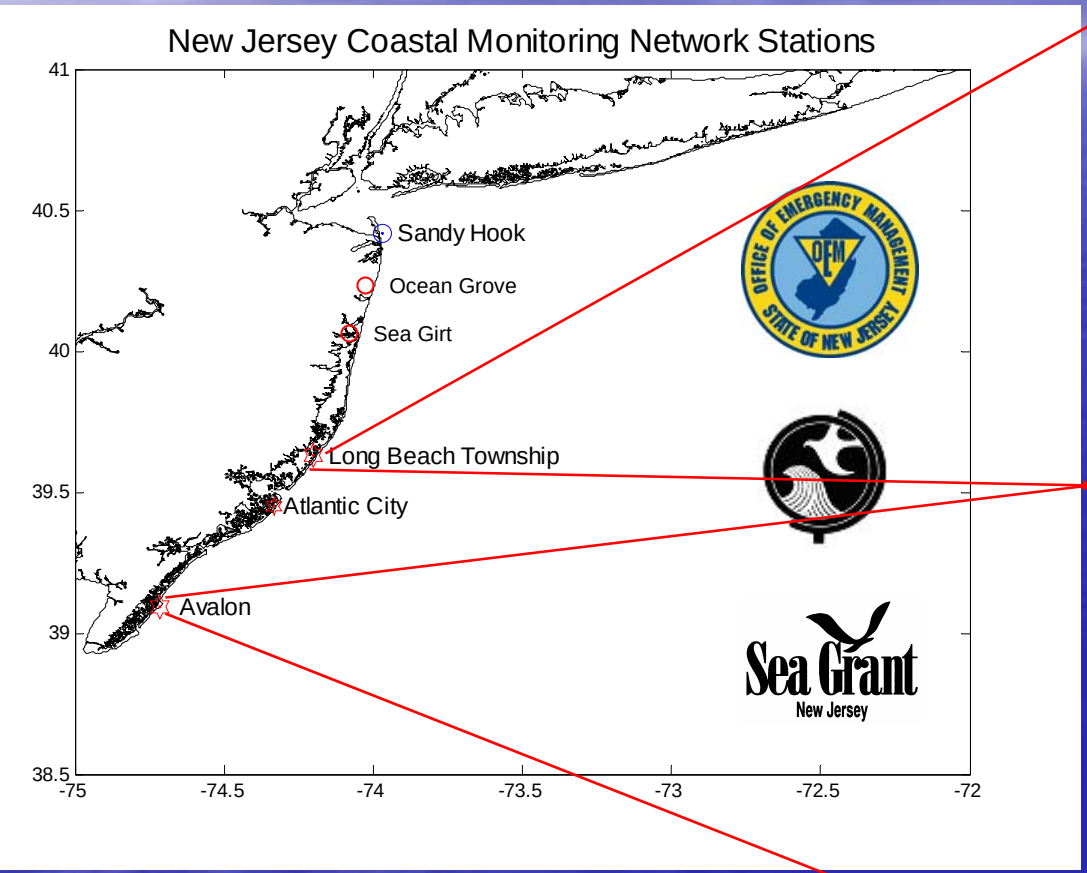


Funding Agencies

Partners and Collaborators


NY Bight Regional Ocean Observing Assets
HF Radar
Met
Sub-surface
Tide Gauge
Water Quality
Streamflow
Stevens
Rutgers
SUNY
USGS
NOS
NJDEP
NWS

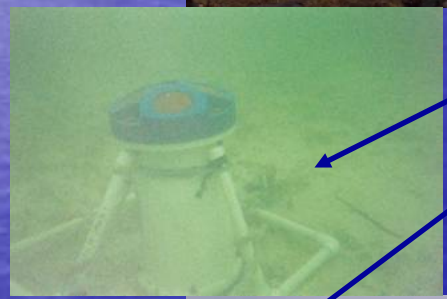
Coastal Observing Network

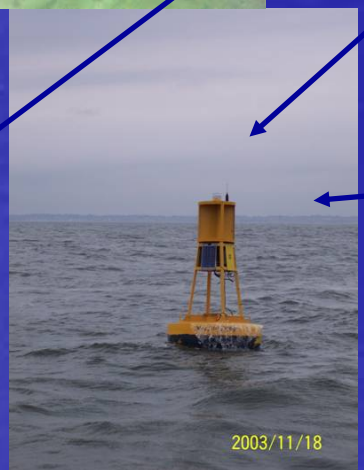


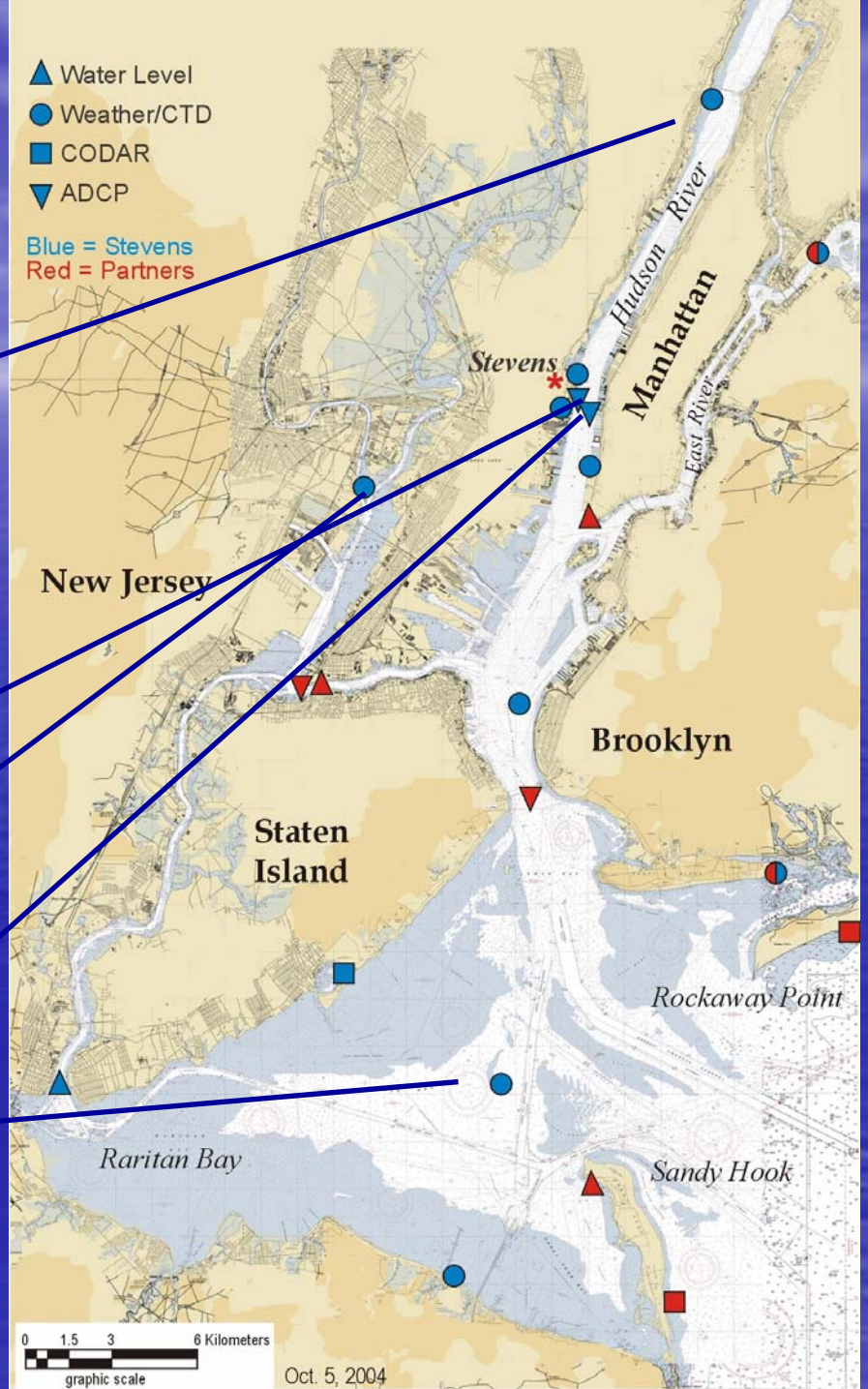
Established in 1998

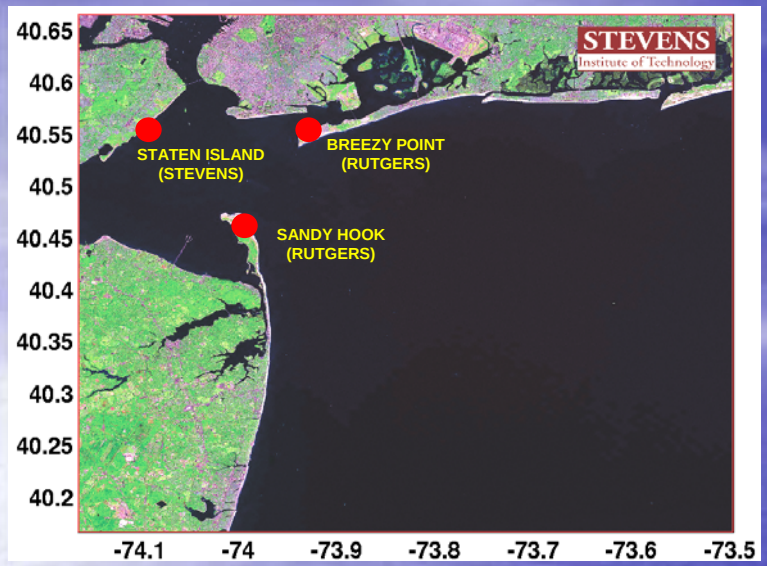
Instrument Platforms

- Real-time Data:
  - Weather
  - Currents
  - Water Level
  - Salinity
  - Temperature
  - Waves

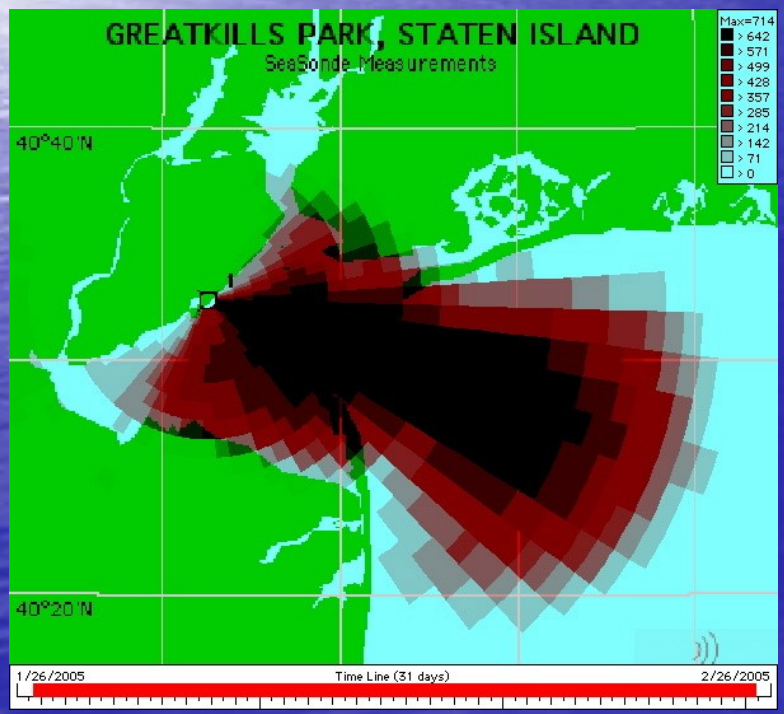


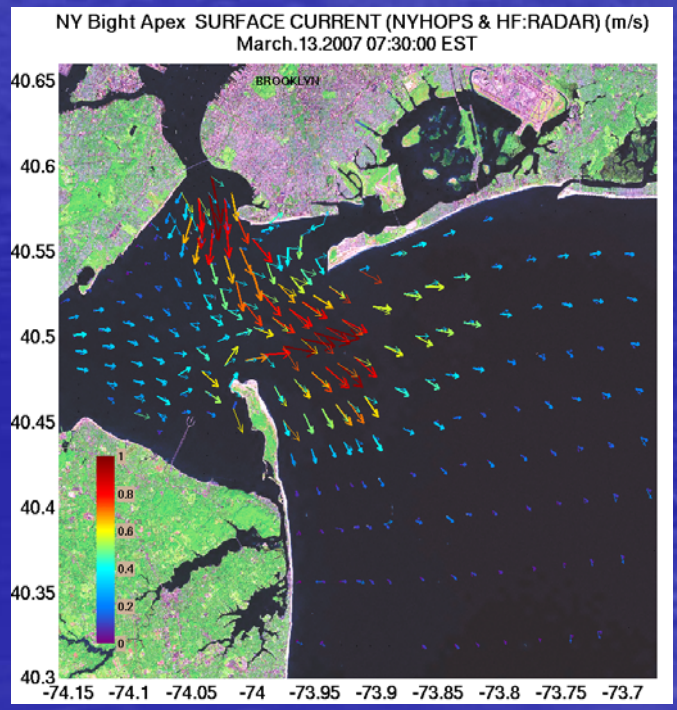




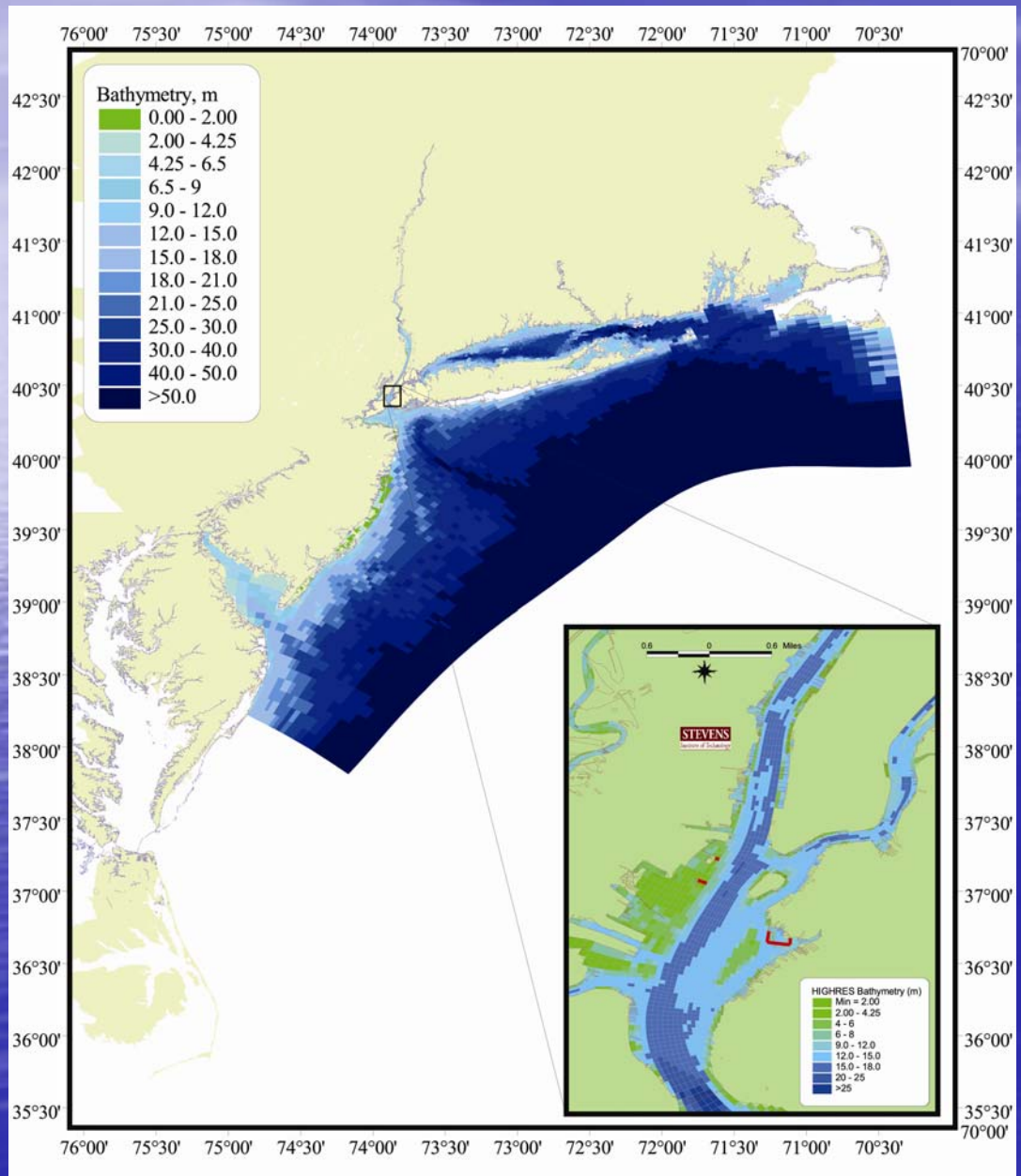

STEVENS
Institute of Technology
STATEN ISLAND
(STEVENS)
BREEZY POINT
(RUTGERS)
SANDY HOOK
(RUTGERS)
40.65
40.6
40.55
40.5
40.45
40.4
40.35
40.3
40.25
40.2
-74.1
-74
-73.9
-73.8
-73.7
-73.6
-73.5

CODAR


GREATKILLS PARK, STATEN ISLAND
SeaSonde Measurements
Max=714
> 642
> 571
> 499
> 428
> 357
> 285
> 214
> 142
> 71
> 0
40°40'N
40°20'N
1/26/2005
Time Line (31 days)
2/26/2005


NY Bight Apex SURFACE CURRENT (NYHOPS & HF:RADAR) (m/s)
March.13.2007 07:30:00 EST
BROOKLYN
40.65
40.6
40.55
40.5
40.45
40.4
40.35
40.3
1
0.8
0.6
0.4
0.2
0
-74.15
-74.1
-74.05
-74
-73.95
-73.9
-73.85
-73.8
-73.75
-73.7

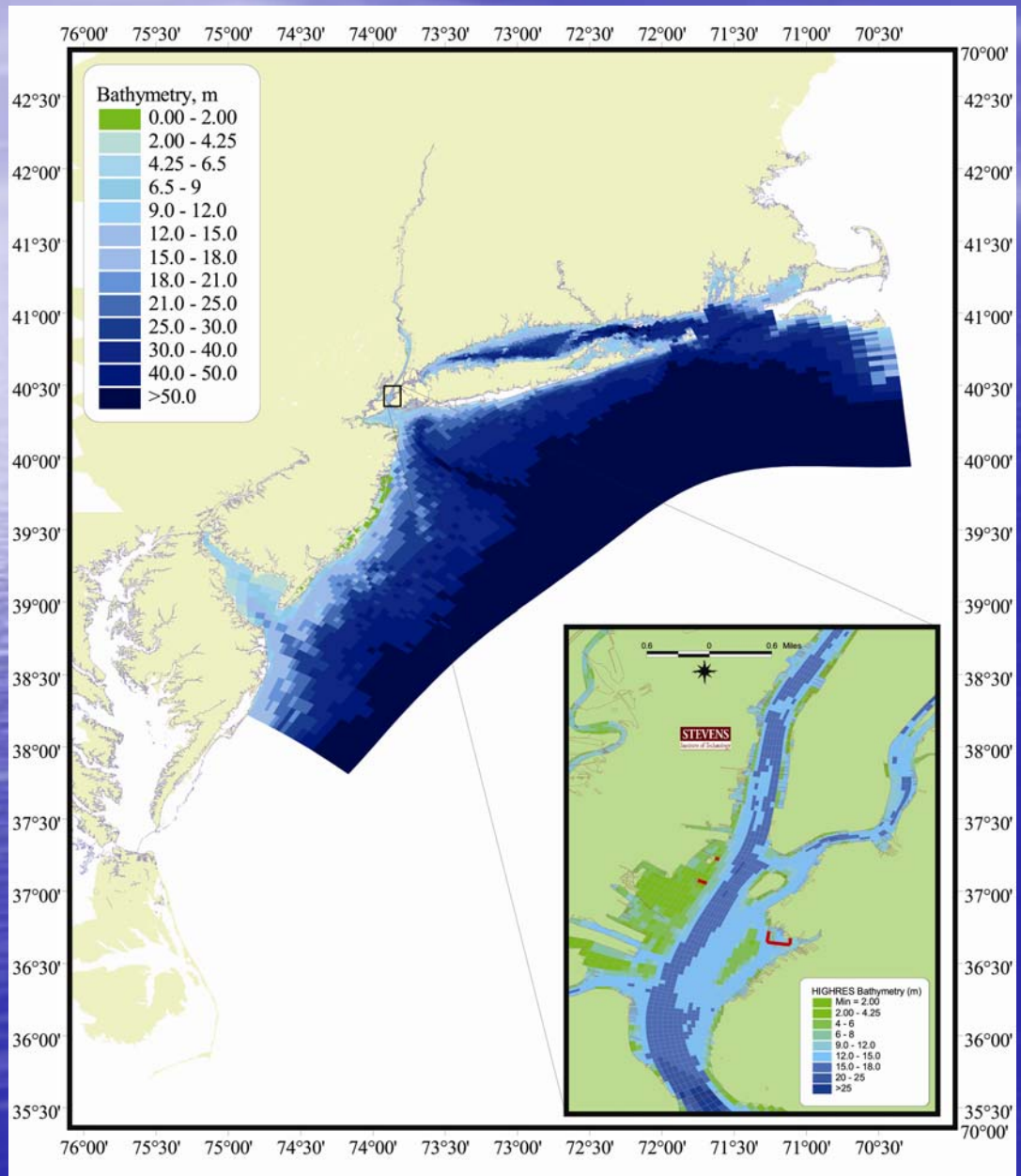
NYHOPS Forecast Model



High-resolution nowcast/forecast modeling system

- Derivative of the Princeton Ocean Model of Mellor and Blumberg
- Resolution of 7 km on the outer shelf boundary increasing to 50m inside the NY Harbor
- Run once per day to generate a 24 hour hindcast and a 48 hour forecast.
- Real-time data from sensors blended with model forecast every hour to product a real-time ensemble of present conditions

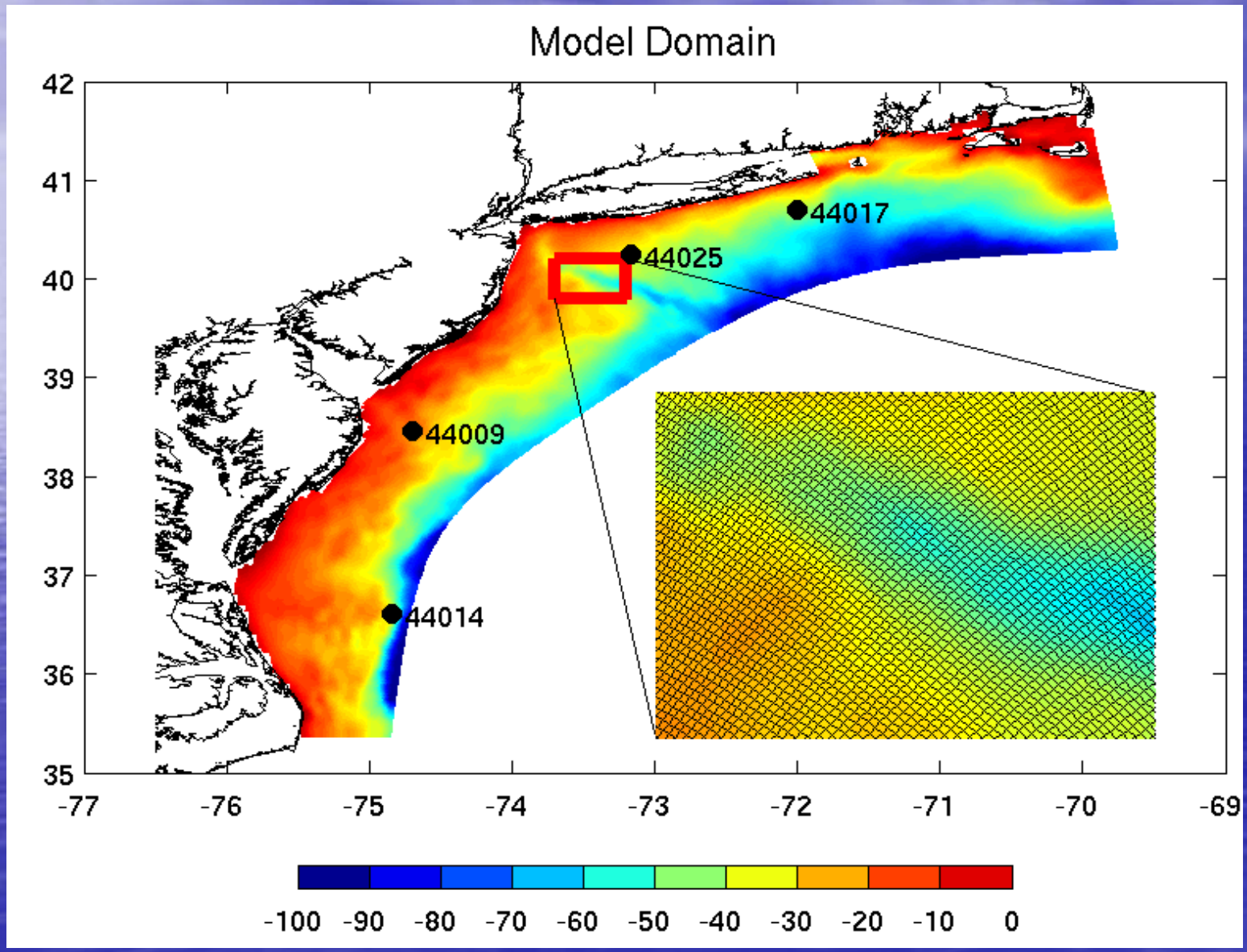
NYHOPS Forecast Model



High-resolution nowcast/forecast modeling system

- Includes hourly infow from 92 rivers
- Daily discharge from 241 industrial and wastwater discharges
- Includes 39 power plant discharges
- Integrated with a high-resolution wind wave model of the Bight and Harbor.

Coastal Wave Model



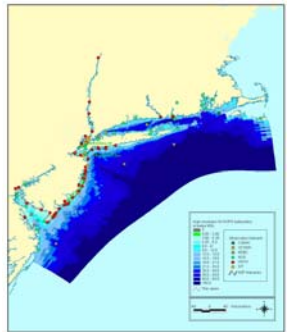
Input forcing:
Tides (O+F)
•Storm Surge (O+F)
•Waves (O+F)
•Winds (O+F)
•Heating and Cooling (O+F)
•Rivers (O+F/P)
•Major Dischargers (H)

Engines:
•ECOMSED 3D hydrodynamics:
  •Baroclinic, curvilinear, F.D. model, with Mellor-Yamada closure, W&D.
•Coastal Wave module:
  •Parametric JONSWAP spectrum, wave momentum, shallow water and open BC effects included.

Prognostic variables:
•Water level.
•3D Temperature, Salinity, Currents, Speed of Sound.
•Significant wave height and average wave period.

(O): Observed
(F): Forecasted
(H): Historic

New York Harbor Observing and Prediction system: NYHOPS



www.stevens.edu/maritimeforecast

STEVENS Institute of Technology

THE CENTER FOR MARITIME SYSTEMS

Daily 48-hr forecasts

PRESENT CONDITIONS ASSIMILATION

Time

Initialized through 24-hr hindcasts

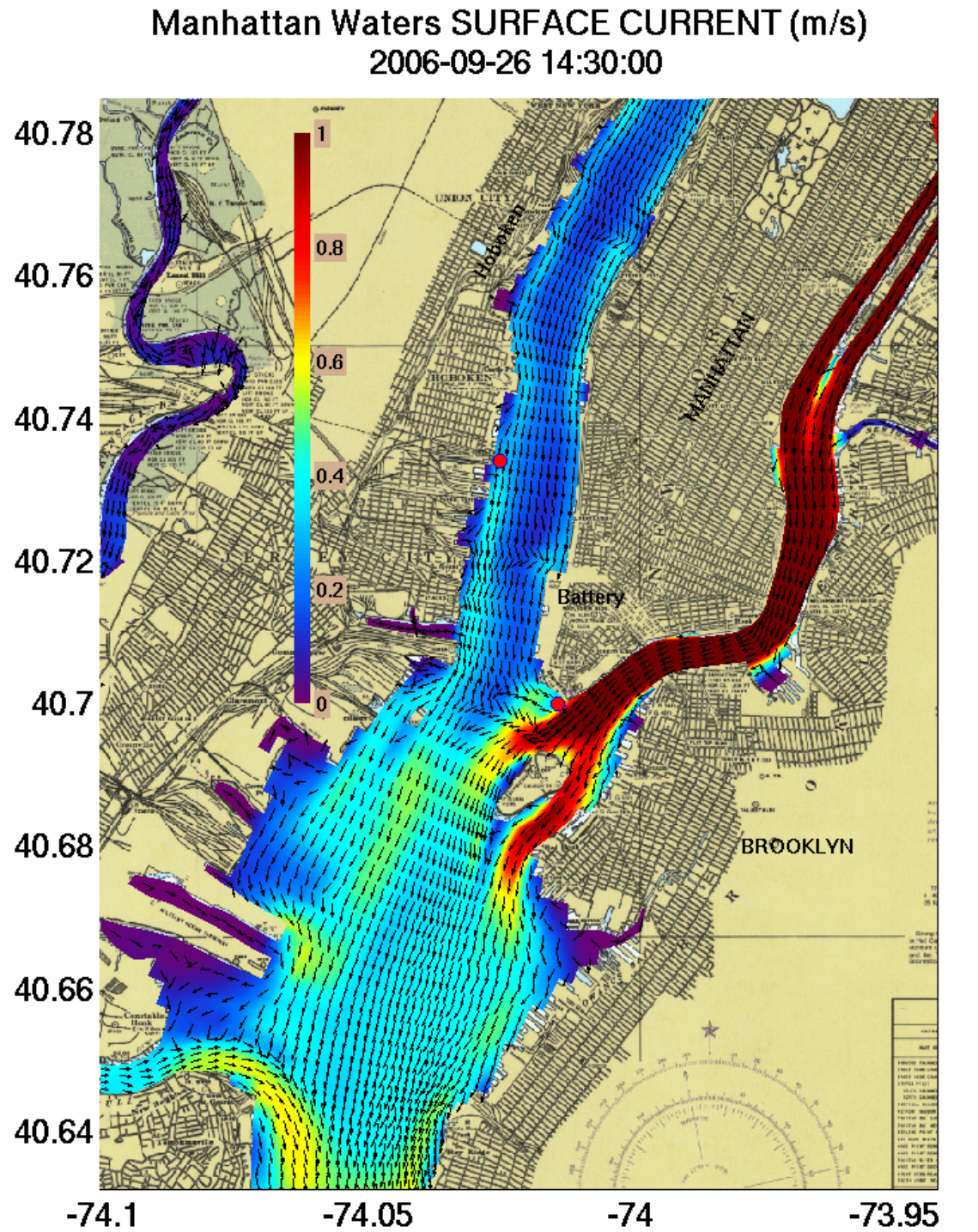
I C

Surface BCs

Open Ocean BCs

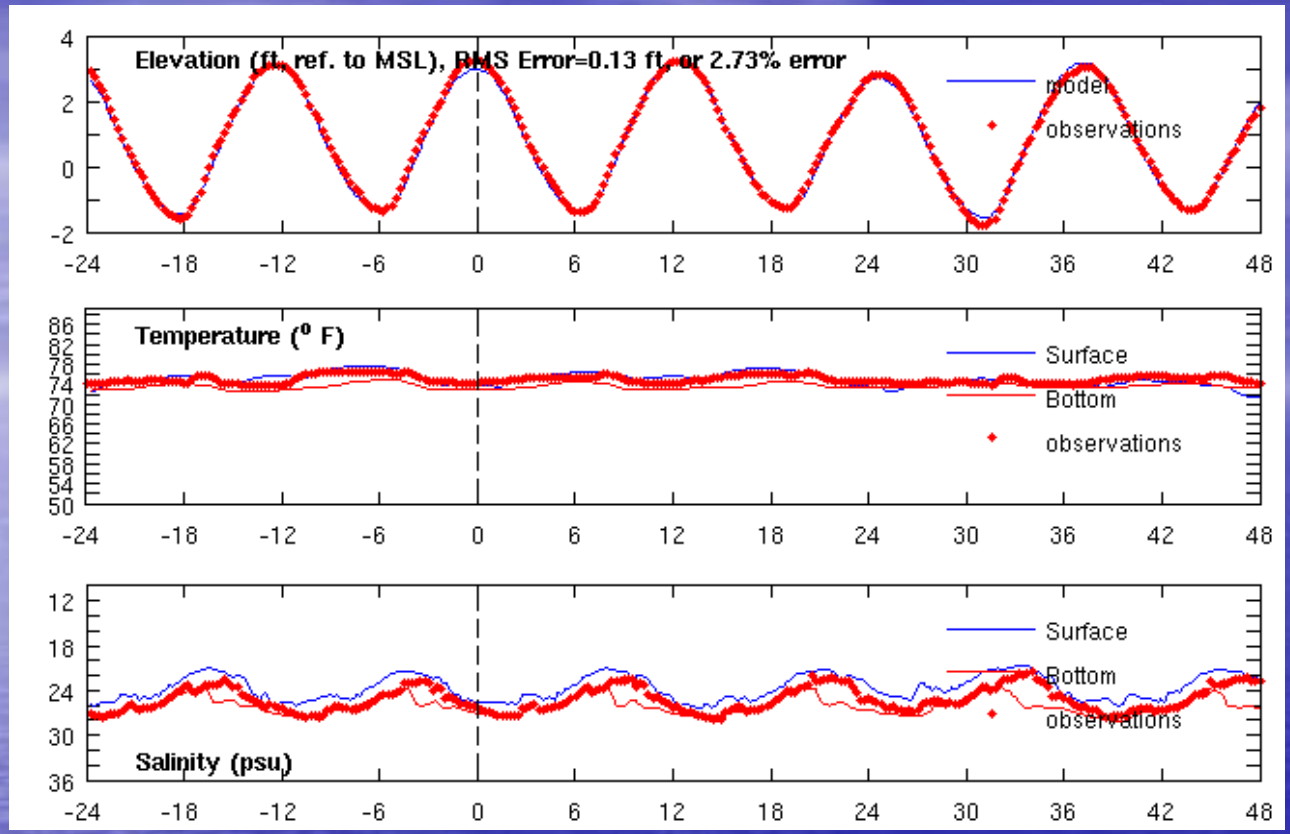
Internal Inputs

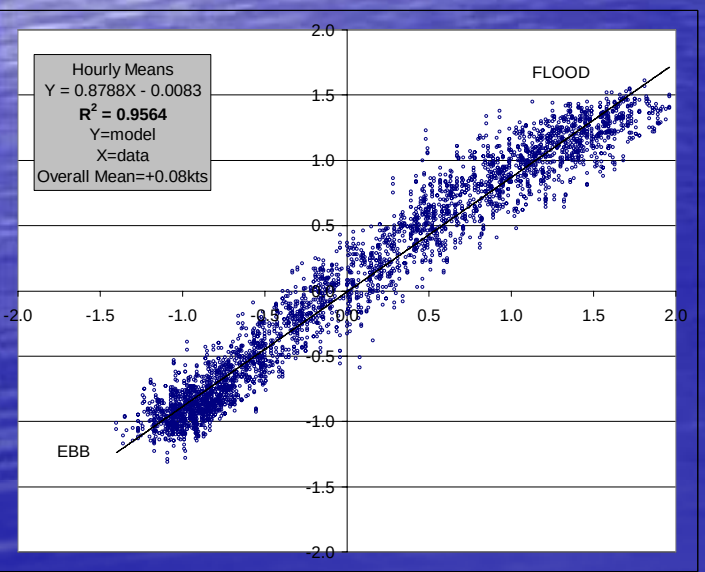
NCEP NAM/WRF model (meteorology)
NCEP WNA/WWIII model (waves) +
EC2001 major tidal constituents +
NOAA ETSURGE model (storm surge) +
Monthly Levitus (T,S climatology)
USGS river flows, T +
NWS AHPS river forecasts +
Monthly EPA dischargers Q, T, dT.



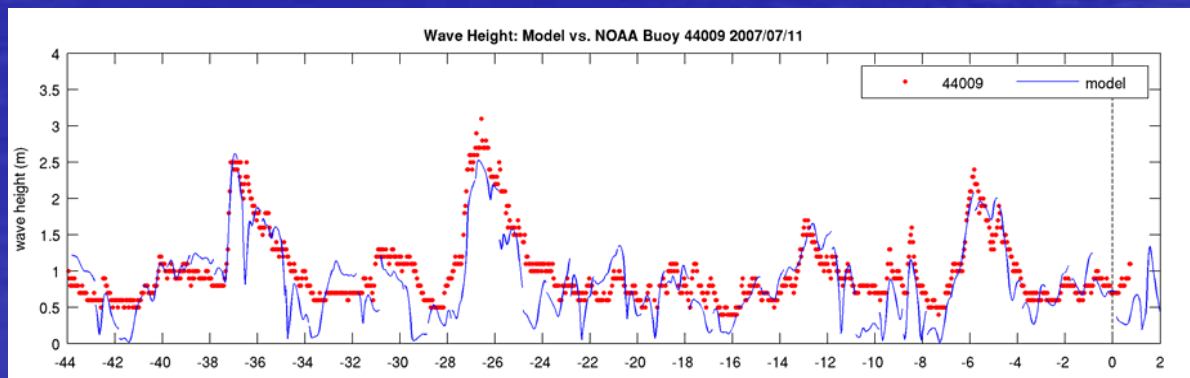
Forecast Products

- Water level
- Currents
- Temperature
- Salinity
- Wave Height
- Wave Period
- Wave Direction





Extensively validated forecast product.



Stevens Maritime Center: Urban Ocean Observatory - Windows Internet Explorer

http://hudson.dl.stevens-tech.edu/maritimeforecast/

File Edit View Favorites Tools Help

Stevens Maritime Center... | Ancient Greek & Roman Scul...

Urban Ocean Observatory at the Center for Maritime Systems

STEVENS Institute of Technology

NY/NJ Harbor
NJ Coast

Present Conditions in selected region:
Winds | Water Temp | Salinity | Water Level | Currents

CMN

NYHOPS Home | Surge Warnings
Wave Forecast | NYHOPS Forecast

Welcome to the Urban Ocean Observatory!

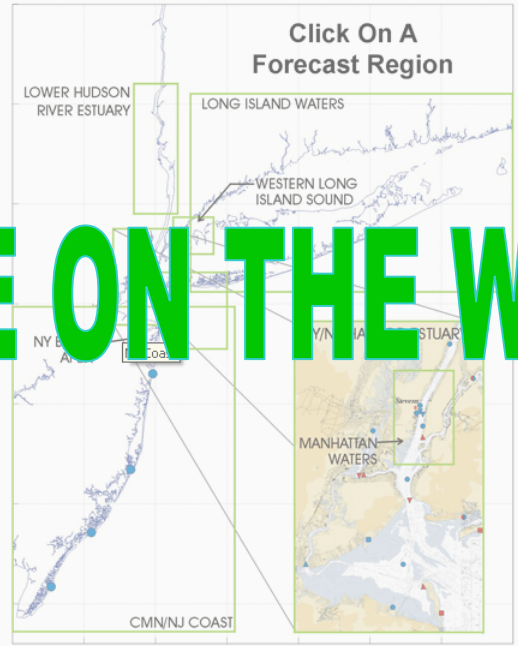
The New York Harbor Observing and Prediction System (NYHOPS) was established to permit an assessment of ocean, weather, environmental, and vessel traffic conditions throughout the New York Harbor region. The system is designed to provide a knowledge of meteorological and oceanographic conditions both in real-time and forecasted out to 48 hours in the Hudson River, the East River, NY/NJ Estuary, Raritan Bay, Long Island Sound and the coastal waters of New Jersey. In this web site you will see graphic images of: **water level; surface and bottom temperature; surface and bottom salinity; surface and bottom currents; NOAA winds; coastal waves - height, period and direction; CDOM (Chromophoric Dissolved Organic Matter).**

DISCLAIMER: This observing and forecast system is a re... product ... is ... evalu... made, expressed or implied at this stage, regarding the ... model output for any particular application.

The real-time analyses and forecasts are be... Prof. ... Prof. Alan F. Blumberg. The forecasts are be... the observations and their analyses are the ... by Dov Kruger, Elena Zagrai & Dave Runnels. Data administration and web development are handled by Dave Runnels. Stevens students Anne Pence, Joe Kilroy, Peter Stahley and Anthony Gude have contributed to the success of the system. Please direct your comments, suggestions or questions to any member of the team.

Support provided by: Office of Naval Research and New Jersey Department of Transportation. A special thank you goes to the New York City Department of Environmental Protection and to HydroQual, Inc. for their permissions to use the extensively validated 3D circulation model from which the NYHOPS model has evolved.

Regional Subdomains NY/NJ Coastal Observing & Forecasting System



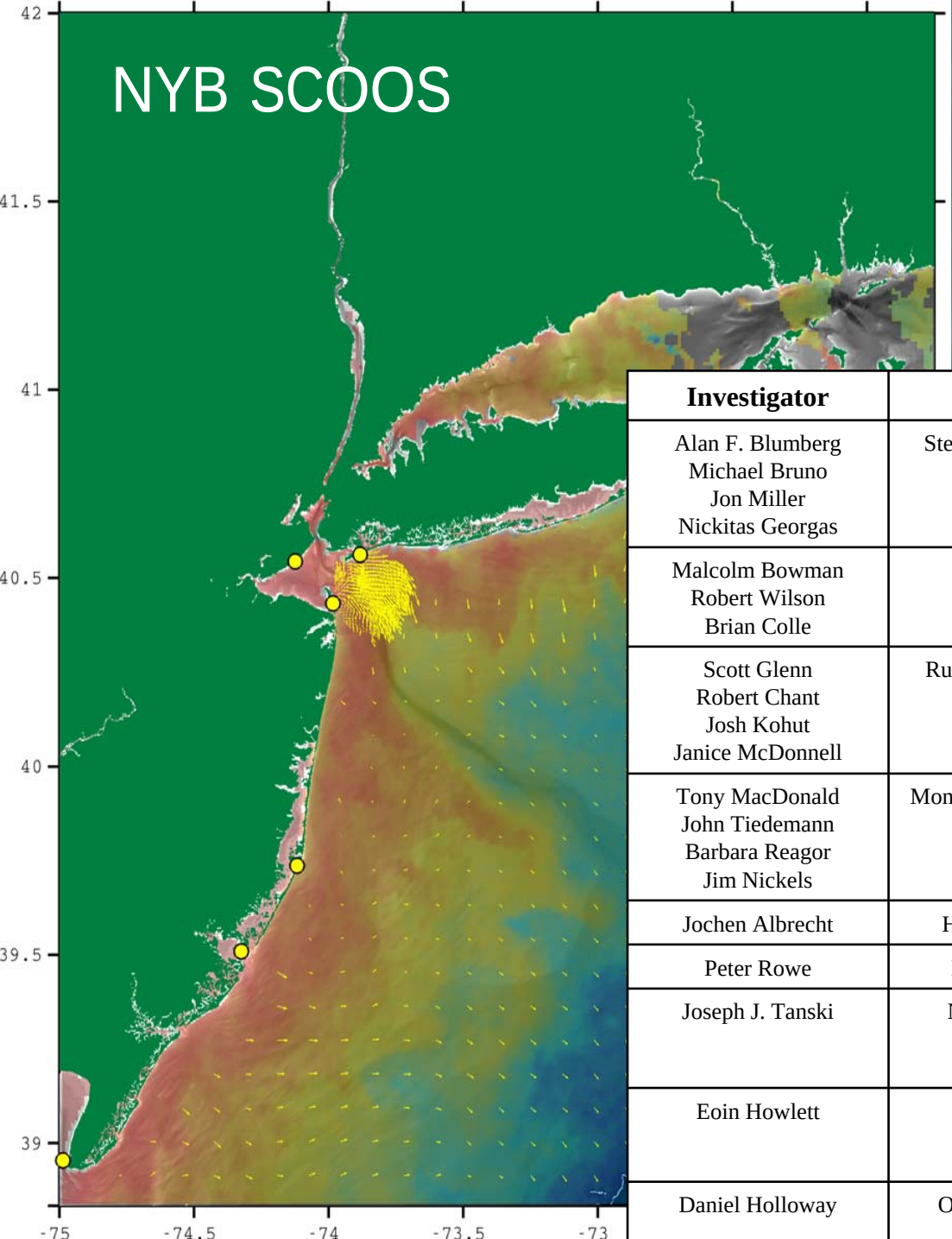
Available Parameters
Surface & Bottom Currents
Surface & Bottom Temperature
Surface & Bottom Salinity
Water Levels
Coas... Waves - Height, Period & Direction
CDOM ...romophoric ...issolved Organic Matter

AVAILABLE ON THE WEB

http : // www.stevens.edu / maritimeforecast

javascript: displayForecastRegion('njcst')

Internet | 100%



Phased Deployment of the NY Bight Sub-regional Coastal Ocean Observing System (NYB SCOOS) as a Sustained Component of MARCOOS

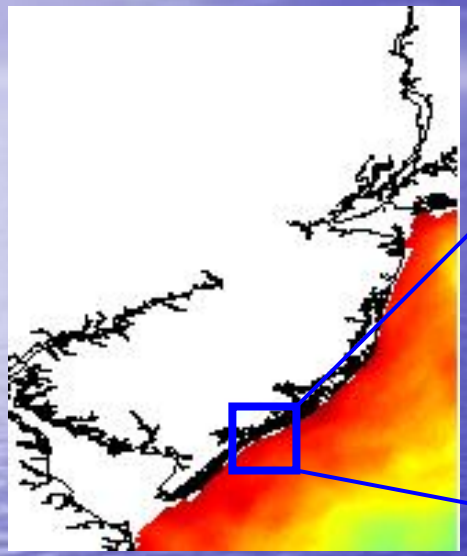
20 Co-PIs, 14 Institutions

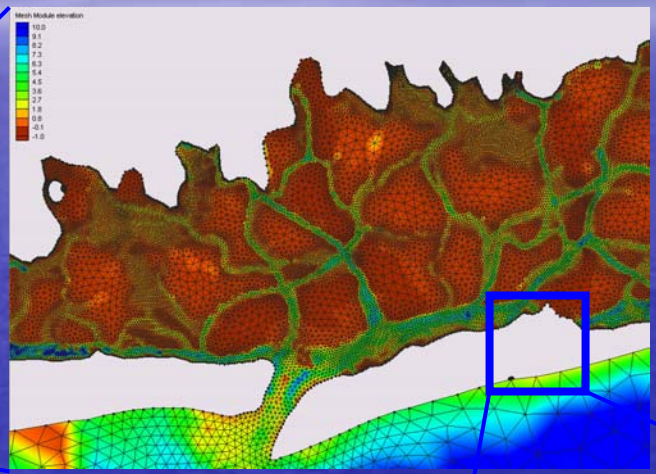
Investigator	Affiliation	Partners	Affiliation
Alan F. Blumberg Michael Bruno Jon Miller Nickitas Georgas	Stevens Institute of Technology	Alan Cope	NWS, Mount Holly, NJ
Malcolm Bowman Robert Wilson Brian Colle	Stony Brook University	Jeffrey Tongue	NWS, Upton, NY
Scott Glenn Robert Chant Josh Kohut Janice McDonnell	Rutgers University	Richard H Kropp	NJ USGS
Tony MacDonald John Tiedemann Barbara Reagor Jim Nickels	Monmouth University	Christopher E. Schubert	NY USGS
Jochen Albrecht	Hunter College	Jeff Osowski	Liberty Science Center
Peter Rowe	NJ Sea Grant	John Manderson	NMFS- Sandy Hook
Joseph J. Tanski	NY Sea Grant	Robert Connell Ruth Ehinger	NJ Dept Environmental Protection
Eoin Howlett	ASA, Inc.		
Daniel Holloway	OPeNDAP, Inc.		

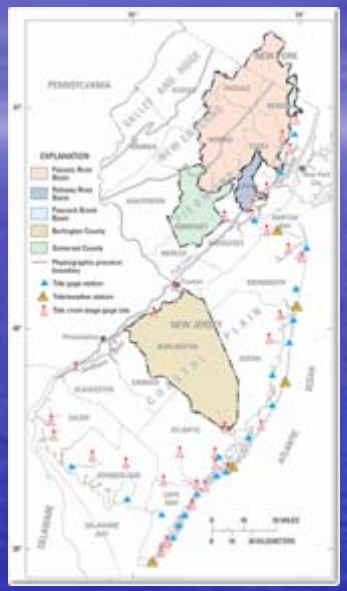
Stakeholder Centric System

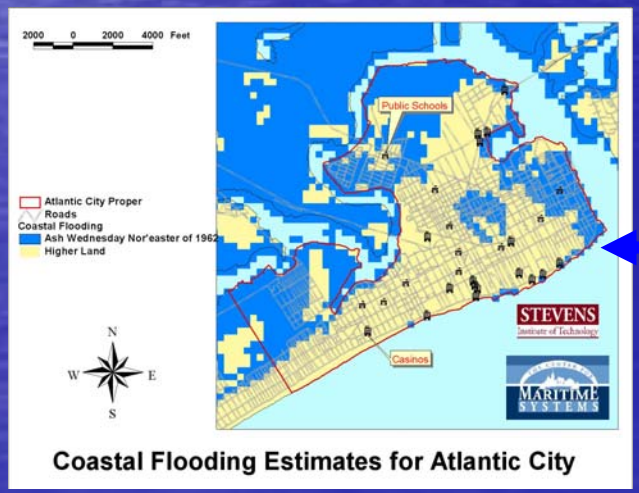
- Engagement of Key stakeholder groups or individuals identify sub-regional topics of greatest importance
  - Inundation
    - State and Local OEM, Coastal Managers, Land Use Regulators, Floodplain Managers
  - Water Quality
    - EPA, State Environmental Agencies, County Health Agents, & Municipal Governments
- Types and frequency of engagement (workshops, regular mtgs, etc.)
  - Annual Meeting (October)
  - User needs workshops
  - Sub-regional meetings

Sub-regional Theme 1: Coastal Inundation Research

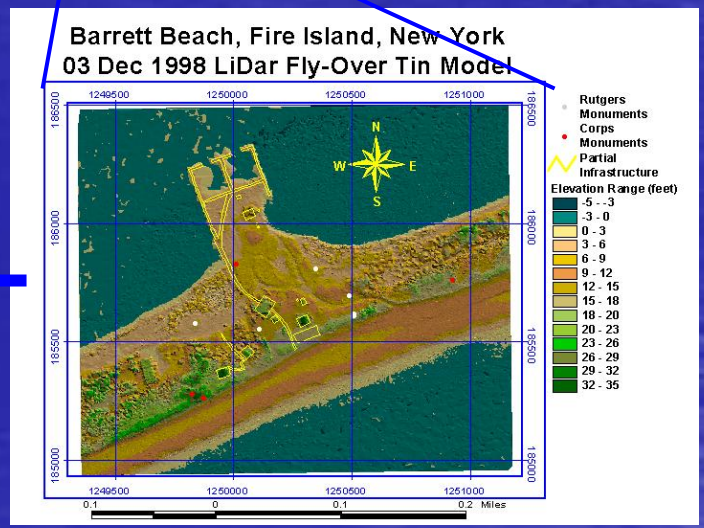




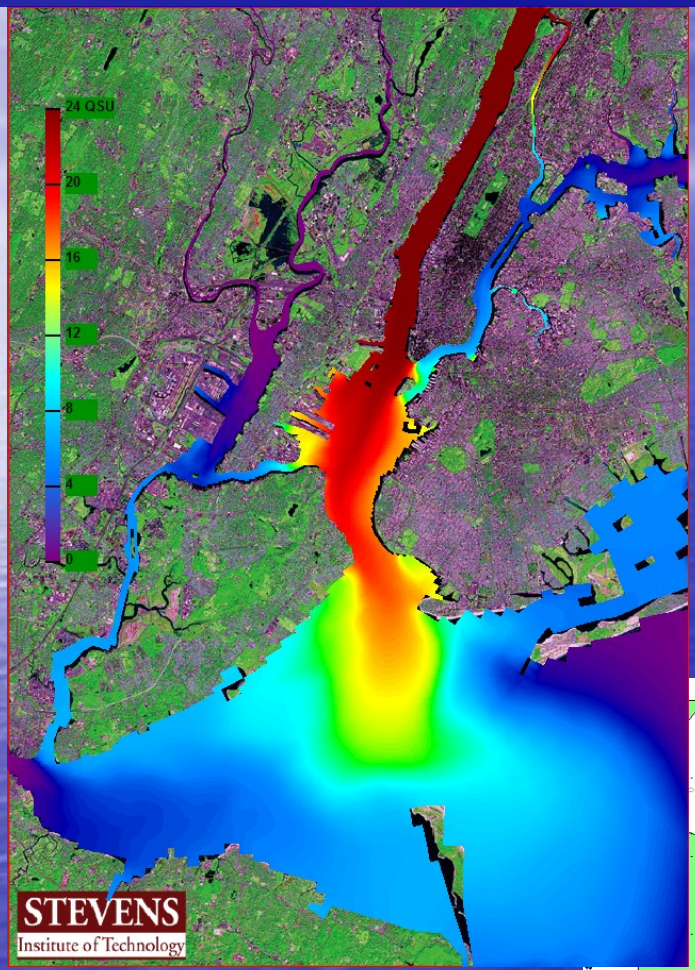




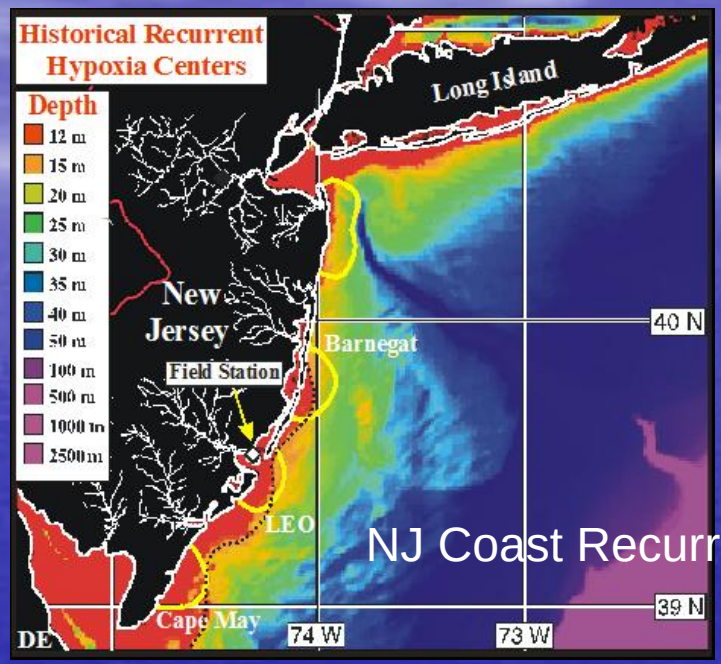
Coastal Flooding Estimates for Atlantic City



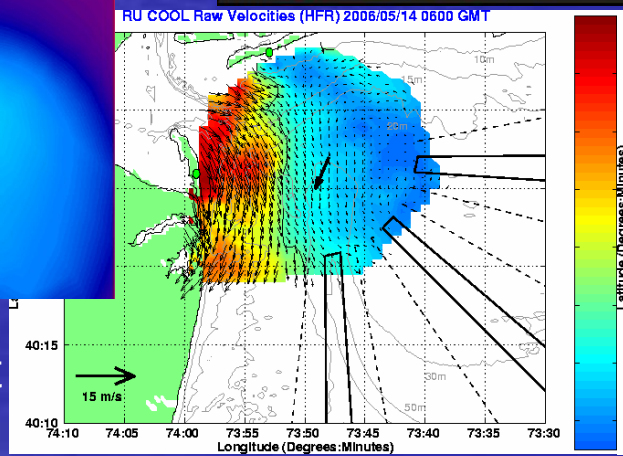
Sub-regional Theme 2: Water Quality

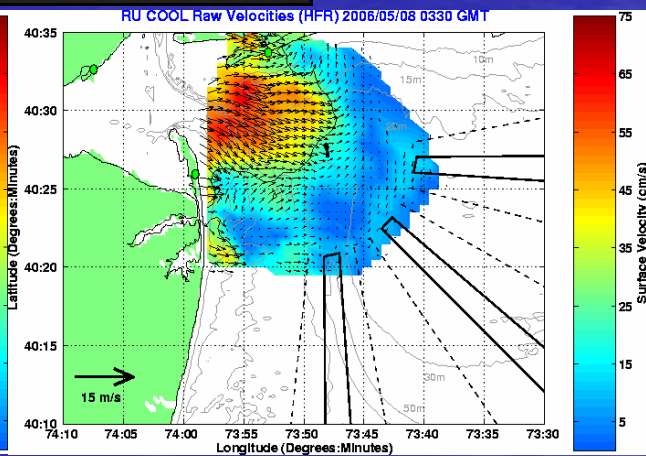


Stevens CDOM Forecast



NJ Coast Recurrent Hypoxia

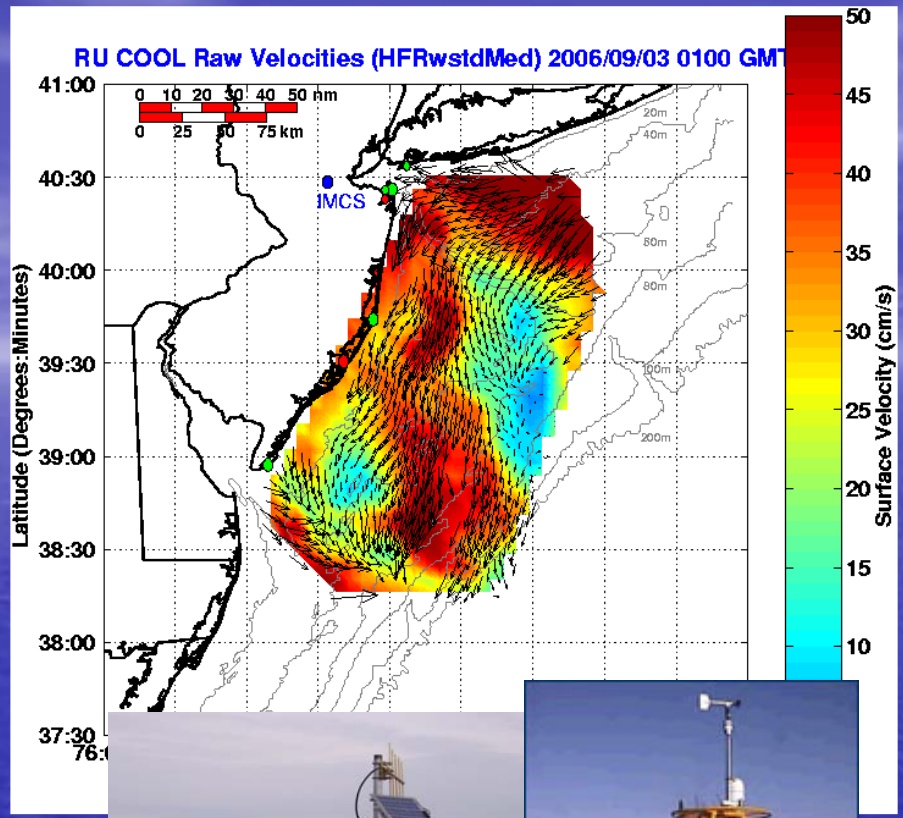




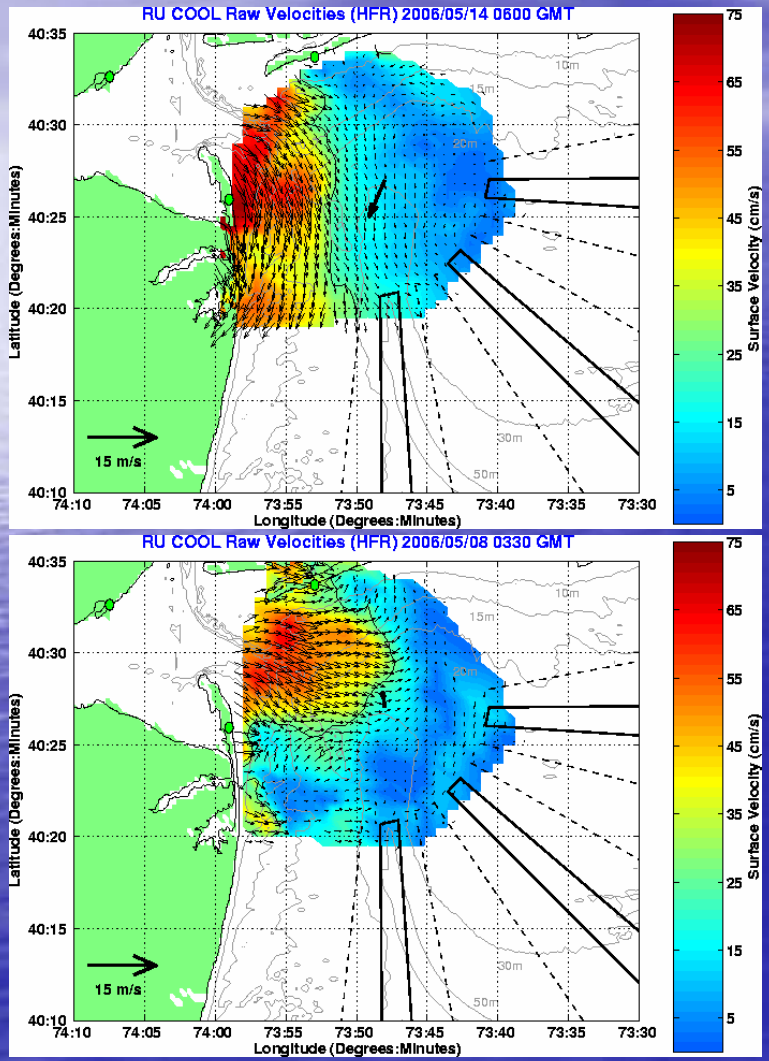
Monmouth County Health

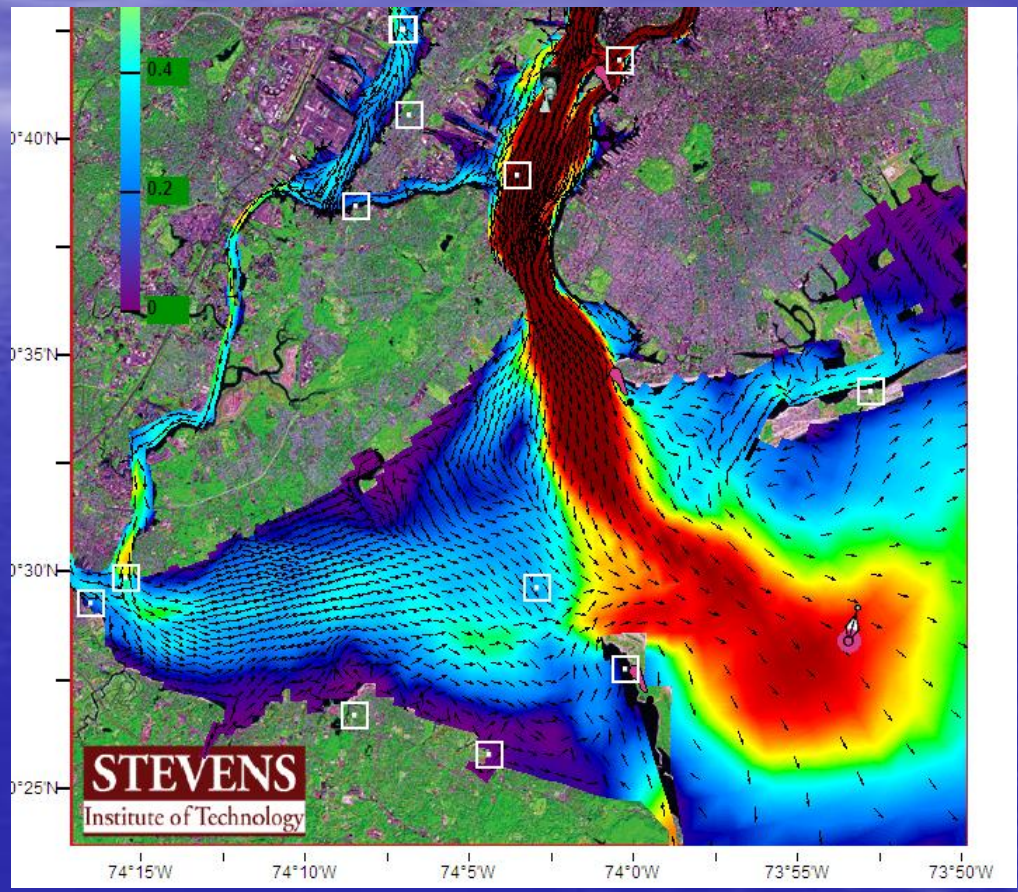
Key Elements

- Integration of Monmouth University/NJDEP Marine Water Quality Network
- Expansion and Integration of Rutgers CODAR Network
- Coupling of Stevens NY Bight Coastal Ocean Observation and Prediction System with sensor networks

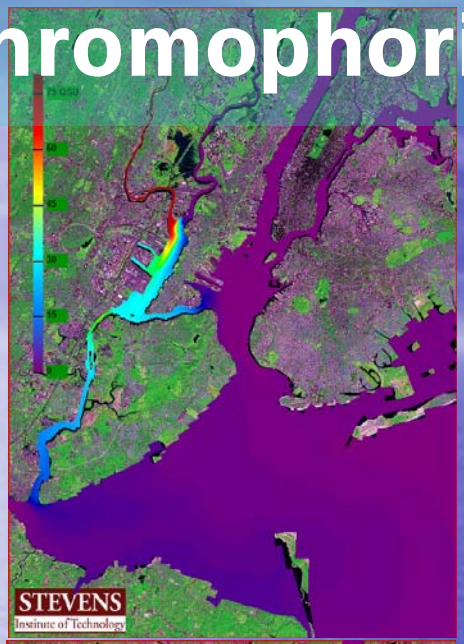


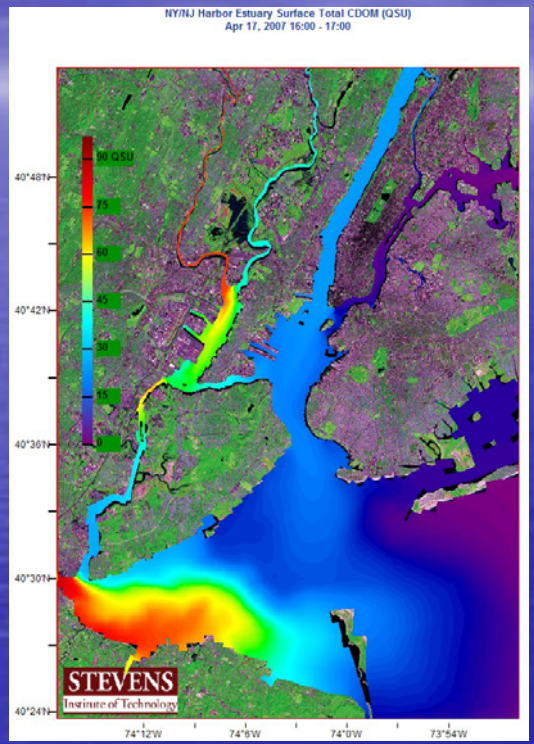
Hudson River Plume & WQ

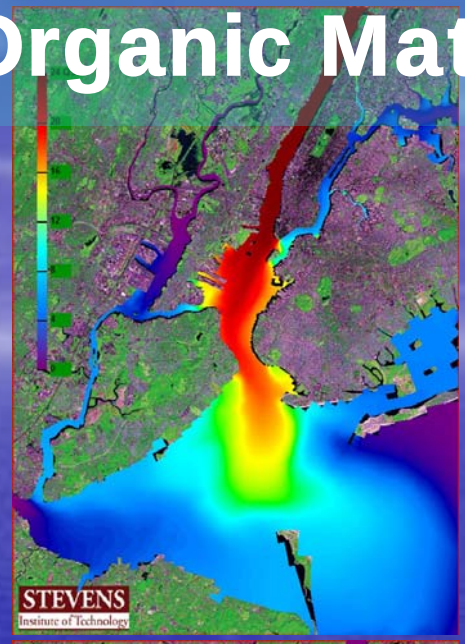


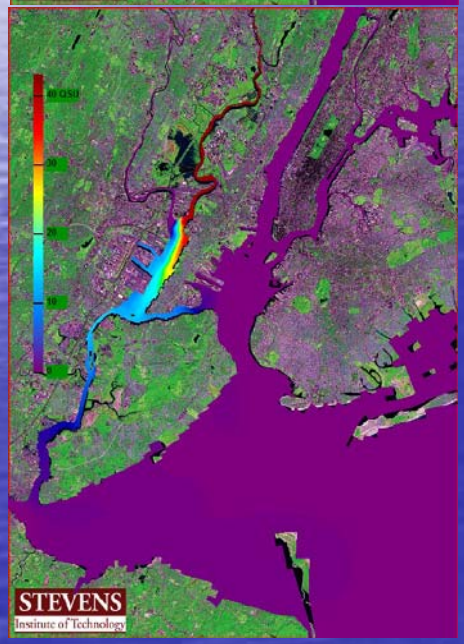


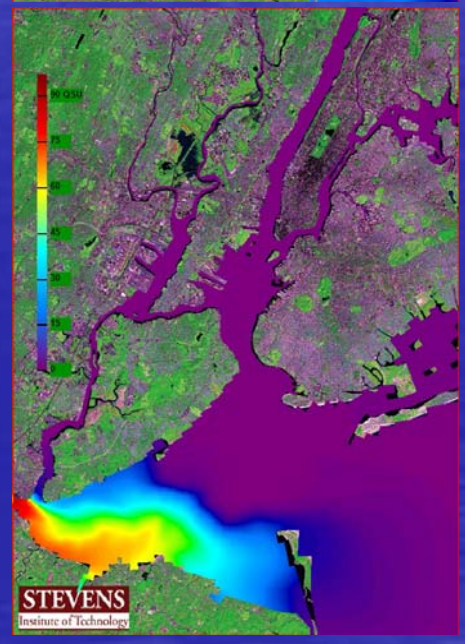
Chromophoric Dissolved Organic Matter









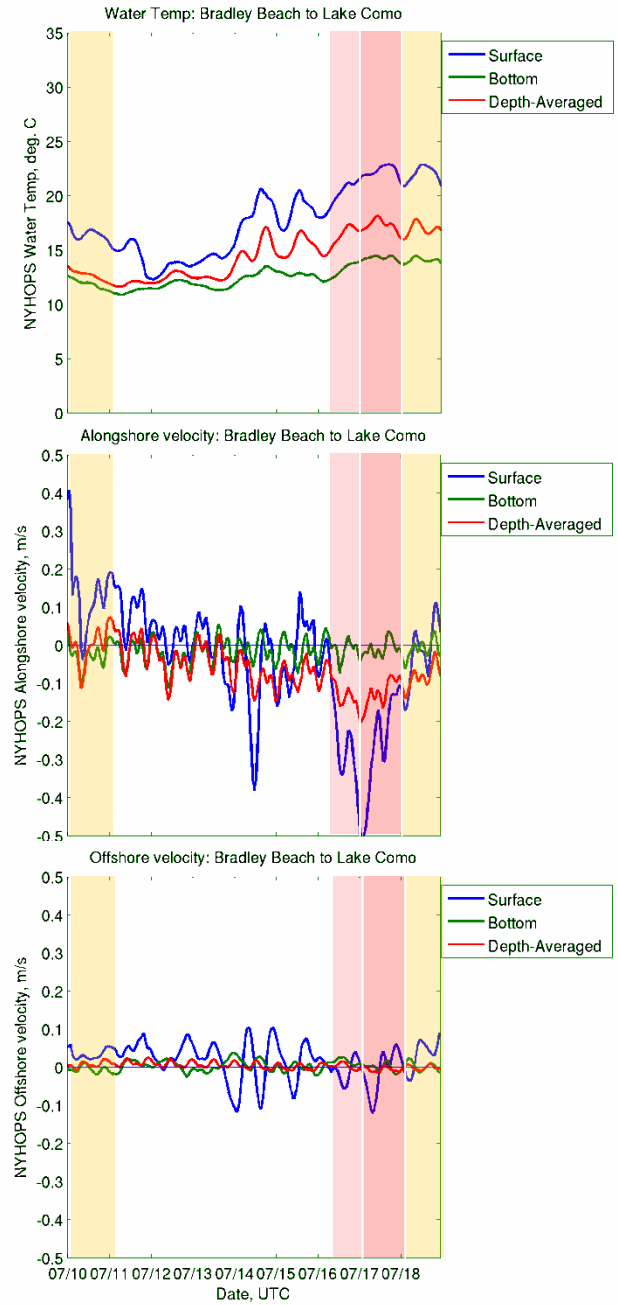


CDOM

NYHOPS-predicted CDOM for April 17, 2007 16:30 ET. This date was one of major flooding

Low Bacteria Count High Bacteria Count

NYHOPS FORECAST



Water Temperature

Along-shore Currents

Cross-shore Currents

GIS-based Coastal Information Sharing Wed Portal

Monmouth University's Rapid Response Institute will be developing user identified GIS data overlays for user assessment and decision making

Questions?