



NOAA IOOS Program Office
Regional Status Assessment for

NERACOOOS

Northeastern Regional Association of Coastal Ocean Observing Systems

April 30, 2008

Evan Richert, University of Southern Maine

John Trowbridge, Woods Hole Oceanographic Institution

RA Structure and Governance

Executive Committee

Representing geographic & stakeholder diversity

Art Allen - USCG HQ, Search & Rescue

Philip Bogden - GoMOOS

Janet Campbell - UNH Coastal Ocean Observing Center

Paul Currier - New Hampshire Department of Environmental Services

Ted Diers - New Hampshire Department of Environmental Services

James O'Donnell - University of Connecticut

Avijit Gangopadhyay - University of Massachusetts Dartmouth

Al Hanson - URI Graduate School of Oceanography

Jon Hare - NOAA/NMFS

Neal Pettigrew - University of Maine

Ron Rozsa - Long Island Sound Programs

Evan Richert - University of Southern Maine

Peter Smith - Bedford Institute of Oceanography

John Trowbridge - WHOI

Advisory Committee

Representing geographic & stakeholder diversity

- *Army Corps of Engineers*
- *Atlantic States Marine Fisheries Commission*
- *EPA Region 1*
- *Bedford Institute of Oceanography*
- *Council of Presidents of NE Land Grant Universities*
- *Gulf of Maine Council*
- *Gulf of Maine Research Institute Island Institute*
- *Long Island Sound Programs*
- *MACOORA*
- *Massachusetts Coastal Zone Management*
- *Maine Department of Marine Resources*
- *Maine State Planning Office*
- *Maine Lobstermen's Association*
- *NE COSEE, Marine Educators*
- *Massachusetts Water Resources Authority*
- *New Brunswick Dept. of Environment & Local Government*
- *New England CZM Programs*
- *Metoc Halifax Naval Undersea Warfare Center*
- *NE NERRS Programs*
- *New England Fishery Management Council*
- *New England Sea Grant Programs*
- *NOAA's National Weather Service*
- *Northeast States Emergency Consortium*
- *North Atlantic Ports Association*
- *GoM Ocean Data Partnership*
- *Regional Association for Research on the Gulf of Maine*
- *RI Dept of Environmental Management*
- *School for Marine Science & Technology*
- *UMASS Boston*
- *United States Geological Society - Woods Hole Science Center*
- *University of Connecticut*
- *University of Maine*
- *University of Massachusetts Dartmouth*
- *University of Southern Maine*
- *US Army Corps of Engineers*
- *URI Graduate School of Oceanography*
- *USACE-New England USCG HQ*
- *Woods Hole Oceanographic Institute*

Organizational and Governance Structure

The background features a stylized, low-poly illustration of a satellite in the upper right, a large white and red ship in the middle right, and a yellow submarine in the lower right. The scene is set against a light blue and green background with faint outlines of land and water.

- 501(c)(3)
- Board of Academic, End-user, and State/Provincial Government Representatives
- Products Requirements and Science Requirements Teams
- Stakeholder Council

Organizational and Governance Structure

The Board

- Up to 7 directors representing academic and research institutions;
- Up to 7 directors representing state and provincial governments;
- Up to 7 directors representing marine-related industrial, governmental, non-profit organizations and other users of ocean data and data products; and
- Up to 4 additional persons who have knowledge or skills or represent geographies or constituencies deemed important.
- Non-voting representatives from agencies otherwise barred by agency rules from serving in a voting capacity

Stakeholder Engagement



Products Requirements Team

Responsible for:

- Identifying the data and product needs of users of ocean observations and predictions;
- Defining the data management, integration, and communications requirements to achieve the desired products; and
- Recommending priorities among products and data management and communications needs.

Consists of:

- End users,
- Professionals in information technology,
- Agency data providers, and
- Scientists.



Stakeholder Engagement

Science Requirements Team

Responsible for:

- Identifying requirements for maintaining existing capacities for ocean observing and modeling in the Northeast;
- Identifying ocean observing and modeling capacities needed to address the priority needs of users as established by the Product Requirements Team;
- Identifying the best methods to address the needs; and
- Prioritizing the methods based on achievability, effectiveness, and costs.

Consists of:

- Principal and co-investigators named in the RCOOS grant awarded in 2007 by NOAA
- Representatives of the sub-regions of the Northeast.



Stakeholder Engagement

Stakeholders' Council

Responsible for:

- Education and outreach to users of ocean observing data and data products; and
- Providing input to the Product Requirements Team and Science Requirements Team concerning the needs of users and the usefulness of ocean observations and products.

Consists of:

- Up to 35 users of ocean observing data and data products, including specialists in education, outreach, and marketing.
- Representatives of the sub-regions of the Northeast



Stakeholder Engagement

Key issues of importance to regional stakeholders

- **Representation:** Board structure, Product Requirements Team, Stakeholders' Council
- **Real time data:** Priority on preserving existing regional observing assets
- **Useful products:** Direct service to Fed/state agencies; prototyping, based on stated needs

Key Issues: Useful Products

The Advisory Committee identified five initial focus areas:

1) Harmful Algal Blooms, 2) Inundation, 3) Water Quality, 4) Living Marine Resources, and 5) Marine Operations

User Needs Assessments have revealed high priority needs for:

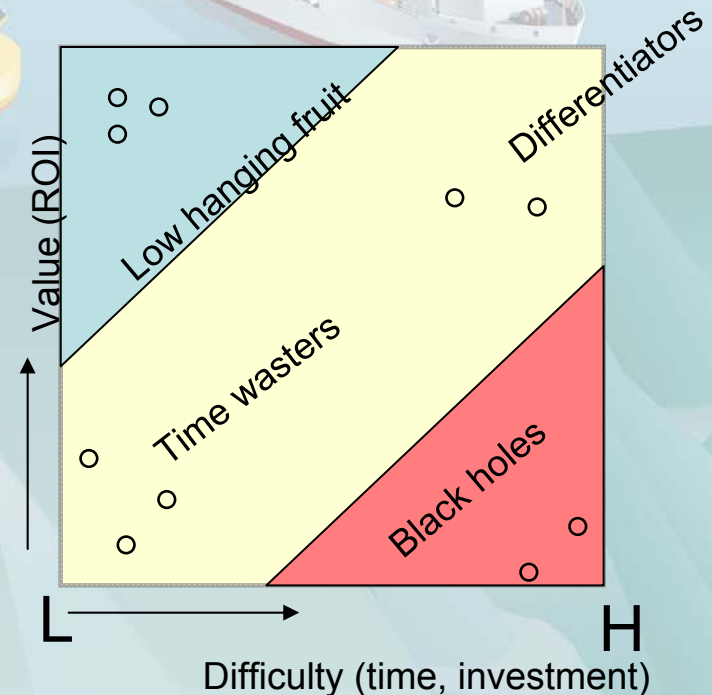
- Alerts (email or SMS text message) of probability of HAB formation when oceanographic conditions are met.
- Web based portal to access all types of data.
- Visualization tool to depict storm impact based on water level and the size of ocean waves.
- Maps with nutrient layers in areas of concern.
- Finer scale water quality monitoring in bays and estuaries.
- Visualization of various species dynamics with other oceanographic data.
- Real-time tide data combined with wind and wave information.

...And Much More

Key Issues: Useful Products

Needs are addressed by:

- Prototyping products to better understand functionality.
- Assessing technical requirements of expressed need.
- Understanding existing versus needed resources.
- Prioritizing funding and activities based on value to end users and feasibility.



Useful Products



Gulf of Maine HAB Potential Index - GoMOOS N01 - Northeast Channel

Select station: ▼

Date	Monday						Tuesday						Wednesday				
HOUR	8:00 AM	11:00 AM	2:00 PM	5:00 PM	8:00 PM	11:00 PM	2:00 AM	5:00 AM	8:00 AM	11:00 AM	2:00 PM	5:00 PM	8:00 PM	11:00 PM	2:00 AM	5:00 AM	8:00 AM
WIND FORECAST																	
WIND SPEED (MPH)	10	9	7	4	7	8	6	6	5	8	12	7	9	11	12	12	11
WIND DIRECTION	SSE	SSE	SE	SSE	S	S	S	SSE	ENE	ENE	NNE	NNE	NNW	NE	NNE	N	NNE

Alert Status:

On Tuesday 11:00 PM the wind forecast calls for winds out of the NE and speed to increase to 11 mph and above. By Wednesday 2:00 AM, wind will increase to 12 mph and will continue out of the NNE. This will create downwelling conditions and could cause Alexandrium cells to move to the Western GOM. Conditions are expected to last through Wednesday 8:00 AM.

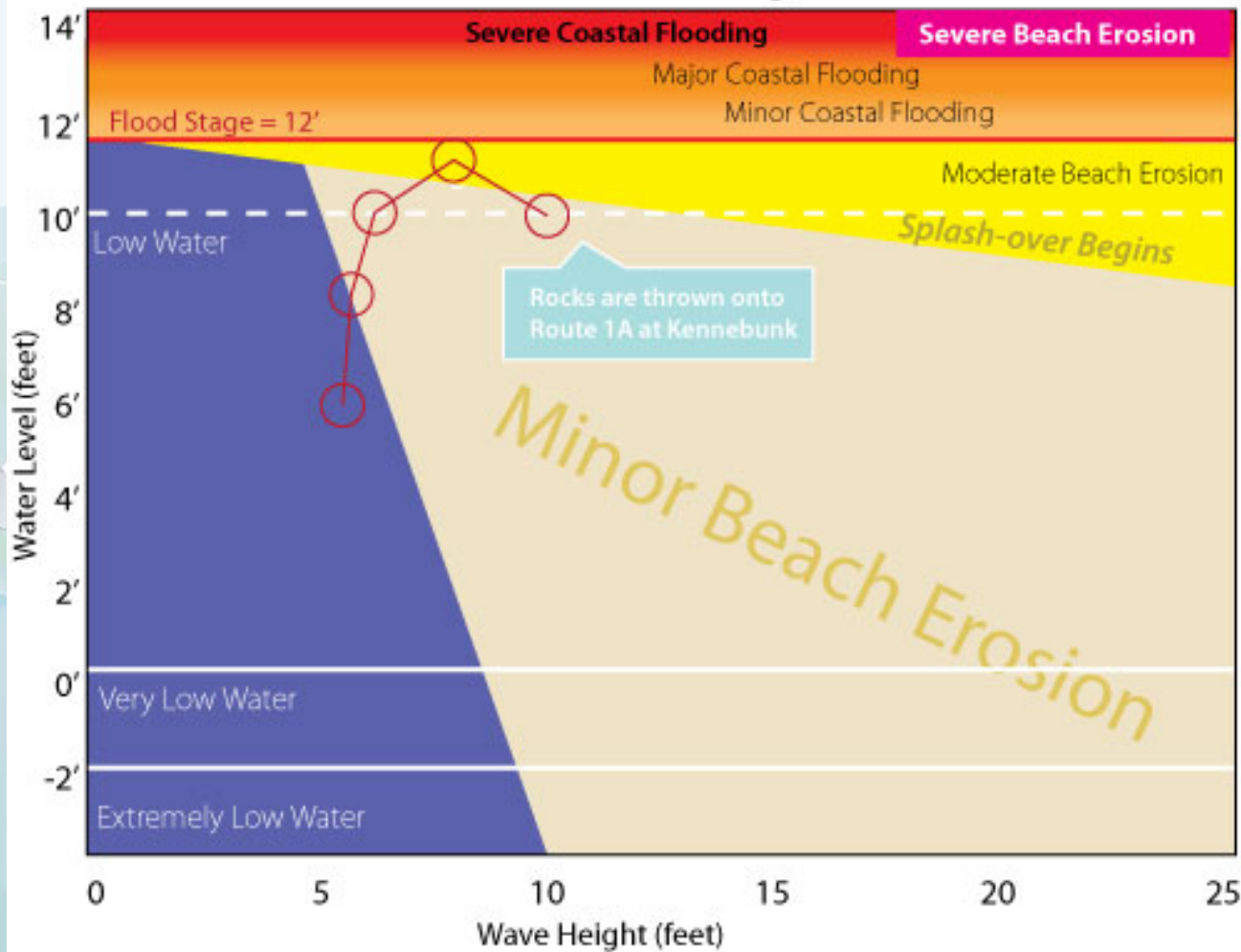
HAB Index developed in conjunction with the University of Maine School of Marine Sciences



Useful Products



Coastal Storm Damage Forecast



- Severe Beach Erosion
- Severe Coastal Flooding
- Major Coastal Flooding
- Minor Coastal Flooding
- Moderate Beach Erosion
- Minor Beach Erosion
- No Erosion/Flooding

Stakeholder Engagement

Expressions of support from stakeholders

- Willing participation of key stakeholders in NERACOOS's governance
 - Academic Consortium
 - Northeast Regional Oceans Council: Governors, Premiers, Coastal Managers
 - Sea Grant: Users and Industry
- 2-1/2 years of active participation by Advisory Committee
- Organization of Data Providers

Stakeholder Engagement

The background features a stylized, semi-transparent illustration of a coastal environment. At the top, a satellite with solar panels is in orbit. Below it, a white commercial airplane flies across the sky. In the middle ground, a large white research vessel with a crane is on the water. To the left, a wooden pier extends into the sea, with a solar panel and a satellite dish on a stand. In the foreground, several yellow and blue oceanographic instruments, including a buoy and a vertical sensor tower, are visible. The overall color palette is light blue and green, suggesting a clean, technological theme.

Data Providers

- 3-year old MOU
- Establishes Gulf of Maine Ocean Data Partnership
- Brings in partners from across coastal ocean domains: environmental, physical, biological, geological
- A cornerstone of “integration”

Serving Stakeholders

“Buoy data and storm-surge predictions during a severe New England storm allowed for early public warnings. As a result, no lives were lost and emergency managers had the information they needed.”

-Maine EMS

- NHDES uses buoy data to assess baseline and episodic water turbidity as well as water clarity impacts on seagrass beds.
- MWRA uses depth-resolved dissolved oxygen and nutrient data for water quality monitoring in Mass. Bay.
- Coastal forecasters routinely use the ocean observations and models from various partners.
- Water quality managers use Alexandrium sampling, conducted in collaboration with regional ECOHAB.

Serving Stakeholders

"As a local television meteorologist I find this information very useful and a welcome addition to the NOAA buoy reports.

Much of the information I gather is passed onto the general public; while other information is used in producing forecasts."

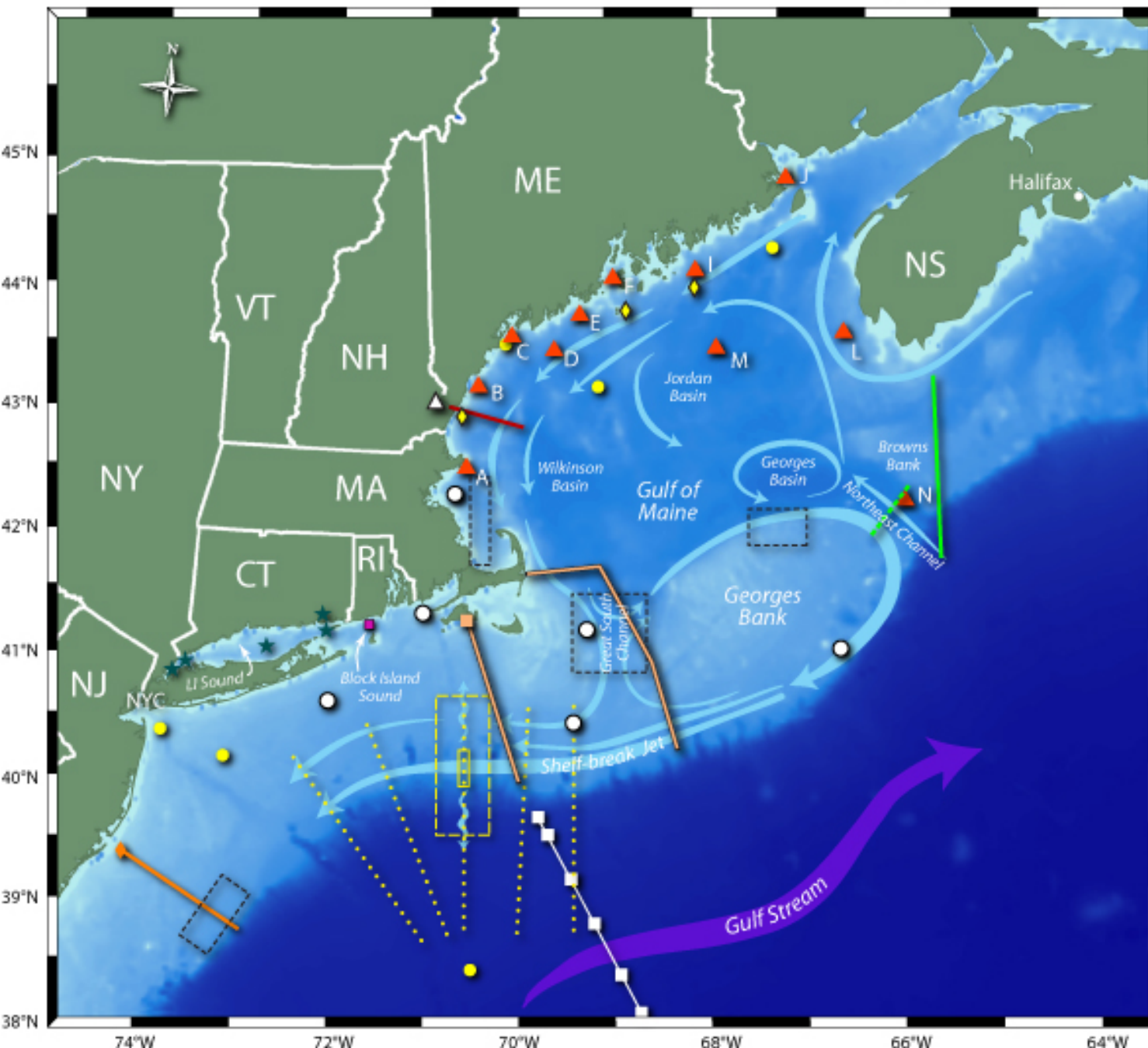
-Meteorologist

- Resource managers use observations to understand the ocean's ecosystem and predict its response to natural and anthropogenic changes.
- Thousands of mariners use daily sea surface conditions information, improving safety at sea.
- Educators benefit from online resources and other efforts, including a display at the NH Seacoast Science Center, Google Earth lesson plans, and an annual secondary school teachers workshop.

Current Activities & Funding: FY07 RCOOS Grant

Organization	Funding	Role
BIO	\$50,000	Wave model, HABs, NE Channel transect
GoMOOS	\$100,000	Data management
NEFSC	0	Fisheries expertise
U Conn	\$225,000	Long Island Sound buoys
U Maine	\$450,000	Gulf of Maine buoys, modeling, satellites
U Mass D	\$125,000	NECOFS
UNH	\$125,000	Great Bay buoy, transect
URI	\$125,000	Nutrient sensors
WHOI	0	Project administration
TOTAL	\$1,200,000	

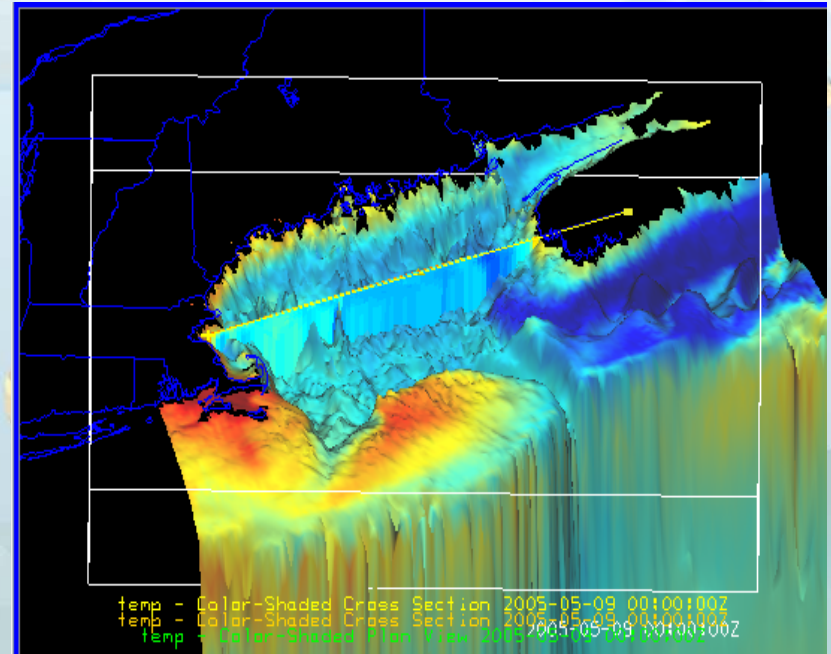
Northeastern Regional Coastal Ocean Observing System



- Processes**
- Schematic winter circulation
 - Cross-shelf exchange
- Existing Assets**
- NOAA buoy
 - NOAA C-man stations
 - GoMOOS buoy
 - Great Bay buoy (UNH/CODA)
 - Line-W buoys (WHOI)
 - MVCO (WHOI)
 - LISICOS mooring (UConn)
 - LEO-15 (Rutgers)
 - Rutgers glider
 - Browns Bank transect (BIO)
 - Wilkinson Basin transect (UNH/CODA)
- ORION Pioneer Array (with MTC/JAI enhancements)**
- Mesoscale Array (Glider)
 - Adaptive Array (AUVs)
 - Frontal Array (moorings)
- NERA/RCOOS Enhancements**
- Block Island Sound mooring (UConn/URI)
 - Sentinel benthic study sites: NEBO Project (WHOI)
 - Northeast Channel transect (BIO)
- MTC/JAI Enhancements**
- MVCO upgrade (WHOI)
 - NOAA buoy met upgrades
 - MVCO glider lines (WHOI)

Current Modeling Activities

- Circulation (U-ME, U-Mass Dartmouth, U-Mass Boston)
- Waves (BIO)
- Fisheries (U-Mass Dartmouth, U-ME)
- ODP Modeling Committee
- Meteorology (UNH, U-Mass Dartmouth)
- Harmful Algal Blooms (WHOI)
- Sediment Transport (USGS Woods Hole)



The Matlab Model Interoperability Demo shows how to access and visualize a 3D field of temperature from several different Gulf of Maine models at a given time step. This is part of the ODP Model Interoperability Experiment.

Current Activities and Funding

Data Management and Integration

- Ocean Data Partnership
- Matching EPA and NOAA funding to harmonize protocols and enable integration of data in coastal ocean and watershed
- www.OOSTethys.org, Open source tools and best practices for interoperability with NOAA/IOOS (Open Geospatial Consortium)

Interaction with Federal Agencies

- **Planning** - Strong federal participation on advisory committee.
- **Governance** - Specific provision for agency participation on BoD.
- **Data** - Key players in Ocean Data Partnership and holders of major ongoing and legacy data sets.
- **Projects** - Shrimp tool, Splashover tool, BIO wave modeling, Exchange Network.

Bedford Institute of Oceanography
Coastal Services Center
Environmental Protection Agency
National Data Buoy Center
NASA Global Change Master Directory
National Estuarine Research Reserve System
National Marine Fisheries Service
National Ocean Service
New England Fishery Science Center
Stellwagen Bank National Marine Sanctuary
U.S. Army Corps of Engineers
U.S. Coast Guard National Weather Service
U.S. Geological Survey



RA Coordination: Progress to Date

- Many stakeholders aware of, conversant in, contributors to the Regional Association
- Advanced data management and interoperability through the Gulf of Maine Ocean Data Partnership
- Draft by-laws and governance structure—ready to incorporate
- User needs assessments
- Product prototypes for HABs, Inundation, Living Marine Resources, and Water Quality.
- Region-wide coordination on RCOOS

RA Coordination: Next Steps

- Convene the NERACOOS Board of Directors in robust strategic planning to address goals, objectives, place of incorporation, business plan, and operating plan
- Incorporate the organization
- Establish Committees (Conflict of Interest Management, Finance, and Nominations), and Teams and Council (Products Requirements Team, Science Requirements Team, and Stakeholders' Council)
- Board to establish central office and hire staff, if it decides to have a central office and staff
- Continue user needs assessments and gap analysis (ongoing)

The background is a stylized, low-poly illustration of a coastal region. It features a large white ship with a crane on its deck, several yellow buoys, a satellite in orbit, a small yellow boat, and a yellow and white buoy. The scene is set against a light blue sky and green hills. The text is overlaid on this background.

RA Coordination: Activities under the FY08 RA grant

- Development of integrated, coordinated, regional plans for
 - Products and product development
 - Science and technology
 - Data
- Staffing NERACOOS office



RA Views on Regional and National IOOS

- Ready access to “National Backbone” agencies for legacy data bases
 - Cooperation in making them discoverable, accessible, interoperable
- Pre-operations to operations – how to sustain operations
- In-shore v off-shore: big system dynamics v everyday users



Cross-regional Coordination

- Conscious decision to expand Northeast region to overlap with Mid-Atlantic
- Step toward aligning regional system with Northeast Fisheries jurisdiction and large area ecosystem
- Do not know if it can be sustained
- Many areas of overlapping scientific interest

The background features a stylized, semi-transparent illustration of a coastal monitoring network. It includes a satellite in orbit, a research vessel on the water, a pier with a solar panel and antenna, and various buoys and sensors in the water. The overall theme is maritime observation and data collection.

Best Practices and Lessons Learned

- Geography: political identity v oceanographic considerations
- Cost of sustaining observing network – IOOS may not be enough
- Prototyping of products a good way to build relationships with agencies – USCG, NWS, State Marine Resources, State Environmental Protection



Thank You!

Evan Richert

University of Southern Maine

John Trowbridge

Woods Hole Oceanographic Institution