

## NERACOOS Product Development – Water Quality

**Summary of user need based products in the focus area of water quality. Product summary link to full product description and functional requirements.**

Description of Feasibility Ranking (Scientific Functional Requirements)	Feasibility
* Have data/science available to build product * Minimal collaboration needed	<b>HIGH</b>
* Need more data * Requires moderate collaboration * More scoping required	<b>MEDIUM</b>
* Need more science to understand problem * Need more data * Need more assets (buoys, sampling equipment) * Requires high level of collaboration * More scoping required	<b>LOW</b>

Prod #	Product Summary	Feasibility
1	Contour maps of water quality parameters for coastal waters <a href="#">Full description</a>	<b>HIGH</b>
2	Cost effective methodology for acquiring baseline data on fundamental water quality parameters for coastal waters <a href="#">Full description</a>	<b>HIGH</b>
5	Mesoscale hydrodynamic models for estuaries and embayments <a href="#">Full description</a>	<b>HIGH</b>
6	Web-based access to monitoring data sets <a href="#">Full description</a>	<b>HIGH</b>
4	Visualizations that integrate water quality parameters <a href="#">Full description</a>	<b>MEDIUM</b>
3	Develop useful visual and analytical products from National Water Quality Monitoring Network <a href="#">Full description</a>	<b>LOW</b>
<b>Other user needs, not specifically web products - <a href="#">More information</a></b>		
7	Maps of eelgrass distribution	
8	Maps of shoreline change and substrate	
9	Maps of invasive species outbreaks	
10	Nearshore bathymetry	
11	Maps of coastal habitats	
12	Data overlay maps for small areas	
13	In water real time sensors	
14	Habitat chemical signatures	

## Water Quality - Full Product Description and Functional Requirements

### User Need Source:

NERA6 – North East Regional Association 2006 Regional Water Quality Managers

Call07 – Email and phone calls to various water quality managers in July 2007

KR06 - Keeley Report 2006

Category: Environmental Data		Product #: 1
Product Description	Contour maps of water quality parameters for coastal waters	
User Need   Source	Spatial coverage and distribution of water quality data displayed as plan view contour maps	NERA6
	Temporal variation of parameter shown as series of contour maps	NERA6
	Spatial coverage of bottom dissolved oxygen	KR06
Technical Requirements (have)	Some agencies have acquired data with sufficient spatial coverage to allow meaningful contour maps to be created for certain locations (i.e., Narragansett Bay, Great Bay)	
Technical Requirements (need)	Many areas are not sufficiently well sampled to create contour maps	
Feasibility	For areas with sufficient data density	HIGH
Notes	Some managers view as low priority since they already have such capability	

Category: Environmental Data		Product #: 2
Product Description	Cost effective methodology for acquiring baseline data on fundamental water quality parameters for coastal waters	
User Need   Source	Understanding of physical characteristics such as circulation and flushing rates	NERA6
	Information used to develop trends and for establishing sentinel monitoring sites	NERA6
Technical Requirements (have)	Models have been applied to many coastal water bodies to simulate circulation and flushing characteristics	
	Some large efforts (USACE ADCIRC) may have sufficient resolution and are already completed	
Technical Requirements (need)	Consensus required on determination of important forcing mechanisms driving circulation and protocol needed in making flushing estimates	
Feasibility	Straightforward to do particularly for tidal driven water bodies	HIGH
Notes	See related Product 5	

Category: Environmental Data		Product #: 3
Product Description	Develop useful visual and analytical products from National Water Quality Monitoring Network	
User Need   Source	Coordinated data monitoring activity	NERA6
Technical Requirements (have)	Pilot studies conducted for coastal areas (Delaware and San Francisco Bays)	
Technical Requirements (need)	Plans and studies required for coastal areas in geographical area of interest	
	Linkages need to be made among disparate generators of data	
Feasibility	Funding and schedule are unclear	LOW
Notes	Managers unsure if network will meet their needs	

Category: Environmental Data		Product #: 4
Product Description	Visualizations that integrate water quality parameters	
User Need   Source	Indices to provide an integrated assessment of ecosystem health	NERA6
	Indicators of eutrophication, susceptibility, nutrient inputs, future nutrient pressures	KR06
	Estuarine classification schemes	KR06
Technical Requirements (have)	Some agencies have acquired data with sufficient detail (Casco Bay program sampled 14 indicators of ecosystem health)	
Technical Requirements (need)		
Feasibility	For areas with sufficient data density	<b>MEDIUM</b>
Notes	Managers indicated that capability already exists	

Category: Models		Product #: 5
Product Description	Mesoscale hydrodynamic models for estuaries and embayments	
User Need   Source	A linked series of models (or model using variably sized grid) required to explain how estuaries respond to changes in salinity, temperature and meteorological forcing	NERA6
	Model system could supply hydrodynamics to drive water quality models (hypoxia, red tide events)	
Technical Requirements (have)	Models have been applied to many individual coastal water bodies and regions	
Technical Requirements (need)	Need to have higher resolution in smaller areas with large gradients and lower elsewhere (either linked low and high resolution models or regional models with variable resolution)	
Feasibility	Straightforward to implement given sufficient resources	<b>HIGH</b>
Notes	See potential application in Product 2	

Category: Environmental Data		Product #: 6
Product Description	Web-based access to monitoring data sets	
User Need   Source	Allow access to monitoring data to assess trends (i.e., response of estuaries to nutrient reduction strategies)	NERA6
Technical Requirements (have)	Some areas have sufficient historical data	
Technical Requirements (need)	Many area do not have sufficient historical data	
Feasibility	Straightforward to implement given sufficient data	<b>HIGH</b>
Notes	Managers view as low priority	

Other user needs not identified as web products		
<b>Product Description</b>	Maps of eelgrass distribution	Product #: 7
<b>User Need   Source</b>	Maps more frequently via aerial photography with sufficient groundtruthing to establish trends	Call07
<b>Product Description</b>	Maps of shoreline change and substrate	Product #: 8
<b>User Need   Source</b>	Maps of erosion and accretion rates along shoreline for planning	Call07
	Sediment budgets and load maps	KR06
<b>Product Description</b>	Maps of invasive species outbreaks	Product #: 9
<b>User Need   Source</b>	Identifying, mapping and tracking historical invasions to better understand nature of problem	Call07
<b>Product Description</b>	Nearshore bathymetry	Product #: 10
<b>User Need   Source</b>	Offshore water bathymetry in good shape but nearshore (<5m) is insufficient	Call07
	Topography and bathymetry (LIDAR) mapping	KR06
<b>Product Description</b>	Maps of coastal habitats	Product #: 11
<b>User Need   Source</b>	Manage coastal zone more effectively via ocean zoning	Call07
<b>Product Description</b>	Data overlay maps for small areas	Product #: 12
<b>User Need   Source</b>	Ability to see small scale information (i.e., for pathogen problem have ability to see shellfish areas, beach closures, spring tide flushed wetlands)	Call07
<b>Product Description</b>	In water real time sensors	Product #: 13
<b>User Need   Source</b>	Need for sensors to quickly quantify water quality problems (i.e., bacteria levels in shellfish and beach areas)	Call07
<b>Product Description</b>	Habitat chemical signatures	Product #: 14
<b>User Need   Source</b>	Need to correlate unique habitat chemical signatures with biological (i.e., winter flounder) populations	Call07

= not a potential web product

## **Sources of user needs used to develop potential products**

### **NERA6 - North East Regional Association 2006 Regional Water Quality Managers Meeting, 25 April 2006**

Series of documents generated

- Meeting Summary
- Summary of Feedback for Regional Water Quality Products
- Potential Water Quality Products

### **Call07 – Emails and telephone communications conducted between April and July 2007 with regional water quality managers.**

Contacts included:

- Todd Callaghan, Massachusetts Coastal Zone Management
- Phil Trowbridge, New Hampshire Department of Environmental Services
- Margherita Pryor, United States Environmental Protection Agency Region 1
- Sue Kiernan, Rhode Island Department of Environmental Management
- Lee Doggett, Maine Department of Environmental Protection

### **KR06 - Synthesis of Coastal Managers Needs for Ocean Observing Products and Services – The Keeley Group – September 2006.**

Synthesizing user needs from the following sources:

- Workshops:
  - Managing Nitrogen Impacts in the Gulf of Maine – 2001
  - Gulf of Maine Coastal Monitoring Strategy – 2002
  - Northeast Coastal Indicators Workshop – 2004
  - Gulf of Maine Summit – 2004
- Proceedings:
  - Alaska User Needs Assessment, May, 2004
  - Coastal and Ocean Observing System User Requirements: An Examination of User Surveys. (Boyd 2000)
  - Improving Methods and Indicators for Evaluating Coastal Water Eutrophication: A Pilot Study in the Gulf of Maine. NOAA/CICEET (Bricker, Lipton, Mason, Dionne, Keeley, Latimer, Pennock 2005)
  - Recommendations to the US Commission on Ocean Policy. 2004 (Coastal States Organization.)
  - SECOORA Ocean Observing Market Analysis; Appendix A Compendium of Needs Assessment Documents. (Eslinger 2004)
  - Great Lakes Observing System. Public Survey. August 2005.
  - More Effectively Using Observing, Monitoring, Research and Education Infrastructure. California and the World Ocean Conference Proceedings (Keeley, Gregorio, Bailey 2002)
  - Ocean Observing and Coastal Managers Users Needs. Coastal States Organization/Anchorage Alaska Annual Meeting. (Keeley 2003)
  - Great Lakes Coastal Managers User Needs Focus Group. NOAA & Coastal States Organization – Chicago, Illinois (Keeley 2005)
  - Southeast Coastal Managers User Needs Focus Group NOAA & Coastal States Organization – Jacksonville, Florida (Keeley 2004)
  - Nutrients and Coastal Managers Needs. NOAA Eutrophication Workshop – Patuxent Maryland. (Keeley 2002)
  - Information Needs for Fishery Management in Maine. Gulf of Maine Modeling Workshop – Portland, Maine (Mercer 2002)
  - NOAA National Ocean Service Requirements for the integrated Ocean Observing System: Case Study for Coastal Management. (Mitreteck Systems 2005)

- A Demonstration of the Alaska Ocean Observing System in Prince William Sound: Alaska Ocean Observing Workshop. (Schoch, McCammon 2005)
- A User Assessment of Coastal Ocean Observation Systems in the Gulf of Mexico. (Thurlow, Kruse, Bierling 2004) Texas Sea Grant Program/Texas A&M University System
- State Coastal Observations and Monitoring Needs: Results of a Survey to Assess Coastal Management Needs. (Urban Harbors Institute 2004) Coastal States Organization/SEACOOS Outreach and Education Work Group
- Improving Links between Science and Coastal Management: Results of a Survey to Assess Science and Technology Needs. (Urban Harbors Institute. 2004) Coastal States Organization/NOAA - Cooperative Institute for Coastal and Estuarine Technology
- Summary of Needs from CeNCOOS Stakeholders. (Watson 2004)
- Additional notes from personal communication and informal meetings with stakeholders in NE region