

Northeast Coastal Indicators Workshop Developing a Set of Regional Indicators



In 2002, efforts began on developing a coordinated regional monitoring effort throughout the northwest Atlantic region. The regional efforts focused on the following vision and mission:

Vision – A sustainable northwest Atlantic ecosystem that ensures environmental integrity and that supports and is supported by economically viable, healthy human communities.

Mission – To track the status and trends in ecosystem integrity throughout the northwest Atlantic region through collaborative partnerships; To provide information for management decisions at regional and local scales.

The regional approach is embraced in the recommendations of several commissions, including the Pew Ocean Commission and House Ocean Commission, who note the need for and importance of regional coordinated efforts to track the status of regional ecosystems. These recommendations were predicated on the premise that regionally coordinated efforts impart more consistency in monitoring programs and in informing decision-makers and the public on progress in coastal protection and restoration.

To further the regional coordination effort started in 2002, a second workshop, the *Northeast Coastal Indicators Workshop*, was held on January 6-7, 2004 in Durham, New Hampshire. The goal of the workshop was to identify indicators useful for

tracking the overall status of the coastal and marine environment from the Bay of Fundy and Gulf of Maine in Canada to Long Island Sound (Connecticut and New York).

The workshop based its discussions on the following definition of indicators:

An indicator is a measurement that provides useful information about the condition of the natural, ecological, cultural or economic environment.

Workshop organizers and participants believed successful implementation of the regional monitoring and indicator approach, can address gaps between monitoring and management by 1) reaching out to environmental managers to ensure the work is relevant, 2) understanding key management and monitoring questions, and 3) ensuring timely, relevant information is produced through the coordination.

Additionally, the success of a regionally coordinated measurement effort depends first on identification of the relevant, key issues and questions, then the determination of indicators that address the questions. To ensure information from local to regional and higher levels is effectively measured and combined, a consistent set of drivers, champions, resource support, and coordination is essential. The 2004 workshop made significant progress in setting the groundwork for such success.

Northeast Coastal Indicators Workshop Focus

Indicators are a necessary part of any regional coordination effort. This workshop was designed to assist in the development of indicators to be used in an effort to track the status of the northwest Atlantic region. The workshop steering committee drafted straw conceptual models, key questions, and indicators for participants to discuss and reach consensus. The key questions and associated indicators were characterized under six major issues (aquatic habitat, coastal development, eutrophication, fisheries, contaminants, and climate change) for which regional data would be compiled.

The workshop was designed such that participants received background information on the regional efforts to date and efforts by other groups to develop indicators for the six major focus issues. Background information developed included: a summary of National Indicator Development Initiatives; a white paper "Tapping the Indicators Knowledge Base: "Lessons Learned""; Indicators Workshop Operational Definitions; Conceptual Model Papers; and Indicators bibliography.

After a series of plenary presentations, the participants were assigned to issue-based breakout sessions to discuss the questions that need to be answered for the region and develop indicators.

The findings of each breakout session were presented to members of a Senior Management Panel who responded with observations, comments, and suggestions on how the indicators might be incorporated into related efforts in the region.

Results

Using conceptual model papers prepared for each topic and a list of proposed questions and indicators, participants discussed and identified the most important issues/questions and indicators that were considered the most constructive within topic areas.

The most important questions and indicators identified by the six breakout groups include:

Aquatic Habitat:

1. How is the extent, distribution, or use of aquatic habitats changing over time?

Indicator(s):

- Extent and distribution per habitat type over time
- Inventory of human use
- Area, percent of public vs. private
- Area, percent designated for permanent habitat protection

2. How is the ecological condition of aquatic habitats changing over time?

Indicator(s):

- Community Structure
- Trophic Structure
- Species of Concern

3. What are the causes of aquatic habitat change over time?

Indicator(s):

- Extent and percent habitat area altered by tidal restrictions
- Boat registrations
- Seagrass Nutrient Pollution Index
- Indicators relating to other causes assumed covered by other groups

Climate Change:

1. How are atmospheric conditions in the Northwest Atlantic Region changing in response to global climate change?"

Indicator(s):

- Carbon dioxide trends at coastal and off shore stations.
- Ozone trends at coastal and off shore stations.
- Cloud cover/solar reflection trends in the Northeast Coastal and Northwest Atlantic region.
- Methane at coastal and off shore stations in the Northeast Coastal region.

2. What are the impacts of climate changes to: weather, atmospheric & ocean circulation, ecosystems, and society?

Indicator(s):

- Precipitation trends
- Storm frequency and intensity
- Water temperature surface bottom
- Relative sea level rise

3. What are the impacts of climate change on biotic ecosystems?

Indicator(s):

- Warm vs. cold water finfish species diversity
- Planktonic diversity
- Wetlands extent, distribution and composition
- Marine diseases indices (i.e., MSX, dermo, shell disease)

Coastal Development:

1. What is the type, pattern, and rate of land use change?

Indicator(s):

- Percent change in land cover to more intensive uses
- Demographic changes (population, etc.)
- Types of land uses and change

2. How are these changes impacting the integrity of coastal ecosystems?

Indicator(s):

- Integrity of coastal ecosystems for:
 - Threatened and endangered coastal species
 - Migratory species
 - Invasive species

3. How is the region responding to changes in coastal ecosystems?

Indicator(s):

- Type, location and pace of land conservation
- Type, location and pace of habitat Restoration
- Land Management (planning, regulatory, etc)

Contaminants:

1. How are contaminants in the region changing?

Indicator(s):

- Area of sediments that have contaminant levels above sediment quality guidelines
- Level of contaminants in representative non-migratory organisms
- Area of shellfish bed closure by state by year
- Days of beach closure due to bacterial contamination by state by year

2. How is the input of contaminants changing over time and space?

Indicator(s):

- Annual chemical load to water bodies by state
- Number of bacterial source investigations and sources eliminated by year by state

3. Are management actions changing the extent and severity of human health effects?

Indicator(s):

- Incidences of human disease caused by consumption of fish and shellfish and recreational contact
- Level of contaminants in representative fish/shellfish and at-risk humans
- Annual number of beach and shellfish closures (reopenings)

4. How well are contaminant management actions protecting ecosystem integrity?

Indicator(s):

- Sediment quality measure by triad approach
- Incidence of disease
- Reproductive success
- Quality of habitats as affected by contaminants

Eutrophication:

1. What is the extent, severity, and trends of eutrophication impacts?

Indicator(s):

- Dissolved oxygen
- Chlorophyll a
- Submerged aquatic vegetation
- Water clarity

2. What are the sources of nutrients, can they be controlled, how are they changing?

Indicator(s):

- Measured and modeled loads
- Land use/cover (load proxy)
- Population (load proxy)

3. What is the state of management measures and how can they be optimized?

Indicator(s):

- Dissolved oxygen
- Chlorophyll a
- Submerged aquatic vegetation
- Water clarity
- Measured and modeled loads
- Land use/cover (load proxy)
- Population (load proxy)

Fisheries:

1. What are the trends in and the status of exploited fisheries stocks?

Indicator(s):

- Proportion of stocks at or above targeted abundance or biomass
- Age/Size structure of species from surveys and/or landings
- Spatial distribution of fisheries species

2. What are the effects of fishing on non-targeted species and their associated communities?

Indicator(s):

- Characteristics of bycatch and discards
- Population levels for selected species
- Species Diversity

- Connecticut Department of Environmental Protection
- NOAA/National Marine Fisheries Service
- Fisheries & Oceans, Canada
- Environmental Protection Agency

3. What are the effects of fishing and non-fishing activities on marine habitat and fisheries productivity?

Indicator(s):

- Area closed to fishing, both pelagic and/or benthic
- Benthic diversity
- Spatial distribution of bottom fishing

4. What are the trends in the socioeconomic characteristics of fishing?

Indicator(s):

- Days at sea
- Fleet composition
- Commercial and recreational fishing economic value
- Angler satisfaction
- Overcapitalized fleets
- Natural capital value
- Market value for consumers

Critical Linkages between all issues:

- Management and regulator community involvement to frame need and buy in
- Monitoring & observing community to provide accessible data
- Indicator community to provide synthetic products
- Scientific community to guide expanded monitoring and identify research needs
- People/Programs with lessons to share

Senior Management Panel

The senior management panelists included personnel from:

- Massachusetts Executive Office of Environmental Affairs
- New Brunswick, Canada
- Conservation Law Foundation
- NOAA/National Ocean Service

In general, the panelists endorsed the indicator development approach, the indicators, movement towards regional reporting of environmental conditions, and the utility of the indicators put before them. Panelists indicated that the regional dialogue is critical and encouraged participants and conveners to continue to define management relevant, comprehensive indicators applicable at both broad and local scales. Many panelists conveyed that they are encouraged by the process defined by the workshop and indicated they would support future efforts to find resources to continue the effort.

Next Steps

The workshop participants and senior panelist dialogue identified that gaining the support of the management community for the indicators as well as informing the public as critical success elements for the regional monitoring and indicators effort.

Participants identified several critical actions that must be implemented over the next 12-18 months to ensure the program continues. These include identifying key partners, specific activities and timelines, adequacy of existing data, and implementation approaches (e.g. users, spatial and temporal scale, and relative budget requirements).

Near-term actions included:

Fall 2004: Present draft indicators at the Gulf of Maine Summit in New Brunswick for review and refinement

Winter 2004/05:

- Integrate indicator efforts into the regional strategy
- Produce strategy and seek implementation funds
- Initiate demonstration pilot

One-Year Deliverables: Produce a region-wide monitoring and indicators strategy.

For additional information on this effort, please visit <http://www.gulfofmaine.org/nciw/>. If you are interested in being an active participant in this program, please contact David Keeley of the Maine State Planning Department at David.Keeley@state.me.us.