

Progress on implementing Ecosystem-based management in the Gulf of Maine

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**Text slides from presentation delivered to
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A bathymetric map of the Gulf of Maine, showing the continental shelf and deep-sea features. The map uses a color scale from light blue (shallow) to dark blue (deep). The text is overlaid on the map.

**2009 GOM Symposium -
Advancing Ecosystem
Research in the Gulf of
Maine**

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Co-convenors**



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REGIONAL ASSOCIATION FOR RESEARCH ON THE GULF OF MAINE

- Gulf of Maine...
- One of the best studied ecosystems
- Highly managed (by two nations)
- A useful case study in progress towards evolution and implementation of Ecosystem Approach

From GoM Summit (2004)

- Implementing the ecosystem approach is essential
- There have been recent positive policy and governance developments in both USA and Canada
- There is need for a 'report card' on health of the Gulf of Maine

Landscape of management has changed...

	Fisheries	Aqua	Energy	Transp	Others
Conservation	More complex plans Market certification				
- Productivity					
- Biodiversity					
- Habitat					
Economic					
Social/cultural					

Cumulative impacts

...Ecosystem approach/Integrated management

EAM Changes – consideration of a greater range of ecosystem attributes

- **Productivity**

- Primary Productivity
- Community Productivity
- Population Productivity

- **Biodiversity**

- Species Diversity
- Population Diversity

- **Habitat**

- **Social and Economic objectives**

Societal expectation is greater than the minimum established in law = 'Social license'

Increasing need for ...

- an integrated approach
- to the management of multiple human activities
- in relation to a more diverse set of objectives and a changing environment
- that include a higher standard of ecological integrity, and diverse aspects of sustainability

Gulf of Maine Symposium – Advancing Ecosystem Research for the Future of the Gulf



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Challenge...

- What have we learned ?
- How are we placed to manage?
- What are the priorities

RARGOM 2009 GOM Symposium

- 240 participants; 140 presentations
- Combination of perspectives, concurrent technical sessions, oral plenary sessions and posters
- Report: *Cooper et al. 2010. Can. Tech. Rep. Fish. Aquat. Sci. 2904*
- Peer reviewed volume in preparation

Program

- Theme Sessions
 - Tools for Integrated Management
 - Ecosystem Structure & Function
 - Anthropogenic & External Influences
 - Monitoring & Observation
- Technical Workshops
 - Ecosystem services
 - Biodiversity
 - Seafloor Mapping
 - Life Histories
 - Ecosystem Health

Changes since RARGOM Symposium in 1996

- International context for EAM (and IM)
- Legislative changes in both USA and Canada
- Major realizations regarding climate change and the need for management stewardship in the face of change
- Public interest leading to marketplace pressure – ‘social license’

Recent Developments

- Increased knowledge in many areas e.g. high resolution seafloor mapping and habitat characterization
- Recognition that EAM includes ecological and social/economic considerations and that it demands an interdisciplinary approach
- Better understanding of the lessons of past management and long-term effects of exploitation
- Legislation (in both Canada and USA) to address more holistic approaches and multiple uses
- Development/evolution of tools for marine spatial planning and state of the environment reporting
- Evolution of concepts and framework for essential habitat, ecosystems services and for ecosystem-based approach

Objective-based Management Planning

Objective

- ‘Why’ manage
 - High sustainable **yield**
(attribute)

Strategy

- ‘WHAT’ will be done
 - Keep **fishing mortality** below **0.2**
(pressure) (reference)

Tactic

- ‘HOW’ it will be done
 - **Catch quota**

DFO Maritimes EAM Framework

OBJECTIVES	STRATEGIES with associated <u>pressures</u>
Productivity: do not cause unacceptable reduction in productivity so that components can play their role in the functioning of the ecosystem	<ul style="list-style-type: none"> • Keep <u>fishing mortality</u> moderate <ul style="list-style-type: none"> - Promote positive biomass change when biomass is low - Manage discards for all harvested species • Allow sufficient escapement from <u>exploitation of spawning biomass</u> • Limit <u>disturbing activity</u> in spawning areas/seasons • Control <u>alteration of nutrient concentrations</u> affecting primary production at the base of the food chain by algae
Biodiversity: do not cause unacceptable reduction in biodiversity in order to preserve the structure and natural resilience of the ecosystem	<ul style="list-style-type: none"> • Control <u>incidental mortality</u> for all non-harvested species • Minimize <u>unintended transmission</u> of invasive species • Distribute population <u>component mortality</u> in relation to component biomass
Habitat: do not cause unacceptable modification to habitat in order to safeguard both physical and chemical properties of the ecosystem	<ul style="list-style-type: none"> • Manage <u>area disturbed</u> of bottom habitat • Limit <u>introduction of pollutants</u> in habitat • Minimize <u>deaths from structures/equipment/lost gear</u> • Control <u>noise and light disturbance</u>

Framework: a common basis

How well placed to implement Ecosystem Approach?

- There is a range of approaches to the ecosystem approach at present...from evolutionary to revolutionary
- There is a challenge in implementing the ecosystem approach in the GoM because of the complexity in jurisdiction and increasingly litigious environment
- There remains the problem of ecosystem complexity
- There is an issue of need for enhanced monitoring and information to support evolving management landscape
- Need for institutional (governance) to support cross disciplinary and inter-jurisdictional considerations
- Some frustration regarding implementation...the time for action is now

Priorities for ecosystem approach?

Two categories:

Increased basic understanding related to environmental and governance change

Appropriate governance structures and improved institutional capacity for implementation of an ecosystem approach

3a) Need basic understanding

- Evaluation of models of climate and flow (are flows changing?)
- Enhanced understanding of coastal processes and life histories in relation to environmental change
- Knowledge of benthic, and especially microbial processes
- Strengthened science and monitoring of aspects of relevance to EAM decisions in management
- Strong link among those with science, management, social and legal expertise
- Institutional ‘bridges’ to link information and research to management
- Requirement for greater general ocean literacy
- Clarification of terminology, and consistency of use
- Enhanced understanding of cumulative impacts
- Metrics of progress and of success (how will we know when we are there?)
- Continued mapping for marine spatial planning

3b) Priorities re governance structure

- A common vision of goals and objectives
- interdisciplinary participation,
- legislative basis and development of appropriate governance structures
- consistency among jurisdictions
- participatory structures (engagement of users)
- more comprehensive approach to ocean use planning
- enhanced collaboration in evaluations/assessments

The bottom line?

- There has been considerable progress in the past decade...moving toward EAM
- However, not there yet
- How would we know when we are there?
- What are the minimum criteria for EAM?
- Does EAM have to be the same in all areas?

Statements of need:

- ‘Development of an **operating framework** for managing the Gulf of Maine using an ecosystem-based approach and in the face of ecosystem change’
- ‘Development of a comprehensive, interdisciplinary, **approach to management and a framework for the evaluation** of management (management strategy evaluation)’
- ‘Development of an **organized approach** to adaptation throughout the region (perhaps through GoM Council)’

Greatest need remains fleshing out of the practical framework(s)...

- an integrated approach,
- to the management of multiple human activities
- in relation to a more diverse set of objectives and a changing environment
- that include a higher standard of ecological integrity, and diverse aspects of sustainability

Progress continues

- NEFMC/NMFS approach articulated by O'Boyle and Fogarty
- DFO Maritimes Region strategy
- Regional experiments in implementation
- Coordinated attempts at State of Environment Reporting
- Considerable collaboration (GOM Council)

Ecoregion/planning area (umbrella plan)

Ecosystem Assessment

Nested plans for Managed activities

Common Objectives/strategies
(Acts and desired attributes/services)

	Fisheries	Aquaculture	Energy	Transport
Conservation	Plans with diverse objectives; Market audit (certification)	Metrics (indicators and refs) Decision support tools	Methods for evaluation of cumulative impacts	
- Productivity				
- Biodiversity				
- Habitat				
Economic				
Social/cultural				

Audit of cumulative performance

Research needs

- Articulation of objectives and desired attributes/services (and performance indicators)
- Methods for demonstrating tradeoffs for decision support (ecological cost-benefit evaluation)
- Methods for evaluation of cumulative effects of multiple activities



Leadership challenge...

**Quilt of Ecosystem-based
(Integrated) Management?**

Minimum standard?

**How will we know
when we have it?**