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

Rob Stephenson and
John Annala

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

Rob Stephenson and John Annala Co-convenors
• 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...

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More complex plans  Market certification

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

**Societal expectation** is greater than the minimum established in law = ‘Social license’

- **Habitat**

- **Social and Economic objectives**
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

St. Andrews, N.B.     October 4-9, 2009

GoM Symposium ’09
St. Andrews, New Brunswick, Canada  October 4 - 9, 2009

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RARGOM
REGIONAL ASSOCIATION FOR RESEARCH ON THE GULF OF MAINE
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


• 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
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<th>OBJECTIVES</th>
<th>STRATEGIES with associated pressures</th>
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**Productivity:** do not cause unacceptable reduction in productivity so that components can play their role in the functioning of the ecosystem

- Keep *fishing mortality* moderate
- Promote positive biomass change when biomass is low
- Manage discards for all harvested species
- Allow sufficient escapement from *exploitation of spawning biomass*
- Limit *disturbing activity* in spawning areas/seasons
- Control *alteration of nutrient concentrations* 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

- Control *incidental mortality* for all non-harvested species
- Minimize *unintended transmission* of invasive species
- Distribute population *component mortality* 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

- Manage *area disturbed* of bottom habitat
- Limit *introduction of pollutants* in habitat
- Minimize *deaths from structures/equipment/lost gear*
- Control *noise and light disturbance*

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)
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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?