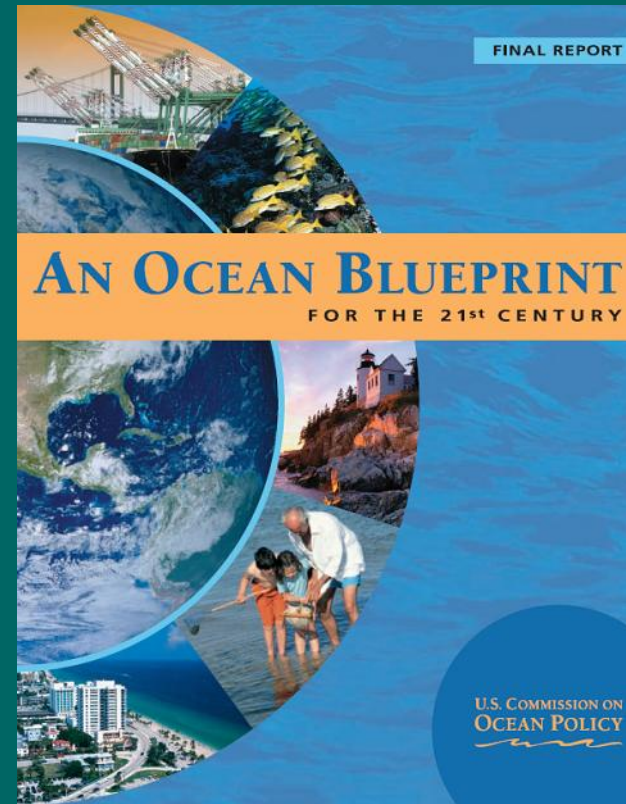
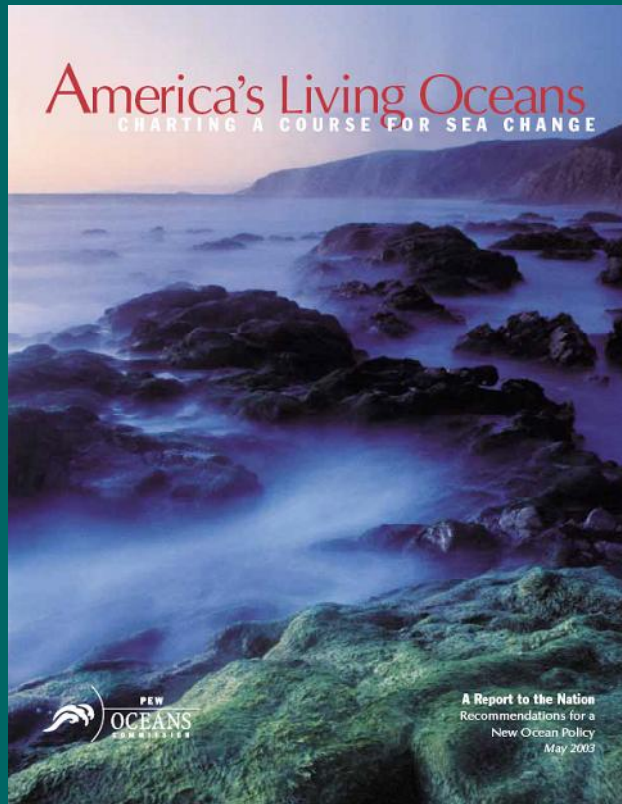


# Confronting trade-offs associated with ecosystem-based management



Kathy Mills and Barbara Knuth  
Cornell University, Department of Natural Resources

# Endorsements of ecosystem-based management

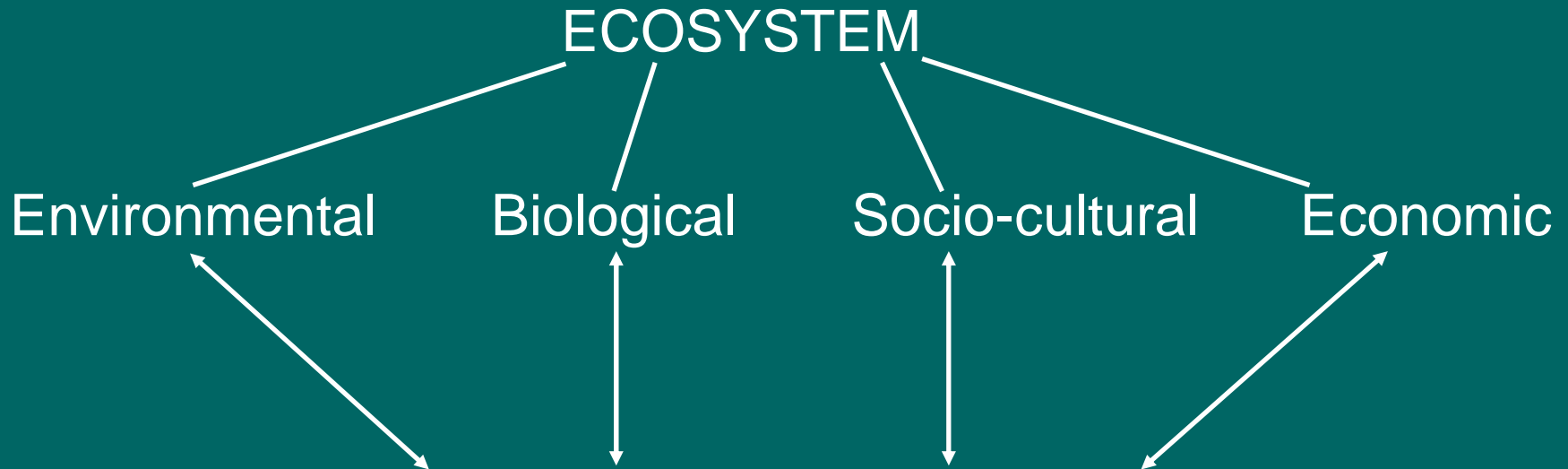


# Diverse marine activities and stakeholders



# Fisheries in an ecosystem context

- Fisheries embedded within and interact with ecosystems



# Managing fisheries within an ecosystem

## Ecosystem-based fishery management (EBFM) (NMFS 1999)

Considers interactions that a target fish stock has with:

- Predators, competitors, and prey
- Weather and climate
- Habitat
- Direct and indirect effects of fishing

## Ecosystem-based management (EBM) (McLeod *et al.* 2005)

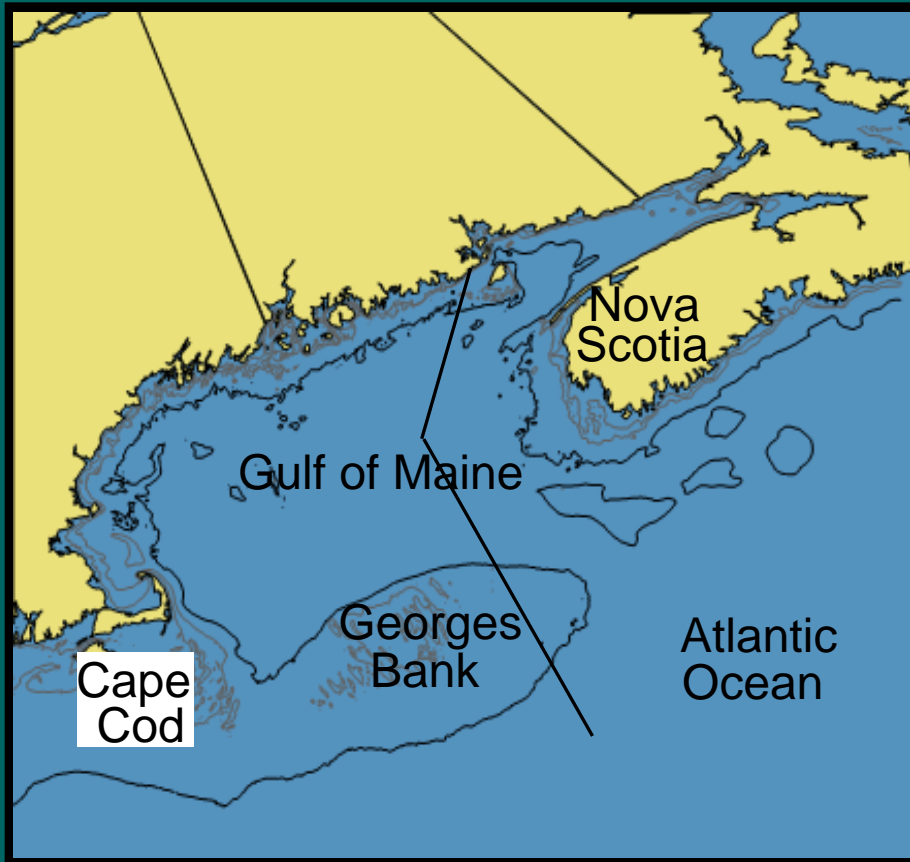
Considers entire ecosystem, including humans

- Protect ecosystem structure, functioning, and processes
- Place-based focus on ecosystem and activities
- Interconnections – ecological and human

# Research objectives

- To characterize the understanding and perception of EBM among fisheries stakeholders in the Gulf of Maine region
- To identify elements of governance structures that may be necessary to support EBM in the region

# Gulf of Maine and its fisheries



# Study description

- 6 stakeholder groups
  - fishery managers
  - fishery scientists
  - commercial fishermen  
(groundfish and lobster)
  - recreational fishermen
  - aquaculturists
  - environmental groups
- interviewees selected via snowball sampling
- pilot interviews
- 40 interviews
  - 6-8 interviews per stakeholder group
  - 25 US interviewees, 15 Canadian interviewees

# Study description

## Interview topics:

- characteristics of good management
- understanding of EBM
- management process needs for EBM
- perceptions of ecosystem change
- goals and priorities for ecosystem
- concerns related to ecosystem

# Stakeholder views on EBM in the Gulf of Maine

Four major axes of perspectives on EBM:

1. **Scope:** EBFM  EBM

2. **Focus:** bio/ecocentric  anthropocentric

3. **Management structure:**  
top down  bottom up

4. **Input to management:**  
science  stakeholders

# Scope of ecosystem-based management

EBFM ← → EBM

- More than half of respondents focused on EBFM
  - Interest in incorporating predator-prey interactions
  - Concern about mandates to maintain multiple stocks at MSY simultaneously
  - Concern about by-catch and habitat effects of fishing
  - Some mention of MPAs but not common focus
  - Prevalent position among US scientists, US and Canadian commercial fishermen, some recreational fishermen and environmental group representatives

# Scope of ecosystem-based management



- Relatively few respondents solely focused on EBM, but cross-sectoral considerations mentioned in many interviews
  - Common interest in considering water quality
  - EBFM will be component of EBM
  - Most familiar to Canadian interviewees (managers, scientists, commercial fishermen)
  - Commonly discussed by US managers and aquaculturists

# Focus of ecosystem-based management

Bio/ecocentric  Anthropocentric

“...The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need....”

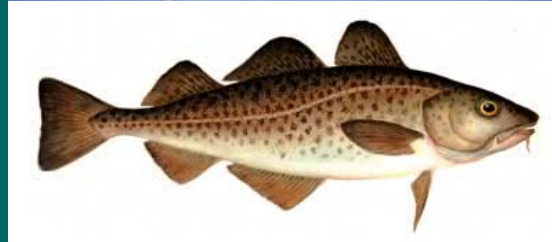
--Scientific Consensus Statement on Marine Ecosystem-Based Management  
(McLeod *et al.* 2005)

# Focus of ecosystem-based management

Bio/ecocentric ← → Anthropocentric

Focus on:

- Maintaining features of interest in ecosystem
- Maintaining all components of ecosystem
- Restoring ecosystem features to some historic reference point



# Focus of ecosystem-based management

Bio/ecocentric ← → Anthropocentric



Focus on:

- Maintaining services derived from ecosystem
- Maintaining human communities as important part of ecosystems
- Resilience of ecosystems exceeds that of human communities



# Management structure for EBM

Top down ← → Bottom up

- Regional council approach suggested by Pew Commission and US Commission on Ocean Policy
- Authority centralized to DFO by Oceans Act in Canada
- Many jurisdictional boundaries and issue-specific authorities, centralized management structure advantageous
- Greater support for top-down structure among Canadian than US interviewees

# Management structure for EBM

Top down ← → Bottom up



- Skepticism of additional layer of bureaucracy that may be created by regional authority
  - additional burdens on existing agencies
  - management agencies already pushed to limit
  - another cultural dynamic in management arena
- No one agency or jurisdiction has full authority to manage oceans
  - represent different stakeholders
  - need to work together *collaboratively* (or *in partnership*) without mandate to report to new authority

# Input to management

Science  Stakeholders

- Recognition that both scientific information and stakeholder input are important to management currently and to ecosystem-based management
  - Both ranked as 'important' or 'very important' among most interviewees

# Input to management



- EBM as information- and data-intensive process
  - multi-component models
  - fishery ecosystem plans
  - ecosystem objectives
  - ecosystem indicators
- Solid grounding in science-based process will simplify trade-offs

# Input to management



- Use stakeholder knowledge to enhance available information
- Scientific information alone will not provide full guidance to managers
  - stakeholder priorities shape objectives
  - balancing objectives is subjective, not scientific, process
- Focus on content of stakeholder input, not number of people involved or comments received
  - advisory panels

# Summary and implications

- Understanding and perceptions of EBM are not identical across or within stakeholder groups in the Gulf of Maine
- Diversity of opinions on the scope, goals, management structure, and information inputs for EBM
- General agreement that scientific information and stakeholder input both shape EBM
- Cannot assume that everyone understands EBM to mean the same thing
  - Avoid talking past one another
- “If we don’t swing, we can’t hit!”
  - Cannot expect to “get it right” the first time, but we have to get started

# Acknowledgements

- All of the interviewees who participated in this research
- Advisors:
  - Mark Bain
  - Patrick Sullivan
  - Wendy Gabriel
- Funding sources:
  - NMFS-Sea Grant Population Dynamics Fellowship
  - Heinz Foundation Scholarship for Environmental Research
  - Edna Bailey Sussman Fund
  - Mellon student research grant
  - Seaspaces Inc.
  - Cornell University Graduate School
  - Einaudi Center for International Studies
  - Skinner Award