Information Needs Supporting Ecosystem-Based Management

- Characteristics of Ecosystem Approaches to Management (EAM)
- A Science Strategy Supporting EAM
- The President’s Ocean Action Plan and EAM

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There is no manual for what we are attempting!

How to Implement Ecosystem Management

Ecosystem Approaches to Mgt.
NOAA Working Definitions for EAM*

• An ecosystem is a *geographically specified* system of organisms (including humans), the environment, and the processes that control its dynamics.

• Characteristics of EAM are:
  
  - *geographically specified*,
  
  - adaptive,
  
  - incremental,
  
  - takes account of ecosystem knowledge and uncertainties,
  
  - considers multiple external influences, and
  
  - strives to balance diverse social objectives

* NOAA’s Ecosystem Goal Team (EGT)
Operational Objectives for EAM

1. Develop broad Stakeholder-Based Governance system
2. Conserve essential Parts of the ecosystem
3. Conserve essential ecosystem Processes

Question, if (2) is done well, is (3) necessary?

Many Recent Publications Proposing General Objectives for EAM, EBM
Ecosystem Mandates: A Paradigm Shift or Evolution?

**Current Mandates**
- Individual Species
- Narrow Perspective & Scale
- Human Activities Evaluated for Individual activities
- Resource Management by Sectors
- Scientific Monitoring programs Focused narrowly
- Single Use and Purpose Observations

**Focus on Managing Ecosystem parts**

**Future Mandates**
- Multiple Species
- Broad Perspective & Scale
- Humans Integral to Ecosystem
- Integrated Resource Management
- Adaptive Management Based On Scientific Monitoring
- Shared and Standardized Observations

**Focus on Ecosystem Relationships, Processes, and Tradeoffs**
Develop Ecosystem Governance System

- **Manage Tradeoffs**
  - among fisheries sectors, optimize fishery benefits, prevent sequential depletion/effort transfer, use management processes that are fair, equitable and transparent, consider cumulative impacts, evaluate impacts of non-fishery sectors, include diverse stakeholder views

- **Use Adaptive Approaches to Management**
  - consider multiple causes for observed changes and sources of uncertainty in assessment & prediction, reverse burden of proof where consequences are great, imbed experiments in management approaches to increase ecosystem knowledge

- **Establish Appropriate Ecosystem Boundaries**
  - allows for interconnections between adjacent ecosystems, allows for imports and exports, includes multiple spatial scales depending on issue - paradox of scale
Elements of Regional Ecosystem Governance

Fishery Management (council, state, state Commissions, International agreements)

Protected Resource Management (MMPA, ESA, Birds Etc.)

Water Quality Management (EPA, states, etc.)

Coastal & EEZ Modifications (COE, MMS, etc.)

Other management authorities for navigation, food quality/safety, International agreements, climate change, etc.

Need for coordination
Conserve & Manage Ecosystem Parts

- **Conserve and Manage Species**
  - Target species, assemblages, non-target species, PET* species, biodiversity protection

- **Minimize Bycatch**
  - Target, non-target & PET species, and minimize waste

* PET = Protected, Endangered or Threatened Species
Account for Ecosystem Processes

- Evaluate & Inform Feedback Effects
  - predator-prey relationships, gear impacts on habitat productivity, irreversibility of fishing impacts, harvesting-induced regime change

- Maintain Ecosystem Productivity, Balance Ecosystem Structure
  - evaluate ecosystem carrying capacity, maintain resilience/resistance to perturbations, attain trophic balance

- Account for Climate Variability
  - low-frequency variation (decadal scale changes), High-frequency variation (year-to-year or more frequent), climate-based regime change