National Oceanic and Atmospheric Administration:

Implementing an Ecosystem Approach to Management

Recommendations from an External Ecosystem Task Team Review
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Overview

- Definition of Ecosystem approaches to management
- NOAA organization and issues
- Expert reviews and recommendations to make progress

Definitions

Ecosystem-based fisheries management (EBFM) – an *approach that takes major ecosystem components and services into account in managing fisheries*.

- Its goal is to sustain biological communities and marine ecosystems at high levels of productivity and biological diversity so as not to jeopardize a wide range of ***goods and services*** from marine ecosystems while providing food, revenues and recreation for humans.

National Research Council. 1998. Sustaining marine fisheries. National Academies Press, Washington, DC.

Definitions

Ecosystem services – benefits that people receive from ecosystems.

- **Provisioning Services – products obtained**: food, water, fuel, fiber, biochemicals, genetic resources
- **Regulating Services – benefits from regulation**: climate, disease, water purification
- **Cultural Services – non-material benefits**: spiritual, recreational, ecotourism, aesthetic, educational
- **Supporting Services – necessary for production of all other ecosystem services**: primary production, nutrient cycling, ecological value, sustaining conditions for life on earth

What is the definition of an ecosystem approach to management?

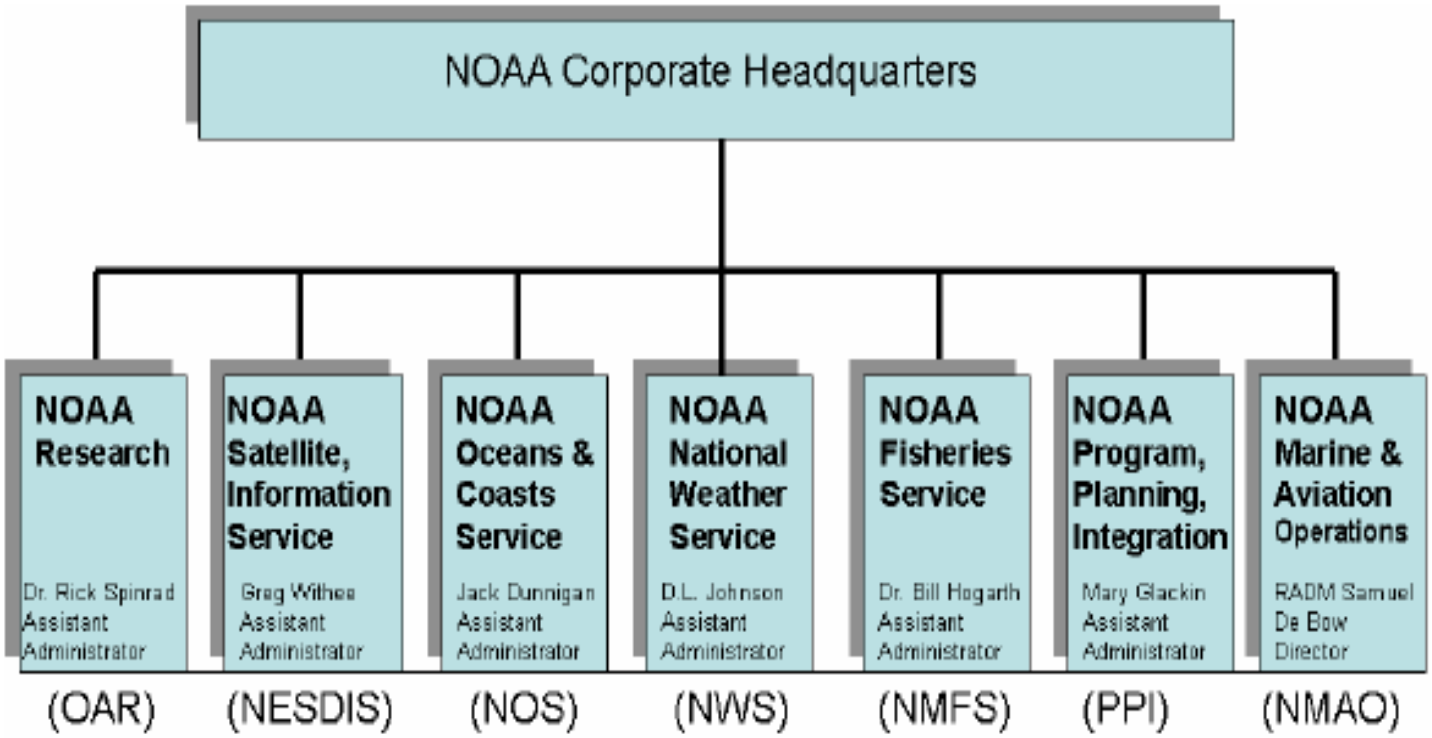
NOAA defines an ecosystem approach to management as one that is:

- Adaptive
- Regionally directed
- Takes account of ecosystem knowledge
- Takes account of uncertainty
- Considers multiple external influences
- Strives to balance diverse societal objectives

NOAA's Challenge to Implement EAM

- NOAA has many line offices each with specific mission
- Ecosystem approach requires expertise, information from several line offices, other governmental agencies, universities
- Development of Goal Teams within NOAA
- External Ecosystem Task Team review
- National Research Council Review

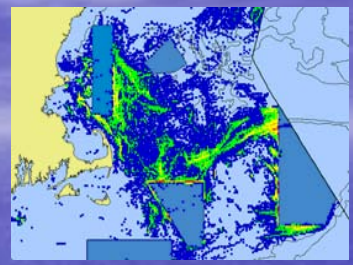
Figure II.C.1. NOAA's line office structure supporting ecosystem, climate, weather and water, and commerce and transportation, and mission support activities



Source: Mike Ford, NOAA

NOAA's Ecosystem Goal Team (EGT) Programs

Fisheries Management



Enforcement

Coastal and Marine Resources

Corals

Protected Species

Aquaculture

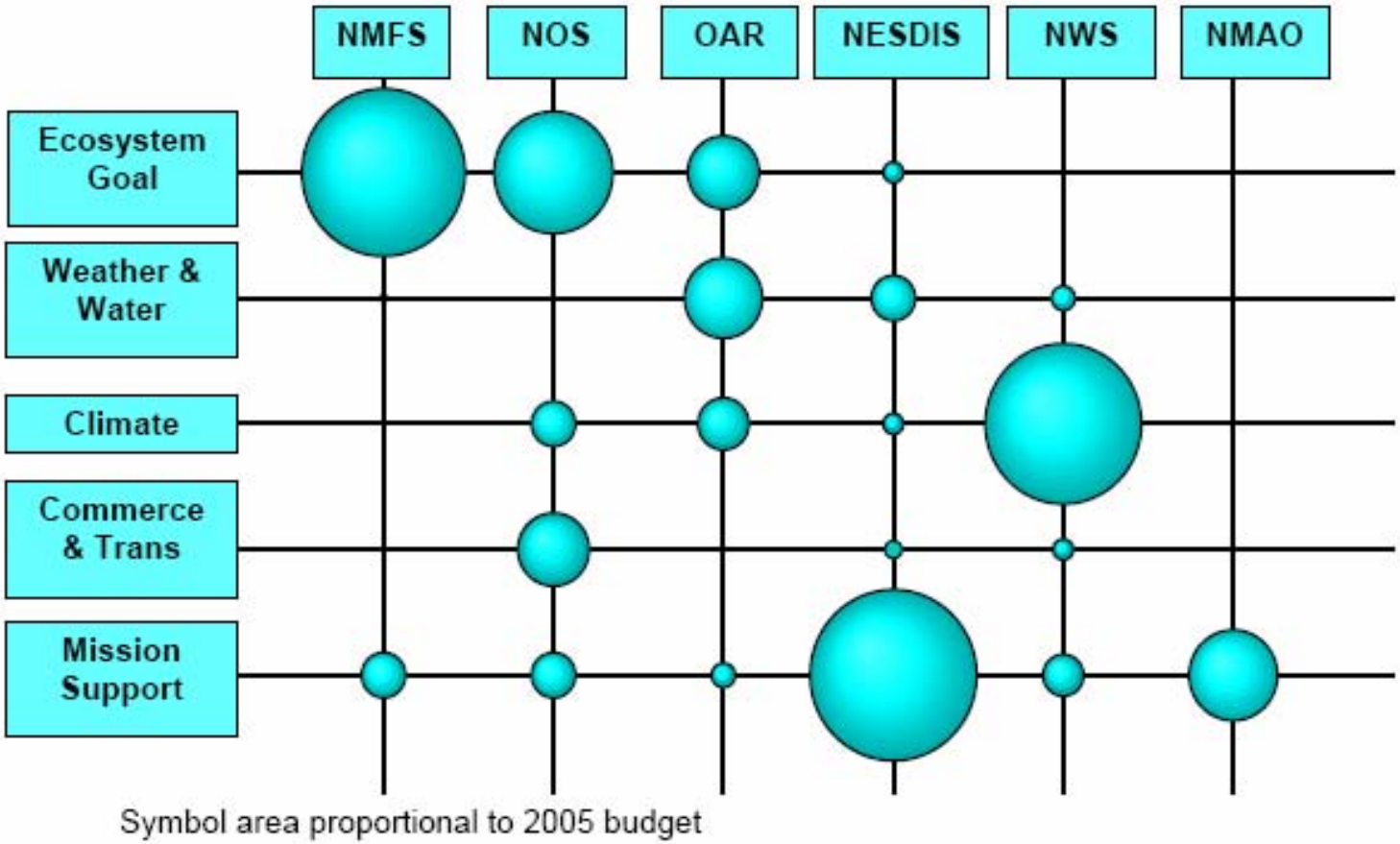
Ecosystem Research

Habitat

Ecosystem Observations

Source: Murawski 2006

Figure II.C.2. NOAA's matrix structure integrating line offices and goal teams



Source: Mike Ford, NOAA

Implementation Issues

- Structural: tendency for separation by scientific specialty at all levels of organization
- Insufficient policy mandate: no overarching Oceans Act
- Lack of resources

Purpose of NOAA's External Ecosystem Task Team Review

- Evaluate mix of scientific activities
  - Subject matter
  - Long-term research vs. products for immediate use
  - Internal vs. external
  - Links to international science programs
- Recommend organization of ecosystem research
  - Relative to non-ecosystem science activities (weather, mapping, etc.)
  - Continuum from long term research to information products
  - Line office distribution

Other Issues

- Separation of science from management
- Separating long-term high risk research from short term science
- Gaps in NOAA's ecosystem enterprise
- Overlap in products and services across line offices

Consolidating Current Plans for Ecosystem Science Enterprise

- **RECOMMENDATION 1. NOAA should describe adequately "ecosystem rich" assessments and advice for products of its ecosystem science enterprise.**
- **RECOMMENDATION 2. NOAA should prepare "ecosystem development plans" for its assessment and advisory activities within each Region.**
- **RECOMMENDATION 3: NOAA should develop a national vision for ecosystem science and services based on regional plans.**

eETT RECOMMENDS INTEGRATED ECOSYSTEM ASSESSMENTS AS THE WAY FORWARD

- Regionally based Integrated Ecosystem Assessments (IEAs), conveying information on the status of ecosystem health and evaluating the impacts of current and proposed human activities should be the central products of NOAA ecosystem science.

Integrated Ecosystem Assessments

- Periodic assessment of ecosystem status that considers sustainability of human uses
- Involve a wide variety of stakeholders and agencies
- Forum for integration of information from broad spectrum of sources
- Use these data for collaborative, synthesis activities

Text Box. What is meant by an "integrated assessment?" Integrated ecosystem assessments (IEAs) are a tool to bring information sources together – organized geographically and supporting a diverse set of stakeholder needs. Ecosystem assessments are intended to do the following:

- Compile and archive all relevant data sets for a defined ecosystem, including physical oceanography, atmospheric climatological and weather observations, human use patterns and statistics, abundance and distribution of biological resources.
- Report on current conditions and trends in relevant data time series of physical, biological and human use information
- Synthesize time series information to link important ecological outcomes to changes in relevant climate and human use drivers, as a basis for forecasting
- Evaluate data time series to provide suites of key indicators of ecosystem state (status), and utilize time series data and modeling results to propose reference levels for the desired state of marine ecosystems
- Forecast the relationship between state indicators and pressure indicators (e.g., pollution, climate change, fishing-related removals, coastal development, etc.) in order to inform the development of management options for marine ecosystems.
- Provide periodic ecosystem assessment updates to inform the managers, stakeholders and the public on the state of marine ecosystems and management options to achieve societal goals and targets, including social science aspects relevant to decision making.

Common Focus for NOAA's Ecosystem Science Enterprise

RECOMMENDATION 4: NOAA's Ecosystem Goal Team should lead and participate in the development of Integrated Ecosystem Assessments (IEAs) for all ecosystems in which NOAA has a statutory or trust responsibility.

IEAs are of great significance as:

- the integrating product of NOAA's (and partners') ecosystem science efforts,
- the common core product for clients of NOAA's ecosystem science

Strengthening the Regional Focus for NOAA Ecosystem Science

RECOMMENDATION 5: NOAA leadership should commit to supplying ecosystem-science support on a regional basis.

RECOMMENDATION 6: NOAA should specify that the eight regional Ecosystems it has defined should be the starting points for coordinating regional ecosystem science and assessments.


Alaska Ecosystem Complex
Great Lakes
Northeast Shelf
Southeast Shelf
California Current
Gulf of Mexico
Caribbean Sea
Pacific Islands Ecosystem Complex
Legend
NOAA Regional Ecosystems
US EEZ
States
NOAA
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WHAT CAPABILITIES ARE NEEDED?

Regions must have core capabilities (competence and capacity) in:

- Monitoring
- Analysis
- Integration

ENSURING CORE CAPABILITIES (reliability of structures & data sources)

RECOMMENDATION 7: NOAA must formally structure those partnerships that are important to the science capability to perform integrated regional assessments

RECOMMENDATION 8: The Ecosystem Goal Team should lead all Line Offices and Goal Teams in developing a national plan for an expanded regional ecosystem monitoring capability.

ENSURING CORE CAPABILITIES (competence & capacity)

- **RECOMMENDATION 9: The NOAA social science plan should specify required monitoring data and develop a strategy to ensure such data are available.**
- **RECOMMENDATION 10: NOAA should develop a national plan to organize, archive, and distribute data needed to track, forecast and understand social change in regional ecosystems.**
- **RECOMMENDATION 11: The capabilities to analyze status and trends in populations, habitats, and human activities need to be sustained and expanded at the regional scale.**

ENSURING CORE CAPABILITIES (forecasting and risk assessments)

- **RECOMMENDATION 12: NOAA should expand capacity in forecasting trajectories of ecosystem components under different hypotheses for environmental and anthropogenic forcing and link these forecasts to potential consequences for resource users, coastal residents, and management options.**

CAPABILITIES NEEDED NATIONALLY

RECOMMENDATION 13: NOAA & partners should develop or designate Centers of Specialized Expertise:

- **to build new tools for modeling & forecasting, and new observation instruments**
- **to develop social science capacity for linking ecosystem science with ecosystems governance,**
- **to develop an understanding of society and its response to changing ecosystem components,**
- **to identify changes in ecosystem structure and function,**
- **to quantify effects of human activities on the ecosystem.**

CAPABILITIES NEEDED NATIONALLY

RECOMMENDATION 14: NOAA should consider whether consolidation of efforts should occur and should develop plans for efficient regional and inter-regional coordination in the following areas:

- **technical analyses on contaminants and toxicology,**
- **biodiversity and taxonomy,**
- **data archiving and integration**

Management / Governance of the Regional Ecosystem Science Enterprise

RECOMMENDATION 15.

- **NOAA should develop Regional Ecosystem Science Boards**
  - **Chaired by an SES-level manager**
  - **Formal representation by all Line Offices providing ecosystem sciences**
  - **Board duties should include planning, coordinating and executing comprehensive plans of marine ecosystem science, and oversight for the production of integrated ecosystem assessments.**

eETT OVERALL CONCLUSION AND RECOMMENDATION

- NOAA must make Integrated Ecosystem Assessments its normal mode for the status of marine ecosystems and for evaluating options for human uses of ecosystems.
- The Integrated Ecosystem Assessments require structured, accountable collaboration among multiple Line Offices, with science partners and with clients of ecosystem products and services.
- Some parts of this transition in science and management are underway. To do all requires support for increased resources.

Strategic Areas for New Investment

- New tools for modeling and forecasting
- Social science methods for linking ecosystem science to governance
- Identifying how humans respond to changes in ecosystems
- Methods for assessing and defining optimal ecosystem structure and function
- Ecosystem roles of toxics and contaminants
- Biodiversity and taxonomy to support an ecosystem approach
- Data archiving and integration
- Ecosystem impacts of human activities

TIMELINE – FAST TRACK

Start – SAB approves report and submits to NOAA

Preparatory Phase. Months 0-6.

Launch Phase. Months 7-12.

Initial Work Phase. Months 13-18.

Integrated Analysis and Reporting Phase. Months 18-24

ALL PHASES REQUIRE COMMUNICATION AND ENGAGEMENT WITH CLIENTS & PARTNERS