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SYNOPSIS
of
Strategic Guidance for Implementing an Ecosystem-based Approach
to
Fisheries Management

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In July 2001, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) and the Atlantic States Marine Fisheries Commission (ASMFC) joined forces to prepare a guidance document designed to assist fisheries management move towards the use of an ecosystem-based approach in resource management. In order to be in compliance with the Federal Advisory Committee Act (1971), the effort was carried out under the auspices of the Marine Fisheries Advisory Committee (MAFAC). The process relied on input from members of an interdisciplinary Technical Committee under the guidance of an interagency Ecosystem Approach Task Force, led by W.-Dieter N. Busch (ASMFC and NMFS contractor), Bonnie L. Brown (Virginia Commonwealth University), and Garry F. Mayer (NOAA Fisheries/HC). Initial input and guidance were obtained through a workshop. The resulting document underwent extensive editing as well as intramural and extramural peer review. Concepts from the document were presented in a special symposium of the American Fisheries Society 2002 annual meeting and at a number of other conferences and workshops.

The report, *Strategic Guidance for Implementing an Ecosystem-based Approach to Fisheries Management*, was completed and accepted by MAFAC in May. The text of the report may be obtained from the MAFAC web page, or from my web page identified above. Selected topics from the *Strategic Guidance* are summarized below.

Policy Challenges

The development of the *Strategic Guidance* builds on the process started by the Interagency Ecosystem Management Task Force¹ and the Ecosystem Principles Advisory Panel². The ecosystem-based approach is a return to the holistic philosophy expressed in the *public trust doctrine*³ and in the resource husbandry promoted by the concept known as *traditional knowledge*. The ecosystem-based approach reemphasizes these guiding principles; all who use or *take* the natural resources must also *take care of* them. However, since the responsibility of caring for resources has been separated and assigned to various governmental agencies at the state and federal levels, the task of moving towards an ecosystem-based approach in fisheries management faces numerous obstacles.

Some perceive that use of an ecosystem-based approach to fisheries management requires such a great deal of new information and may change management so drastically that it can not be advanced at this time. The Fisheries Management Councils (FMCs) acknowledged that more data and direction are needed and expressed concern that the estimated cost of implementing ecosystem-based management would be high if the activity was mandated to be accomplished quickly and comprehensively. However, a more pragmatic view was also expressed by some of the FMCs—i.e., that moving towards the use of an ecosystem-based approach “is a process and can be started regardless of the level of information on hand.”⁴

Key Concepts

Specific activities that are part of the main structure for moving towards use of an ecosystem-based approach include:

1. Identification of the geographic area to be managed, its boundaries, and the mapped inventory of its major characteristics (as available).

Delineating Geographic Area(s) of the Ecosystem - Most management units are identified by political boundaries. However, to delineate ecosystem boundaries, it will be important to identify the geographic ranges/areas using ecological metrics. Political boundaries usually do not match ecological boundaries, leaving the management and assessment of a system disjointed. This problem is compounded because jurisdictions and mandates operate at different temporal and spatial scales (e.g., local, state, and federal management systems). Ecosystem-based initiatives may need to include significant focus on the current condition, restoration (if needed), and sustainability of ecological parameters within the geographic area of responsibility. This would be in addition to the more common focus on sustainability of individual fish populations.

Delineating ecosystems or subsystems at various user-defined scales requires a hierarchical approach. It is reasonable to start with the Large Marine Ecosystem classification and step the area down as necessary using metrics such as:

- Natural physical boundaries such as those of an estuary.
- Range of key species and the physical conditions that limit this range.
- Political boundaries of responsible jurisdictions.

2. Setting goals with reference to the larger environment, including ecosystem parameters or environmental conditions (e.g., water quality) that limit fishery management options. The guidance also includes the identification of specific elements/indicators and their application to describing the goals and objectives of the desired future conditions/settings of the specific geographic area to be managed.

Public support and understanding will be improved when management decisions connected to achieving desired resources goals and objectives are clear, are based on quality information, and require management accountability. Accountability requires specific goals and quantifiable objectives. Such accountability is coming into use for terrestrial natural resource management but is not yet common in aquatic resource management.

Therefore, the *Strategic Guidance* suggests the following:

- Use an open and public process, guided by historic resource structure and limitations, to develop general goals and specific objectives that describe the “desired future condition” of the ecosystem and its major component parts.
- Identify and define tolerance limits for the evolving or functional ecosystem within an acceptable range of fluctuations similar to the natural historic fluctuations.
- Develop a process for evolving policy, direction, and resource objectives as well as an institutional process for implementation strategies, integrating inputs, and evaluating outcomes.

The process of determining the goals and objectives (future desired conditions) of an ecosystem-approach to marine fisheries management requires the use of measurable characteristics related to structure, composition or functioning of the ecological system.⁵ Because ecosystems are dynamic and can be unpredictable, a precautionary approach must be implemented to accommodate natural variability, our incomplete understanding of ecosystem structure and function, and other uncertainties encountered in setting ecosystem reference points and in assessing the direct and indirect effects of anthropogenic stressors, including fishing, on natural ecosystems.⁶ Once selected, the effectiveness of these indicator characteristics in identifying, describing, and conserving ecosystems and their natural resources must be reviewed with respect to uncertainties and unpredictability of responses to management actions. The following criteria should be considered:

- Indicators for robust and resilient single species, multi-species, and/or the more holistic ecologically functioning eco-reach.
- Descriptors or metrics that are easily understood (e.g., desired age depth, size range, geographic distribution, and abundance for species).

- Needed/required habitat areas of particular concern to support important life history functions.

Characteristics of desirable ecosystem indicators include:

- Be reasonably simple to compute and understand,
- Have an intuitively reasonable interpretation,
- Be discussed in a comprehensive way (statistically, mathematically and/or ecologically),
- Have some appropriate foundation in terms of an ecological theory, statistics or mathematics, and
- Be applicable to marine ecosystems, including the open oceans, the EEZ and continental shelf, and the near-shore and its watersheds.

3. Instituting proactive interagency communication and coordination with other resource regulatory agencies. This includes becoming familiar with their available descriptive data for the specific eco-reach and sharing in future planning.

Successful implementation of ecosystem-based approaches will require unprecedented changes in approach and communication. An ecosystem approach is, by design, interdisciplinary and should benefit from the coordination and cooperation of numerous agencies at all levels of government.⁷ The good news is that many agencies already are collecting and processing information that would provide major building blocks for implementing an ecosystem approach. However, most marine resource agencies or departments within these agencies still focus mostly on their direct responsibilities. For example, in a recent U.S. state survey of fish and wildlife agencies, only 64 percent cooperated with their state's environmental agency.⁸ An exception is the biannual "National Coastal Condition Report"⁹, which is a start in interagency cooperation dealing with marine resources. The addition of a few more trends in physical habitat and biological resources would make it even more applicable.

- Focus on interactions among constituents, understanding of the problem, team building, and trust.
- Put emphasis on "coordination and cooperation" as opposed to "control."
- Access and incorporate local and regional expertise (regionalize).

Recommendations

The following are some the recommendations supported by MAFAC. They were provided to the Secretary of Commerce via the *Strategic Guidance* and/or in the cover letter and attachment.

- Evaluate a limited number of current Fishery Management Plans with regard to ecosystem issues (delineate boundaries; set natural resource goals; establish indicators for measuring ecosystem effects; compile social and economic data; establish interagency cooperation) and recommended management tools. The outcomes would include improved understanding of the more common ecosystem issues that are adequately included while also identifying those challenges that are not being addressed.

- Prepare a guidance document that describes ecosystem indicators and their recommended use and potential limitations through participation in the 2004 SCOR/IOC activities.

- Assist in the preparation of "desired" natural resources goals, based on historic conditions and abundance and modified by current irreversible and reversible constraints. A limited number of successful examples of proactive development of common resource goals and objectives, for select ecosystems or eco-reaches (estuaries) could greatly advance the implementation of an ecosystem-based approach to resource management.

- Assist in the preparation of one or more Fishery Ecosystem Plans (FEPs)(a comprehensive outline for preparation of an FEP is included in the *Strategic Guidance*). The FEP may be prepared at different scales such as on a broad scale for an LME or with more specific data for smaller geographic areas. The development of these FEPs should encourage the collection of all relevant information (biological, physical, and socioeconomic), processed through a logical sequence of analyses, leading to solid options.

➤ Assist/encourage the standardization of data collection and reporting for habitat inventories (Geographic Information System inventories and mapping of physical and chemical conditions and trends). GIS inventories are planned or underway for some offshore areas by NOAA Fisheries, NOS, and USGS. GIS mapping of coastal watersheds has been underway by USFWS.

➤ Regional interagency workshops may be needed to bring the various federal and state partners together in order to increase cooperation (to use the same “sheet of music”). In order for the *Strategic Guidance* to be as ecosystem-based as possible, it included information, assessment, and/or management topics that are the responsibilities of agencies other than NMFS. An ecosystem-based approach acknowledges the need for partnerships; interagency workshops can/should be used to bring them together. New efforts (data compilation and management, new field collections) can/should be identified and prioritized at these workshops for/by each cooperating agency.

➤ Through pilot projects, assist and encourage FMCs, states, and coastal commissions in the preparation of goals and objectives. The resource management agencies and the public will need assistance in setting the desired goals and quantifiable objectives, by eco-region. The objectives will need to reference life history metrics for key species, trophic guilds, or habitat important for supporting populations or communities.

Transition to ecosystem-based management benefits include, but are not limited to:

- Improve conserving natural resources and protecting biodiversity while optimizing social and economic benefits and minimizing negative social and economic impacts to communities.
- Improve public understanding of natural resource management; including public participation in the management process and in identifying required tradeoffs.
- Help bring fisheries management into compliance with existing and proposed laws because resource goals and objectives have been prepared to guide the restoration and maintenance of fish communities with respect to harvest effects, forage, and habitat, thereby reducing the incidence of unintended consequences of management.

¹ IEMTF (Interagency Ecosystem Management Task Force). 1995. The Ecosystem approach: Healthy ecosystems *and* Sustainable Economics. United States Department of Commerce, National Technical Information Service, PB95-265591.

² Ecosystems Principles Advisory Panel. 1999. Ecosystem-Based Fishery Management—A Report to Congress. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, MD. 55p.

³ Coastal States Organization, Inc. 1997. *Putting The Public Trust Doctrine To Work*, 2nd Edition. Prepared under contract with the Office of Ocean & Coastal Resource Management, NOAA by the Coastal States Organization, 376 p plus tables.

⁴ Busch, W.-D.N., M. Treadwell, L. Ross, and R.S. Jones. 2002. A Summary of Progress and Challenges in the use of an Ecosystem-based Approach for Marine Resource Management - with Responses or Comments from the NOAA Fisheries Management Councils to related Questions. Birch, Horton, Bittner, and Cherot. Washington DC. 25 p. plus 13 Appendices.

⁵ Boehlert, G.W. 1996. Biodiversity and the Sustainability of Marine Fisheries. *Oceanography* Vol 9, No. 1 pp 28-35.

⁶ Caddy, J. and H. Regier. 2002. Policies for Sustainable and Responsible Fisheries. In: M.K. Tolba (ed.), Vol. 4 Responding to global environmental change, pp. 343-351. In: T. Munn (Ed. In Chief) *Encyclopedia of Global Environmental Change*. John Wiley & Sons, Ltd. Chichester

⁷ Schrope, M. 2002. Troubled Waters. *Nature* 418:718-720.

⁸ Fisher, W.L. and J.P. Burroughs. 2003. Stream Fisheries Management in the United States: A Survey of State Agency Programs. *Fisheries* 28(2)10-18.

⁹ EPA. 2001. National Coastal Condition Report (Office of Research and Development/Office of Water, Washington, DC. 204p.