

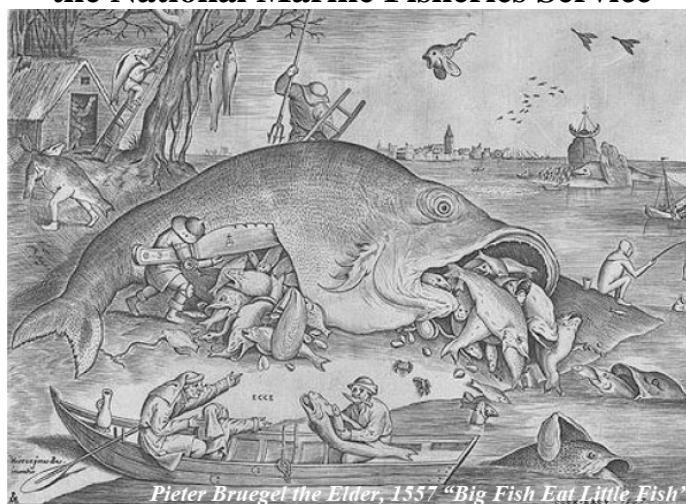
MAFMC - EVOLUTION TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES (EAF)



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Mid-Atlantic Fishery Management Council
in cooperation with
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EXECUTIVE SUMMARY

The Mid-Atlantic Fishery Management Council (along with the three other Atlantic Councils) was tasked by Congress in the FY-2004 appropriations to incorporate ecosystem considerations into fisheries management. The purpose of the Congressional outlay from the pilot program was to engage the four Councils and their constituencies in public debate on goal setting, the types of considerations to be included in ecosystem management and to identify issues not covered under existing authorities. The Council responded with a cooperative agreement application (Appendix A) to a statement of work (SOW) from the National Marine Fisheries Service (NMFS) which called for the Council to do five tasks: 1) public meetings with affected/interested parties, 2) attitudes/values survey, 3) identification of technical needs and of existing information, 4) synthesis of public input on ecosystem goals and objectives, and 5) final report. The production of this report meets task number five. This report is organized along the lines of the other four tasks where section 2 is the public meetings, section 3 is the attitudes/values survey, section 4 is the technical needs, and section 5 is the synthesis of the public input.

Much of the Council's cooperative agreement with NMFS called for the Council to undertake public meetings with stakeholder groups and interested parties "to facilitate wide-ranging discussions with affected/interested parties and the general public in nine topic areas: (1) views regarding the adequacy of current approaches for addressing ecosystem considerations, (2) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues, (3) the nature of the public decision making processes within the Councils for addressing management tradeoffs, consistent with identified goals, (4) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity, (5) the boundaries of sub-regional ecosystems within the areas of the various FMCs, (6) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals, (7) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP), (8) techniques for determining success of ecosystem-based management, and (9) other issues considered important in any particular region." The scoping meetings that were held in September and October 2005 focused on these nine topic areas.

There is a growing awareness that an ecosystem approach to fisheries (EAF) is important to the way we rethink fisheries management for the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research.

The U.S. Commission on Ocean Policy (USCOP 2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments

in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

The National Oceanic and Atmospheric Administration [NOAA; as well as the National Marine Fisheries Service (NMFS) within NOAA] have fully embraced the concept of EAF. The 2005 through 2010 strategic plan for NMFS has an objective to: "Protect, restore, and manage the use of the coastal and ocean resources through an ecosystem approach to management" (NOAA 2004).

The NMFS defines an ecosystem as: "a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics."

The Council began single-species fisheries management nearly 30 years ago with their very successful efforts for surfclams and it has 11 others species under their lead authority: ocean quahogs, Atlantic mackerel, butterfish, *Loligo* and *Illex* squid, summer flounder, scup, black sea bass, bluefish, dogfish, and most recently, tilefish. All of these species are being successfully rebuilt or are at their maximum sustainable yield level. The Mid-Atlantic Council is generally perceived as being responsible managers and as Roger Rufe (Executive Director of The Ocean Conservancy) pointed out in his scorecard at *Managing Our Nations Fisheries II* (Washington Conference March 2005) the MAFMC scored the highest of the east coast Councils.

At the March 2005 Washington conference, the Ecosystem Advisory Panel acknowledged that ending overfishing and getting fleet overcapacity under control would be effective first steps towards ecosystem management (section 2.4). Of the Council's 12 species, only summer flounder are experiencing overfishing, with the status of scup being "unknown" as of the NMFS 2004 Report to Congress (NOAA 2005). Only scup and butterfish are currently overfished, with the status of *Illex* squid and dogfish being "undefined" or "unknown" relative to being overfished. Thus the species that the Council manages are all at or near their target levels. The Council also has an ITQ program for surfclams and ocean quahogs and limited access for nearly all the other fisheries, thus preventing or limiting overcapacity.

During the evolution of the various FMPs the Council has amended its: Surfclam and Ocean Quahog FMP 13 times; Summer Flounder, Scup and Black Sea Bass FMP 13 times; Atlantic Mackerel, Squid and Butterfish FMP 9 times and the Bluefish FMP once. The Dogfish and Tilefish FMPs were recently implemented and are already undergoing management changes.

As the FMPs were amended they generally evolved from single-species to multi-species, and now many of the management issues facing the Council currently deal with ecosystem-type ideas. For example, the surfclam and ocean quahog FMP currently is dealing with the loss of the southern and inshore portion of the surfclam biomass which is most likely a function of global warming. For the Atlantic mackerel, *Loligo*, *Illex*, and butterfish FMP the Council is addressing bycatch issues in the *Loligo* and butterfish fisheries for scup, as well as, the fact that all four species are prey for marine mammals, highly migratory species, most fishes, and themselves. In the summer flounder, scup, and black sea bass FMP there are ecological issues of summer

flounder juveniles strongly associated with submerged aquatic vegetation which is very vulnerable to man-made disturbances in the estuaries. Bluefish and striped bass are competitors with an inverse relationship between the two. Finally, tilefish are structure-oriented and while an HAPC (habitat area of particular concern) has been identified, there are no gear restrictions.

Council management of our fishery resources has been based on the goals and objectives set through public participation under Magnuson-Stevens Act (MSA) and often times compromises have resulted in not the maximization of a certain parameter or output but rather the overall "optimizing" for society. Many of the current 10 National Standards that FMPs are required to meet under the MSA (i.e., 1 – overfishing, 2 – best science, 3 – managed as unit throughout its range, 5 – efficiency, 8 – communities, 9 – bycatch) and the essential fish habitat provisions require a more holistic approach that has evolved the fisheries management efforts towards EAF.

The evolution of the FMPs themselves has gone towards EAF as can readily be seen in the new Table of Contents for Amendment 9 to the Atlantic Mackerel, Squid and Butterfish FMP. The entire FMP is set up to meet the requirements of the National Environmental Policy Act (NEPA) where the major sections deal with the impacts of the alternatives to the targeted species, impacts to non-targeted (bycatch) species, impacts to habitat, impacts to protected resources, and social and economic impacts. Reviewing section 8 of the FMP, the "Cumulative Effects Assessment", one can see that the geographic and temporal boundaries are addressed in sections 8.2 and 8.3. "Ecosystems" are mentioned in the titles for sections 8.4, 8.5, 8.6, 8.7, and 8.8. As recently as 2003 when the Council's latest approved FMP (Surfclam and Ocean Quahog Amendment 13) was submitted, the word "ecosystem" did not appear in the Table of Contents.

PUBLIC MEETINGS

Extensive efforts to involve the public occurred throughout the Council's efforts under this cooperative agreement. Every Council meeting from August 2004 through March 2006 had a report from the Ecosystem Committee which updated the Council on EAF activities and allowed for public involvement (section 2.1). The Ecosystem Committee met at each Council meeting from August 2004 through March 2006 (section 2.2). Generally, the meetings lasted about two hours and occurred at the start of each of the three day Council meeting. The agenda (without all the attachments) and the summary minutes for each meeting are included in Appendix B.

The Council's Scientific and Statistical Committee (SSC) met in Philadelphia on August 30, 2005. Present at the meeting were SSC members: Dr. Jim Gilford, Dr. Cynthia Jones, Dr. Lee Anderson, Dr. Mark Holliday, Dr. Ed Houde, Dr. Mike Prager, Dr. Wendy Gabriel. Others: Dr. Gene Kray, Dr. Kristy Wallmo, Chad Demarest, and Dr. Mike Fogarty. This was a very important meeting and the summary meeting minutes are included in their entirety in section 2.3. The purpose of the meeting was to help Council and staff with initial advice and recommendations on how the Council could proceed with EAF after submittal of this final report in March 2006.

The March 2005 conference *Managing Our Nation's Fisheries II*, attracted about 600 people, including commercial and recreational fishermen and other fishing industry participants, fisheries managers, scientists, academics, environmental organizations, Congressional staffs, media, community leaders, regional Council members and staff, federal and state fisheries agency staff, and other interested members of the public.

The conference format was designed to reflect the open and deliberative process used by the Regional Fisheries Management Councils, and to obtain diverse perspectives on major issues and challenges. A main conference panel composed of Council representatives from each region, NMFS officials, representatives from the Interstate Fisheries Commissions, US Coast Guard, NOAA General Counsel, State Department, and US Fish and Wildlife Service, deliberated the recommendations from three Advisory Panels. The recommendations from these Advisory Panels were developed from presentations by invited experts, public comment, panel presentations, and thoughtful deliberations by panelists and committee members. The entirety of the Advisory Panel Report on Developing an Ecosystem Approach to Fisheries is included in section 2.4.

The NMFS held three workshops with their portion of the Congressional monies allocated to ecosystem efforts. There was a GIS workshop in Charleston in September 2004 (Executive Director Furlong and Dr. Hoff attended), a socio-economic workshop in Miami in December 2004 (Drs. Kray, Hoff, and Montanez, as well as, Ms. Lyons attended), and an ecosystem tools workshop in February 2005 (Dr. Hoff attended). The GIS and tools workshops have had websites developed on them and parts of them are included as Appendices C and D. The socio-economic workshop led to the NMFS' effort on the attitudes/values survey (section 3.0).

With the understanding that habitat is a crucial component of EAF, Dr. Hoff has maintained the Council's involvement with the Northeast Regional Essential Fish Habitat (EFH) Steering Committee. During the past 18 months this Steering Committee has organized workshops on nonfishing gear impacts to EFH (January 2005) and methodologies for identifying and describing EFH (June 2005). Staff has also served on a joint NEFSC and Sea Grant Program steering committee to hold a conference on GIS and Ocean Mapping in support of Fisheries Research and Management (April 2006). The former Council Chairman, Executive Director, and Senior Ecologist attended an invitational only meeting with Admiral Lautenbacher in which the Admiral shared his desires for ecosystem based fisheries and his reorganization of NOAA to that end (January 2005). Dr. Hoff participated in the national EFH coordinators meeting (April 2005). Finally, Dr. Hoff was one of four individuals (along with the ED of WPFMC, the ED of NPFMC, and the Deputy ED of SAFMC) selected to work with NMFS on the development of ecosystem guidelines during 2005.

During September and October 2005 the Council held 13 public scoping meeting (section 2.7). The Council's scoping document is Appendix E and the three other east coast Council's scoping documents are included in Appendix F. Appendix G provides all the names and addresses of participants that attended the 13 Mid-Atlantic public scoping meetings. Nine topic areas served

as the outline of the scoping document which was introduced by a statement, described in a brief narrative with questions asked which were intended to solicit responses from the public. These nine topic areas are listed below along with a summary of the responses and major issues elicited from the public.

1. Adequacy of current approaches for addressing ecosystem considerations.

In the course of the public meetings there was considerable discussion that the Council needs to attend more carefully to the issues of estuaries where many species spawn and develop. The habitat connection and gear impacts were mentioned often also. The predator/prey relationships and how they interact were also discussed at numerous meetings. Among both the recreational and commercial sectors, the reduction of bycatch was a topic suggested for more attention. A theme in the discussions was the shortage of data and how much is unknown at this time.

2. Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The clear message was that in order for the ecosystem to be preserved for the future, we must both conserve and manage. There were strong indications that the Council has done a good job in fisheries management, but that the range of management must reach to the headwaters for all the anthropogenic impacts. Marine Protected Areas (MPAs) were a major concern of the recreational fishermen commenting on this topic.

3. Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

There was strong consensus that the public should be involved in a scoping type process similar to these public meetings. Also, the Council process needs to be regional, deliberative and collaborative and that both conservation and management is the desired state. There was agreement that Regional Councils and NMFS should be advocates for the fish as well as advocates for protected, endangered and threatened species (PETS). Except for representatives of the environmental community, it was generally agreed that there was not a need for new Ecosystem Councils.

4. Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

There was general agreement from the participants that the Council will need to work with other agencies that are not now within their purview if this EAF is to succeed. Most participants felt that the Council was doing a good job in the management of fishing mortality and could engage these other agencies if empowered to do so. The environmental participants felt that Regional Ecosystem Councils would be necessary; however, the majority of the participants did not want a new layer of government on top of the fishery management process. All agreed that we must increase the public's level of awareness about these issues.

5. Boundaries of sub-regional ecosystems with the areas of the various Fishery Management Councils.

It is interesting to note that at ten of the locations of the scoping hearings, there was agreement from the participants that management should extend from the headwaters out to two hundred miles, except for the Philadelphia public meeting where participants wanted the Council to stay within their current jurisdiction, the EEZ, i.e., three to two hundred miles.

6. Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

It was stated on several occasions that there needs to be better monitoring of bycatch, both recreational and commercial if this ecosystem approach is to be successful. There also needs to be better documentation of habitat changes throughout the ecosystem. The Total Allowable Catch may need to be lowered in order to be "risk averse" in recognition of the importance of prey. The science of multispecies assessments is growing rapidly and models must be explored. Several participants indicated that the NEFMC approach has not been successful for single species management and that it may not work in an ecosystem-based approach either. Again there was consensus that the MAFMC model of management (i.e. hard quotas) seems to work.

7. Specific regional issues that need to be addressed in a fishery ecosystem plan [FEP]

There was overwhelming support for an umbrella-type Fishery Ecosystem Plan, but not at the expense of the current efforts of the Council. The public in general supported the 1999 EPAP Report to Congress (Appendix H) for the desirability of an FEP. That being said, there was serious concern about being able to move in this direction because of the paucity of data, skilled staff, and financial resources.

8. Techniques for determining success of ecosystem-based management.

There was support for the concept that success rests on the goals of EAF. Also if this approach is to work, there will be a need for improving the current stock assessment process. There will also be a need to develop new and better tools to assist the managers in their decision making process.

9. Other issues considered for our region.

Many participants suggested that what the Council is currently doing is best for now, but that they could start to take incremental steps towards EAF. There currently are inadequate data, and inadequate funds to begin to acquire these data, in order to make a quantum leap into EAF, but the continuing introduction of ecosystem considerations in the fishery management process will accrue and the ecosystem will be better for it. There was a loud call for keeping science at the forefront in this process.

ATTITUDES/VALUES SURVEY AND TECHNICAL NEEDS

When the Council initially submitted its Cooperative Agreement Application (Appendix A), it envisioned coordinating a small contract with an entity (perhaps a mid-Atlantic Sea Grant institute) to approach how to solicit the participation of the public in the envisioned attitudes/values survey called for in the NMFS SOW. However, when NMFS organized a social sciences workshop and committed to developing the attitudes/values survey, the Council saw no need for an outside contract. This social sciences workshop in November/December 2004 was attended by: Drs. Kray, Montanez and Hoff, as well as, Ms. Lyons.

The Ecosystem Committee was presented with the results of the social science workshop at their December 2004 meeting and commented on the approach to the project coordinator, Dr. Kristy Wallmo. In August 2005, staff helped organize for Dr. Wallmo a wide-ranging group of individuals who reviewed the survey and again offered comments. The survey development duration was extensive, mainly because of Paperwork Reduction Act issues and the impacts of Hurricane Katrina in the fall of 2005. Finally on February 28, 2006 the survey instrument was provided to the Council and is produced in section 3.1. The survey implementation will begin in March 2006. The NMFS anticipates preliminary results in April 2006. A full report is expected to be completed by the summer of 2006. Unfortunately, none of the results from this effort will be available for the completion of this Council report.

The data and information needs document that was developed at the NMFS sponsored Key Largo meeting (February 2005) on Ecosystem-Based Decision Support Tools for Fisheries Management is the best document compiled at this time on this topic. Dr. Hoff was one of the six authors of this report section which was peer-reviewed by the entire workshop with scientists from around the world. This workshop report section is included in its entirety in section 4.0. The NEFSC brochure entitled: *Ecology of the Northeast Continental Shelf* (Appendix I) that was produced in the fall of 2005 is a compilation of our technical knowledge for our Northeast US Large Marine Ecosystem.

CONCLUSIONS

In the beginning of this Executive Summary, we identified what the Council's past and present efforts have been towards an ecosystem approach to fisheries. The Ecosystem Committee requested in January 2006 that we speculate what ecosystem issues may not likely occur in the future (section 6.3). The lack of dedicated money will restrict further dedicated ecosystem efforts of the Mid-Atlantic Council. Monies for this pilot project have been exhausted. The vast majority of the public who participated in the public scoping meetings, the Ecosystem Committee, and the Council staff support the concept of an FEP development as a framework for organizing information about the structure and function of ecosystems, and for developing ways to enhance decision making when goals of single-species or fishery-by-fishery management approaches conflict. However, as is obvious, a significant amount of research money will be

needed for the development of an FEP. If Congress and the Agency desire to continue to move forward with an ecosystem approach to fisheries, it is logical that an FEP development would be one of the next steps.

The Mid-Atlantic Council strongly supports the conclusions of the Ecosystem Advisory Panel as presented in *Managing Our Nation's Fisheries II* (section 2.4). The main conference panel, which was comprised of all eight Regional Councils, the three Interstate Fisheries Commissions, NMFS officials, US Coast Guard, NOAA General Counsel, State Department, and US Fish and Wildlife Service also concurred with the Ecosystem Advisory Panel.

The Ecosystem Advisory Panel came to consensus on some overarching issues regarding an EAF. They endorsed the finding of many other science and management boards that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. In that regard, they endorsed a preference for the use of currently available tools and the resources and funding necessary to better engage those tools. Rather than endorsing wholly new mandates, the Panel favored an incremental approach that would allow managers to learn lessons from the pilot programs, and incorporate ecosystem considerations consonant with the activities of each region.

To that end, the Ecosystem Advisory Panel was insistent that Fishery Management Councils and regions need to retain the flexibility to be able to manage their regional fisheries. The concept of "standardization" is incompatible with the need for ecosystem approaches to reflect regional differences. Regional management has been the cornerstone of the Federal fishery management system since the inception of the Magnuson Act in 1976.

Finally, the Advisory Panel reinforced its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among Fishery Management Councils, NMFS, partner agencies and stakeholders.

The Mid-Atlantic Council again supports the position of the Ecosystem Advisory Panel as presented in *Managing Our Nation's Fisheries II* (section 2.4) as to the need for national guidance and whether to codify EAF in the Magnuson-Stevens Act. The Ecosystem Advisory Panel recommended that general guidance be developed and provided, and that it not be in the form of formal national technical guidelines or regulations that might limit the flexibility for regions to develop different strategies appropriate to their circumstances. Critics point to the essential fish habitat guidelines as an example of binding national guidelines that have changed the fishery management focus from habitat protection to the avoidance of legal challenge.

The Council believes that the process needs to be more evolutionary than revolutionary and that it will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability **and** productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders. The Council believes (as was identified by the Ecosystem Panel at the March 2005 conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering Committee for ecosystem goals and objectives. The Council reinforces its commitment to a collaborative and participatory process.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity. Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

The "Northeast U.S. Large Marine Ecosystem (LME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

The EPAP (1999) recommended the development of FEPs and the research to support them (Appendix H). The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council

believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

The Council fully supports the EPAP (1999) identified basic principles and goals which embody the key elements for ecosystem approaches to fisheries:

PRINCIPLES

- The ability to predict ecosystem behavior is limited.
- Ecosystems have real thresholds and limits which, when exceeded, can effect major system restructuring.
- Once thresholds and limits have been exceeded, changes can be irreversible.
- Diversity is important to ecosystem functioning.
- Multiple scales interact within and among ecosystems.
- Components of ecosystems are linked.
- Ecosystem boundaries are open.
- Ecosystems change with time.

GOAL

- Maintain ecosystem health and sustainability.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of the NEFSC into usable products for management.

The initial Congressional funds ran through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA as a surrogate for an ecosystem approach to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the non-targeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

TABLE OF CONTENTS

COVER.....	1
EXECUTIVE SUMMARY	1
TABLE OF CONTENTS.....	11
1.0 INTRODUCTION	13
1.1 Ecosystem Approach to Fisheries Management (EAF)	15
1.2 MAFMC Current Management	15
1.3 Nine Topic Areas for Discussion at the Scoping Meetings	17
2.0 PUBLIC MEETINGS	20
2.1 Council.....	20
2.2 Ecosystem Committee	20
2.3 MAFMC Scientific and Statistical Committee	22
2.4 Managing Our Nation's Fisheries II.....	34
2.5 NMFS Workshop.....	41
2.6 Staff Involvement with Other Ecosystem Efforts.....	41
2.7 Public Scoping Meetings Summarized By Location	41
3.0 ATTITUDES/VALUES SURVEY.....	117
3.1 NMFS March 2006 Survey.....	119
4.0 TECHNICAL NEEDS	132
5.0 SYNTHESIS OF PUBLIC INPUT.....	140
5.1 Adequacy of Current Approach.....	140
5.2 Nature of Management and Goals	146
5.3 Nature of Public Decision Making	151
5.4 Activities outside Council Purview	155
5.5 Boundaries of Sub-regional Ecosystems	159
5.6 Types of Management Measures	162
5.7 Specific Regional Issues	165
5.8 Techniques for Determining Success.....	168
5.9 Other Regional Issues	171
6.0 MAFMC CONCLUSIONS.....	177
6.1 Council Efforts on Ecosystem Approaches to Fisheries in the Past	177
6.2 Current Council Efforts on Ecosystem Approaches to Fisheries.....	177

6.3 Ecosystem Approaches to Fisheries that the Council Can Not Do Presently.....	178
6.4 Council Support for Advisory Panel Report on Developing EAF.....	179
6.5 Council View on Necessity of Ecosystem Guidelines.....	180
6.6 Council Summary of Nine Topics Covered at Scoping Meetings.....	181
6.7 Overall Council Conclusions on Ecosystem Approaches to Fisheries.....	183
7.0 REFERENCES	186
8.0 ACRONMYS.....	187

APPENDICES:

A. COOPERATIVE AGREEMENT APPLICATION.....	
B. ECOSYSTEM COMMITTEE MEETINGS MEMOS AND MINUTES.....	
C. GIS WORKSHOP -- Table of Contents, Executive Summary, Staff Presentation.....	
D. ECOSYSTEM TOOLS WORKSHOP – Agenda, Working Groups, Staff Presentation.....	
E. MAFMC SCOPING DOCUMENT	
F. SCOPING DOCUMENTS FOR OTHER EAST COAST COUNCILS.....	
G. NAMES AND ADDRESSES OF PARTICIPANTS AT SCOPING MEETINGS	
H. ECOSYSTEM-BASED FISHERY MANAGEMENT REPORT TO CONGRESS	
I. ECOLOGY OF THE NORTHEAST CONTINENTAL SHELF.....	
J. AMENDMENT 9 SQUID/MACKEREL/BUTTERFISH – TOC and Cumulative Impacts	

1.0 INTRODUCTION

The Mid-Atlantic Fishery Management Council (along with the three other Atlantic Councils) was tasked by Congress in the FY-2004 appropriations to incorporate ecosystem considerations into fisheries management. The purpose of the Congressional outlay for the pilot program was to engage the four Councils and their constituencies in public debate on goal setting, the types of considerations to be included in ecosystem management and to identify issues not covered under existing authorities. The Council responded with a cooperative agreement application (Appendix A) to a statement of work (SOW) from the National Marine Fisheries Service (NMFS) which called for the Council to do five tasks: 1) public meetings with affected/interested parties, 2) attitudes/values survey, 3) identification of technical needs and of existing information, 4) synthesis of public input on ecosystem goals and objectives, and 5) final report. The production of this report meets task number five. This report is organized along the lines of the other four tasks where section 2 is the public meetings, section 3 is the attitudes/values survey, section 4 is the technical needs and section 5 is the synthesis of the public input.

The NMFS' facilitated Council involvement throughout the Council's development efforts addressing ecosystem approaches to fisheries (EAF). Greater public involvement in ecosystem-based goal setting as well as the development of management plans, technical information, and management decision support tools (such as more sophisticated models and GIS systems for depicting and analyzing ecosystem interactions) has been and continues to be needed.

To better address ecosystem interactions that influence FMP species, the NMFS Ecosystems Principles Advisory Panel (EPAP 1999 and Appendix H) provided a number of recommended goals, policies and operational steps that would allow ecosystem considerations to be melded into the approaches currently used by the Councils. Chief among the recommended steps was the development of umbrella FEPs for each region. This pilot project provided a timely way to gather public input regarding the goals and objectives to be accomplished through FEPs. The intent of the FEPs (as given in the Ecosystem Principles Advisory Report) is to provide a framework for organizing information about the structure and function of ecosystems, and for developing ways to enhance decision making when goals of single-species or fishery-by-fishery management approaches conflict. Development of the FEPs as identified in EPAP (1999) requires at least eight operational steps:

- (1) delineate the geographic extent of ecosystems,
- (2) develop a conceptual model of the food web,
- (3) describe habitat needs of different life history stages for all plants and animals,
- (4) calculate total removals, and show how they relate to biomass, production and trophic structure,
- (5) assess how uncertainty is characterized and what kind of buffers are to be included in management,

- (6) develop indices of ecosystem health as targets for management,
- (7) describe available long-term monitoring data, and
- (8) assess ecological, human and institutional elements, which affect fisheries and are outside Council/DOC authority.

Not all these actions could be accomplished with the limited available pilot project funding. The pilot project laid the groundwork for developing ecosystem approaches to fisheries goals and objectives, and for consideration of implementing an FEP, with emphasis on public involvement in goal setting and needs assessment.

About four years ago, the MAFMC combined its former Ecosystems Committee, Habitat Committee and Comprehensive Management Committee into one Committee which at the outset of this project, in July 2004, was called the Fishery Issues Focus Committee. That Committee was renamed the Ecosystem Committee and its efforts refocused for this pilot project. This Committee met at every Council meeting over the course of the project (section 2.2 and Appendix B). The Council initially planned to rely on its Scientific and Statistical Committee (SSC) to initiate the identification of technical needs and existing information (section 2.3), however the Ecosystem Tools Workshop addressed those technical needs and the NEFSC identified the current level of knowledge in the brochure *Ecology of the Northeast Continental Shelf* (Appendix I). The Council's SSC is comprised of experts in population dynamics, ecology, economics, social anthropology, and data collection -- all of which will be needed for an ecosystem approach to fisheries management. This effort was coordinated with work at the NEFSC. Initially the Council anticipated coordinating a small contract with an entity (perhaps a mid-Atlantic Sea Grant institute) to approach how to solicit the participation of the public in the envisioned attitudes/values survey. However, when NMFS organized a social sciences workshop (section 3), and committed to developing the attitudes/value survey, the Council saw no need for an outside contract.

Much of the Council's cooperative agreement with NMFS called for the Council to undertake public meetings with stakeholder groups and interested parties "to facilitate wide-ranging discussions with affected/interested parties and the general public in nine topic areas: (1) views regarding the adequacy of current approaches for addressing ecosystem considerations, (2) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues, (3) the nature of the public decision making processes within the Councils for addressing management tradeoffs, consistent with identified goals, (4) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity, (5) the boundaries of sub-regional ecosystems within the areas of the various FMCs, (6) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals, (7) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP), (8) techniques for determining success of ecosystem-based management, and (9) other issues considered important in any particular region." The scoping meetings that were held in September and October 2005 focused on these nine topic areas which had a series of questions associated with each area (Appendix E).

1.1 Ecosystem Approach to Fisheries Management (EAF)

There is a growing awareness that EAF is important to the way we rethink fisheries management for the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research.

The U.S. Commission on Ocean Policy (USCOP 2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

The National Oceanic and Atmospheric Administration [NOAA; as well as the National Marine Fisheries Service (NMFS) within NOAA] have fully embraced the concept of EAF. The 2005 through 2010 strategic plan for NMFS has an objective to: "Protect, restore, and manage the use of the coastal and ocean resources through an ecosystem approach to management" (NOAA 2004).

The NMFS defines an ecosystem as: "a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics."

When Congress last re-authorized the Magnuson-Stevens Act (MSA) in 1996, it required the eight regional Councils and NMFS to account for bycatch, protect habitat, and improve monitoring and research. Also established in 1996 by Congress was an Ecosystems Principles Advisory Panel (EPAP). This EPAP was charged to review the extent to which ecosystem principles are incorporated in fishery management and research, and recommend management and research activities that would integrate ecosystem principles (EPAP 1999). In addition to proposing comprehensive principles, goals, and policies for fishery management, the EPAP recommended the development of Fishery Ecosystem Plans (FEPs) and research to support them.

A comprehensive ecosystem approach to fisheries management would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. An initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem (EPAP 1999).

1.2 MAFMC Current Management

The Council began single-species fisheries management nearly 30 years ago with their now very

successful efforts for surfclams and it has 11 others species under their lead authority: ocean quahogs, Atlantic mackerel, butterfish, *Loligo* and *Illex* squid, summer flounder, scup, black sea bass, bluefish, dogfish, and most recently, tilefish. All of these species are being successfully rebuilt or are at their maximum sustainable yield. The Mid-Atlantic Council is generally perceived as being responsible managers and as Roger Rufe (Executive Director of The Ocean Conservancy) pointed out in his scorecard at *Managing Our Nations Fisheries II* (Washington Conference March 2005) the MAFMC scored the highest of the east coast Councils.

At the March 2005 Washington conference, the Ecosystem Advisory Panel acknowledged that ending overfishing and getting fleet overcapacity under control would be effective first steps towards ecosystem management (section 2.4). Of the Council's 12 species, only summer flounder are experiencing overfishing, with the status of scup being "unknown" as of the NMFS 2004 Report to Congress (NOAA 2005). Only scup and butterfish are currently overfished, with the status of *Illex* squid and dogfish being "undefined" or "unknown" relative to being overfished. Thus the species that the Council manages are all at or near their target levels. The Council also has an ITQ program for surfclams and ocean quahogs and limited access for nearly all the other fisheries, thus preventing or limiting overcapacity.

During the evolution of the various FMPs the Council has amended its: Surfclam and Ocean Quahog FMP 13 times; Summer Flounder, Scup and Black Sea Bass FMP 13 times; Atlantic Mackerel, Squid and Butterfish FMP 9 times and the Bluefish FMP once. The Dogfish and Tilefish FMPs were recently implemented and are already undergoing management changes.

As the FMPs were amended they generally evolved from single-species to multi-species, and now many of the management issues facing the Council currently deal with ecosystem-type ideas. For example, the surfclam and ocean quahog FMP currently is dealing with the loss of the southern and inshore portion of the surfclam biomass which is most likely a function of global warming. For the Atlantic mackerel, *Loligo*, *Illex*, and butterfish FMP the Council is addressing bycatch issues in the *Loligo* and butterfish fisheries for scup, as well as, the fact that all four species are prey for marine mammals, highly migratory species, most fishes, and themselves. In the summer flounder, scup, and black sea bass FMP there are ecological issues of summer flounder juveniles strongly associated with submerged aquatic vegetation which is very vulnerable to man-made disturbances in the estuaries. Bluefish and striped bass are competitors with an inverse relationship between the two. Finally, tilefish are structure-oriented and while an HAPC (habitat area of particular concern) has been identified, there are no gear restrictions.

Council management of our fishery resources has been based on the goals and objectives set through public participation under MSA and often times compromises have resulted in not the maximization of a certain parameter or output but rather the overall "optimizing" for society. Many of the current 10 National Standards that FMPs are required to meet under the MSA (i.e., 1– overfishing, 2 – best science, 3 – managed as unit throughout its range, 5 – efficiency, 8 – communities, 9 – bycatch) and the essential fish habitat provisions require a more holistic approach that has evolved the fisheries management efforts towards EAF.

The evolution of the FMPs themselves has gone towards EAF as can readily be seen in the new Table of Contents for Amendment 9 to the Atlantic Mackerel, Squid and Butterfish FMP (Appendix J). The entire FMP is set up to meet the requirements of the National Environmental Policy Act (NEPA) where the major sections deal with the impacts of the alternatives to the targeted species, impacts to non-targeted (bycatch) species, impacts to habitat, impacts to protected resources, and social and economic impacts. Reviewing section 8 of the FMP, the "Cumulative Effects Assessment", one can see that the geographic and temporal boundaries are addressed in sections 8.2 and 8.3. "Ecosystems" are mentioned in the titles for sections 8.4, 8.5, 8.6, 8.7, and 8.8. As recently as 2003 when the Council's latest approved FMP (Surfclam and Ocean Quahog Amendment 13) was submitted, the word "ecosystem" did not appear in the Table of Contents.

1.3 Nine Topic Areas for Discussion at the Scoping Meetings

The following nine topic areas were required by the SOW (Appendix A) in order to engage the public and were the basis of the 13 scoping meetings (section 2.7). The two questions associated with each of the nine topics are not listed here. The entire scoping document can be found in Appendix E.

1.3.1 Adequacy of current approaches for addressing ecosystem considerations.

The Council believes that the process needs to be more evolutionary than revolutionary and will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

1.3.2 Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability **and** productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

1.3.3 Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders – fishermen, mineral extractors, energy producers, aquaculture, transportation, etc. The Council believes (as was identified by the Ecosystem Panel at the March 2005 Washington conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering

Committee for ecosystem goals and objectives. The Council reinforces its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among various Councils, NMFS, partner agencies, and stakeholders.

1.3.4 Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity. Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

1.3.5 Boundaries of sub-regional ecosystems with the areas of the various FMCs.

The "Northeast U.S. Large Marine Ecosystem (LME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

1.3.6 Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

1.3.7 Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

The EPAP (1999) recommended the development of FEPs and the research to support them. The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals

are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

1.3.8 Techniques for determining success of ecosystem-based management.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of NMFS into usable products for management.

1.3.9 Other issues considered important for our region.

The initial Congressional funds run through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA (question 7) as a surrogate for ecosystem-approaches to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the non-targeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

2.0 PUBLIC MEETINGS

2.1 Council

Every Council meeting from August 2004 through March 2006 had a report from the Ecosystem Committee which updated the Council on Ecosystem Approaches to Fisheries activities and allowed for public involvement. These Council meetings occurred at the following dates and locations:

- August 12, 2004 – Baltimore, MD
- October 7, 2004 – Ronkonkoma, NY
- December 9, 2004 – Wilmington, DE
- January 20, 2005 – Hampton, VA
- March 17, 2005 – Kill Devil Hills, NC
- May 5, 2005 – Ocean City, MD
- June 16, 2005 – Wilmington, DE
- August 10, 2005 – Philadelphia, PA
- October 6, 2005 – Southampton, NY
- December 7, 2005 – Atlantic City, NJ
- January 18, 2006 – Annapolis, MD
- March 16, 2006 – Cape May, NJ

2.2 Ecosystem Committee

The Ecosystem Committee met at each Council meeting from August 2004 through March 2006. Generally, the meetings lasted about two hours and occurred at the start of each of the three day Council meeting. The agenda (without all the attachments) and the summary minutes for each meeting are included in Appendix B.

The first Ecosystem Committee meeting was held on August 12, 2004. The Committee was briefed on the Cooperative Agreement with NMFS for this project, reviewed Dr. Steve Murawski's slides on the overall ecosystem efforts of the Agency, and discussed both the GIS workshop and social sciences workshop. The Pew Commission report had just been released and many people expressed concerns about available information and knowledge in relation to the concept of moving towards EAF.

The second Committee meeting occurred October 4, 2004. The staff ecologist reviewed the GIS workshop that was held in Charleston, SC in September that he and the Executive Director attended. The majority of the meeting was devoted to Dr. Murawski's presentation on NMFS's ecosystem efforts. There were significant, lively interactions with Dr. Murawski as to where he envisioned ecosystem efforts heading and whether there were to be monies available after these initial grants.

The third Committee meeting occurred December 7, 2004. Mr. Keith Bickers of NMFS Headquarters and Mr. Ken Buja from NOS in Silver Spring presented on the status of GIS capabilities and their applications for fisheries management. Both individuals had participated in the September GIS Ecosystem workshop. These individuals described the various data layers/sets that already exist and demonstrated how geographic type information could benefit the Committee. Dr. Kristy Wallmo (NMFS headquarters) then gave a presentation on the prior week's workshop on social science and ecosystem management that was held in Miami. Dr. Kray, Dr. Montanez, Ms. Shannon Lyons, and Dr. Hoff represented the Council at the Miami workshop. Dr. Wallmo's survey was designed to fulfill the requirements for the four Council's to involve the public as to their values and attitudes towards ecosystem approaches to fisheries management (section 3).

The fourth Committee meeting occurred January 20, 2005. Dr. Mike Fogarty, Project Director for Ecosystem Based Fisheries Management at the NEFSC, gave a very informative presentation on the types of information that the NEFSC can provide in order to aid in the decision-making process and in shaping the evolution of ecosystem-based approaches. Dr. Roger Locandro, formerly of Rutgers University and a three time appointed MAFMC member reviewed our Council's previous efforts involving ecosystem management.

The fifth Committee meeting occurred March 15, 2005. Mr. Derek Orner of NOAA's Chesapeake Bay Office presented an overview of the ecosystem efforts in Chesapeake Bay. Several individuals commented that the ecosystem efforts in Chesapeake Bay are not necessarily limited by the science but by the political will of those involved. The second part of the meeting discussed the Ecosystem-Based Decision Support Tools for Fisheries Management workshop that occurred in Key Largo in February and the draft data needs document (section 4) that staff was involved in drafting. The final issue dealt with the draft document for the conference on *Managing Our Nation's Fisheries II*.

The sixth Committee meeting occurred May 4, 2005. All of the I&E presentations were completed in the previous four meetings and the Committee began to wrestle with ways to solicit information from the affected/interested parties as to what they perceive the goals and objectives of ecosystem approaches to fisheries management should be. This meeting was the first time that it was identified that continuation of monies for Council ecosystem activities may not be likely.

At the sixth Committee meeting on June 15, 2005, the only item was a review of the first draft of the public scoping meetings document. Unfortunately, the staff ecologist was unable to attend due to a family death. Committee comments on the first draft indicated quite a ways to go before the document was ready for public distribution.

At the seventh meeting on August 10, 2005 the Committee reviewed the third draft of the public scoping meetings document. Changes were suggested, but everyone supported scheduling the public meetings in September and October so that the final report could be submitted to NMFS in March 2006. There was significant discussion about the Attitudes/Values Survey of Dr.

Kristy Wallmo, and while everyone recognized its importance for engaging the public, it was decided not to delay our efforts because of our March 2006 deadline.

At the eighth Committee meeting on October 4, 2005 Council staff reviewed the first four public meetings. There was significant discussion about the Scientific and Statistical Committees meeting where they discussed ecosystem efforts (section 2.3). There was also a very well attended scoping meeting that night.

At the ninth Committee meeting on December 6, 2005, Dr. Hoff reviewed the public hearing comments from all 13 meetings (section 2.7). The Committee was also presented with the synthesis of all the public input (section 5.0). Many people expressed concerns that there was not better attendance (only around 100 people in total, Appendix G). There was recognition that monies for ecosystem efforts for the Councils are unlikely in near-term budgets.

The Committee met for the tenth time on January 17, 2006. Most of the meeting was spent on the draft outline of this report. Many very useful comments were received and included in the final report.

The Committee met for the final time on this ecosystem approaches to fisheries cooperative agreement on March 14. The report to NMFS was approved and was submitted prior to the deadline of March 31, 2006.

2.3 MAFMC Scientific and Statistical Committee

The Council's Scientific and Statistical Committee (SSC) met in Philadelphia on August 30, 2005. Present at the meeting were SSC members: Dr. Jim Gilford, Dr. Cynthia Jones, Dr. Lee Anderson, Dr. Mark Holliday, Dr. Ed Houde, Dr. Mike Prager, Dr. Wendy Gabriel. Others: Dr. Gene Kray, Dr. Kristy Wallmo, Chad Demarest, and Dr. Mike Fogarty. Staff present: Dr. Tom Hoff, Jan Saunders, Kathy Collins, and Dan Furlong. This was a very important meeting and the summary meeting minutes are included below.

The purpose of the meeting is to help Council and staff with initial advice and recommendations on how the Council could proceed with ecosystem based management after next March. Agenda items for this meeting: 1) is to inform members of what the Council has done on ecosystems and 2) to get SSC advice and specific issues Council would like to get info on.

Dr. Hoff - The report to the Service next March will mostly focus on five topics we have identified in our Statement of Work, engaging the public in the public meetings, the Attitudes/Value Survey, technical needs, synthesis of public input, and production of final report. Kristy Wallmo's Values and Attitudes Survey will be out to the public soon. The report will not be a Fisheries Ecosystems Plan. It might be a recommendation the Council will move. We need pros and cons of either having an FEP or folding it into existing fishery management plans.

Dr. Gilford - In the event the Council moves towards ecosystem based management, what

approach will they use? With all the interest in ecosystem based management, it is going to be inevitable. It is going to be a direct program or built into existing plans.

Dr. Houde - Moving from single species plans that have moved into multi-species plans (for example SMB Plan) - it is still single species management. The MAC has done well with single species management.

Dr. Holliday - Do you think the Council and the Committee are clear on what the target is for an ecosystem based approach? Is there still a debate what it is, what the Councils are asked to consider? You are anticipating going out soon to convey the message that everyone understands. Need to define what are your goals and objectives for ecosystems at large?

Dr. Hoff - Over the last year in the 7 or 8 Ecosystems Committee meetings, many of the Committee members have begun to understand ecosystem approach. Would not say everybody is on board with understanding.

Dr. Gilford - The question Mark asked is, is it clear what Council has expected of them. There are a lot of questions about ecosystems based management. What are we expected to do, what can we do?

Dr. Hoff - Included in the briefing package is Jack Dunnigan's report, it was helpful. There has got to be some direction and there has to be monies. Money dictates that path. Not sure there is a clear consistent message in the agency.

Dr. Holliday - There is an objective of answering what ecosystems based fishery management will look like. How will it be different? Doesn't require a boat load of money to do that. When describing evolving into it, there are background papers. Doesn't think Reauthorization of Magnuson is going to come with new appropriations for money to do it. What can we do to improve scope of factors affecting living marine resources? Managing LNG platforms and windfarms - we have no authority to regulate them. Agency has a view of it, but Magnuson is very plain and there is no requirement to do ecosystems anything. There is no mandate, requirement, or time frame. It is a gradual addition of ecosystem considerations in the process you have already been using.

Dr. Gilford - Sees anxiety within Council. What happens when Congress says YOU WILL DO IT. No doubt that a Council member is concerned over details. How much do we have to do with things we don't have to do with? Are we going to be tasked with the undoable?

Dr. Holliday - Administrations view is not to propose anything that would result in an unfunded mandate. We don't in an Administrative objective want to have to be held to something that we cannot support scientifically. The discussions and debates on reauthorization - no one is in favor of proposing an unfunded mandate. We may need some pilot programs. There is recognition for people on the ground. Taking this into account, we need to make sure we can answer questions of what we can accomplish. How different will it look from what we are doing now?

Dr. Gilford - Thinks there is a group that believes there will be FEP plans.

Dr. Kray - in early discussions of the process, he remembers when Dr. Steve Murawski was at the Council meeting in October 2004, and was asked when we will know we have an ecosystems plan. Dr. Murawski commented that it is evolutionary. It will evolve. You will not have an ecosystem plan, but will be rolled into existing plans as we move along. Not sure if that has changed.

Dr. Anderson - The term "Ecosystem Plan" scares him. Ecosystem approach to fisheries management is a better term. He thinks it is doable.

Dr. Houde - Thinks people moved away from "Ecosystem Plan". Ecosystem approaches and ecosystem plans are different.

Dr. Gilford - It is not ecosystem management - it is approaches.

Mr. Demarest - General strategy for NEC, they have allocated funds similarly to MAC. Starting in Oct to Nov. a white paper was drafted for LNG terminals and windfarms around NE area. The purpose of the paper was to give Council insight into the difficulty of regulating. One thing was clear; Council has a role as the public through NEPA process. If public wanted to participate and comment on more stringent things, then NEPA process itself is best avenue in developing and understanding memorandums. We hired a grad student to look into detailing coastal pollution and impacts particular on marine fisheries and impacts on fisheries ecosystems. The paper will be presented at the NEC November Council meeting. It generated a lot of interest. People have been talking a lot about impacts of pollution. Also hired a person who is doing their dissertation on ecosystems. There will be 10 meetings from ME to CT. We have talked about ecosystems and constraints on small areas. Try to become more involved in non fishing impacts and ways to incorporate changes into FMPs. Ecosystem science and ecosystem governance - regarding the science side, we are not paying as much attention to as other Councils. People are going to be able to see a difference from single species plans and ecosystems approaches. Can help inform Service on science issues. Would like to discuss how can stakeholder input best be targeted to move forward? Need to figure out who stakeholders are. We have learned there are more people in ME on their mailing list than anywhere else. A lot of that comes from lobsters. We are going to look for gaps where we know there are those who would be interested but we do not have addresses. What can stakeholders provide to us - physical and biological areas where they fish, where they see changes in fishing practices, biology, etc? Expanding of management - new objectives, biodiversity, or managing under different units. Try to expand single species paradigm. How can you recognize trade based management with a highly mobile fleet? On the FEP - thinks it is really not that bad, it is a strategic document. It would be a purpose document. NE would probably welcome it.

Dr. Holliday - There is maximum flexibility of using an FEP. There is no right answer; Councils have to figure out what works best. There is some reference in the Committee minutes of new

interactions with NE and MA - what is the intersection of the two Councils with respect to an ecosystems approach?

Mr. Demarest - Right now it is Tom Hoff and I talking.

Dr. Hoff - New England management is effort driven. The MA is quota driven. The MA has been very successful with single species management because of hard quotas and effort limitations. NE might be more successful in ecosystem management because they are effort driven.

Dr. Wallmo - The Attitudes/Values survey is related to the ecosystem pilot project. Technically it is not an ecosystem pilot project. Process has been interesting and challenging. It has been a collaborative process. We held a workshop back in November of last year. It was very hard to design a survey to measure stakeholder's interest at that time. Ended up with an instrument that only a small section asks about ecosystem approaches. We have tried to use elements of ecosystem management without telling them that this is an ecosystem approach. Expect to get OMB clearance to get survey out soon. The sampling frame is for fisheries stakeholders. Sample some of the mediated stakeholders which would be more informed than others. Good time to do survey - before we have gotten full throttle into it. We have gone far into this management. Presentation that was given at MA meeting in December, has changed.

Dr. Houde - Would like some examples of questions that are in the survey.

Dr. Wallmo - Each region had its own part of the survey. The difference is there is a section in the survey trying to engage what people think of current management system and those of select stocks. We have tried to figure out what people are going to trade-off in order to have something else. The five topic areas:

Intro - typical survey demo questions - do you participate in coastal activities, fishing activities

Second section: current fisheries management, what people think of current condition of stock?

Next section: preference on managing fisheries - asked how important things are to them.

Next section: ecosystem section- defining it - asking people what they think of it and how it might help

Last Section: more demographic information.

NEFSC ACTIVITIES

Dr. Fogarty - Reality is that most people know us for our stock assessment work. We want to try to provide information for stakeholders. We have given a number of presentations. Objective is to try to let people know what we think we understand of functioning of elements of Continental Shelf. We need to figure out how to get information out to others - have developed a brochure to distribute. It tries to lay out some of the principal components. Focuses on spatial and temporal patterns in each component. We have some very dramatic differences in different parts of the Shelf. Trying to make some of these points available to a broader audience. The next phase is intended to serve two purposes; we are putting together an ecosystems web page. Can go to site

and get information of different elements. Serves purpose of providing background of FEP for Continental Shelf. Designing it so we can extract certain sections out of it. We are currently reevaluating subregions that might be considered management units. Currently working on a program of EMAX - models for different areas for the Shelf, models that look at forage based predators. Have done the most work on herring. Assembling software tools for multi species modeling. We have 4 models in that system - hoping to have half a dozen by end of the year. If it is the decision to go forward with ecosystem management, we can begin evaluating management policies.

Dr. Wallmo - How are you going to distribute brochure?

Dr. Fogarty - Hope to have it available at scoping meetings. Production process is taking longer than anticipated. Might have to go out in a subsequent mailing. Will be available on the web before scoping process.

Dr. Houde - How does this work serve Chad's purpose?

Dr. Fogarty - I am trying to talk to Tom and Chad regularly. Trying to understand emerging needs from Council perspective. The people's perception of what ecosystem approach to management is still forming. Want to incorporate exchange of ideas by providing what information we have and other sources of information.

Dr. Houde - The Council's concern is they are worried about demands of Service and money.

Dr. Fogarty - Benefit would be recognition that we have got elements of an ecosystem approach in place from a number of different mandates and other elements either Endangered Species Act or MMPA. There are properties of the system that are different. We want to know what harvesting will do to the system. By looking at the past and looking at elements in place, what exactly would we do?

Mr. Demarest - Asked about review of multi-species models that are on agenda for November SARC?

Dr. Fogarty - At the center there has been a fair bit of multi species modeling. The types of models run from aggregate production models to more detailed models that try to model interactions. Exact choices for models have not been considered yet.

Dr. Gabriel - Focus will be on biogeography. We cannot take on everything at once. Thinks that will be less debatable because of more information.

Dr. Holliday - Any extension of model into social science side? Competing objectives, leave in place, retract it?

Dr. Fogarty - For the web site, there is a pretty extensive model on social science. It is a critical part. Trying to marry anthropology and economics.

CHARGES TO COMMITTEE

Dr. Gilford - Looking at the way the Service has restructured itself and the budget, there is going to be a great deal of interest in ecosystem approach based management. Seems we are doing a lot of groundwork to move in the right direction. Survey seems to have 2 functions: 1) to find out how stakeholders feel and how it will impact management, and 2) to find out areas of where ignorances are and bring stakeholders up to the point where they would understand. Appears we are not talking about interest in EFP being developed, there is the question of building up incrementally. This will be an additional burden on Councils for priorities.

Dr. Houde - Wouldn't the Council use it as a tactical plan to manage directly? Good way to develop a strategy.

Dr. Gilford - Does it seem reasonable that Council begin involvement with overall view rather than try to build from the bottom up?

Dr. Prager - Number of ways to proceed. One is represented by the suite of the 8 items in the EPAP document and incorporates them into FMPs. The other is to start at the other end of single species and multi species plans and identify areas where there are ecosystem principles that have not yet been recognized. That is probably more of the technical approach. Such issues as predator/prey and habitat could be looked at. The latter approach might be more manageable in shorter term and with smaller budget needs.

Dr. Anderson - NOAA's definition using the word "adaptive" - thinks it is appropriate. Gradually expand out from our single species. Rather than set out the 8 items, take steps and keep evolving.

Dr. Gabriel - Concerns about data availability or unanswered questions, the way the Center collects data, it is on a whole group of species simultaneously, then take out as single species. Suggest when doing this, in terms of economy, one way is to take one species on an ecosystems basis and expand that into another data type. At the same time, you would answer single species questions. Don't have to do two species of an FMP - do an ecosystems species bycatch component. Take bycatch as a big blob and see who is taking what in each species. It is consistent with the way data are collected. Suggested to look at bycatch.

Dr. Fogarty - Usefulness for background sections of FMP are mapped in the 8 items from the EPAP. There is less in the last one regarding sectoral issues. In terms of thinking about broader strategic perspective, hoping to fulfill that with what we are going to send out.

Dr. Gilford - What would be helpful to the Council is that irrespective of how they get involved, whether looking at existing plans, what is the broad range of concerns they should be looking at. The Councils are users of the data - not gathers. Are there things on the list or not on the list the Councils should be looking at?

Dr. Holliday - One thing lacking in the list of 8 items is the reason for doing an ecosystem approach in the first place. The 8 items tell you what you can do. It doesn't get you to an outcome. In laying out a framework, would goals and objectives be met in employing steps? If don't have a discussion of setting up a goal or objective that incorporates ecosystem management, should consider why we are doing ecosystem approaches. We are looking for a different outcome. If cannot look at a different outcome, then no need to go forward. Everyone must be in agreement.

Dr. Jones - Spent a year and a half on a panel looking at Arctic Yukon salmon. We were helping interest groups build a research plan. We talked about how you approach doing that research. This isn't research, this is management. There are commonalities of doing research and planning to do management. Concern with ecosystem based approach as it is ill defined. Agrees that you need an overarching concept. What does ecosystem based management mean for MAC because it will be different than what NEC, GFM, SAC believes it is. One concern would be the concept of what does this mean to the MA region. NMFS has done much of the groundwork. In the context of what ecosystem based management would be, need to see where relevant data exist and where were there gaps. Need to look at what data are out there and what can be used. This is a task that could spin out in all kinds of unproductive ways. Have absolutely focused issues on doing an ecosystem plans. Need a good conceptual model.

Dr. Houde - Agrees with needing a good conceptual model. Thinks they are still lacking the word "structure" - community structure and habitat structure. It is those elements that need to be worked into a conceptual model.

Dr. Fogarty - You are forced to deal with trade-offs of management. Might be missing a large part of the story by not considering them. Need to address pathways. Would it mean amending FMPs? It has a lot of merit. The downside you would have to consider is it is adding on to complexities. Took Dr. Jones comments as a different way of approaching it. Looking at parts of the systems that are higher than the population. When moving from a strategic point of view to a tactical point of view.

Dr. Anderson - Trade-offs are critical. Concerned about structure and function, but not of and in themselves. Issue is what we are getting from this for uses of human kind. What we are doing now in single species would be best looked at? Would start research and go from there. What do we want, what are trade-offs and how do we go from there?

Dr. Gilford - Problem is Council doesn't do research. What would you tell the Council if the Service or Congress states that Councils will develop an FEP? Where do the Councils start? What do they do? If going to put together in some point of time an FEP, what are the elements needed to do the plan. The question the Council has to face - are they going to do ecosystem based approach and how are they going to do an overall program? If faced with requirement of developing an overall plan or piece by piece, what are they going to do?

Mr. Demarest - There is a lot of guidance out there for Councils with current budgetary constraints. It may not be ideal, but the groundwork has been laid. One of the big changes going down the road is that Councils need to identify an objective. That factor in trade-offs and structure.

Dr. Holliday - Reason NMFS divided up monies was that this was the first step necessary. If resiliency is not an important attribute, then we don't need to worry about it. Maybe we don't want to broaden it. We need to see what we are concerned about in the broader sense. There is some sequencing in what needs to be done. They have got to be applied to what is important to the constituents of the MA.

Dr. Houde - Was convinced that the plan has some appeal and value. It does need to be adaptive to certain areas. We would look at SMB Plan and say bycatch issues are important.

Dr. Prager - Doesn't see anything wrong or frightening in developing document of side effects of fishing or extended effects of fishing and applying that to single species FMPs. Doesn't think you need to study every aspect of the food chain.

Dr. Houde - Need relatively little work to meet the standards from the EPAP. Other issues may require more.

Dr. Anderson - To answer what is it going to look like, this thing "adaptive", doesn't think you want to define what it is. It is adaptive. Let's work on it piece by piece.

Dr. Gilford - The 8 items listed in the EPAP are not telling you what it looks like, it might tell you what the documents may look like. Sees what is closest to consensus is what advisory panel came up with. Going to be faced with single species management plans and moving them into ecosystem approach management. What do they look at, what do they begin with? Council needs some kind of guidance in order to move into this. They need to know where they start.

Dr. Gilford - Sees a consensus, need a set of objectives - is it going to be general?

Dr. Wallmo - If have this set of objectives the Council comes up with, then under objective, list trade-offs. Then could look at number 7 and inventory data and see if it will address trade-offs.

Dr. Anderson - Would go back to definition which considers multiple external influences. There are things that are external that are man made but NMFS and the Councils don't have control over. What affects us, how do we fix it?

Dr. Prager - Need answer to what are the Council's goals in wanting to do ecosystems approach management?

Dr. Holliday - Look at what is current condition of stocks you are managing. Look at important factors that are occurring on stocks in MA. There are effects on habitat. Can look at trade-off

issues and turn them into goals. Would look at species by species and look at commonalities.

Dr. Jones - Under MA guidance, most of the stocks are in some of the best conditions of the managed stocks in US, except dogfish are overfished. Need to look at what do you gain from managing with ecosystem based approach that you haven't already done. One of the drivers is external. Could also look at it as to what you have to gain in sustaining that management. What might happen with shifts of species? What do you do about stocks that are problematic and problems elsewhere that come into your spatial areas?

Dr. Anderson - If you say you cannot improve it then wouldn't push it. Would look at certain other things like if the criteria you are looking at are the best. Could there be other things that you are missing by looking at that?

Dr. Jones - Look at what is to be gained and focus on those cracks to continue to have excellent management.

Dr. Holliday - We are looking at a scope of potential outcomes beyond whether it is overfished. The effects of harvest, external issues. Perhaps people are not making the living they are looking to have. Council has to address if objectives are important and what are they looking for to improve them. If answer is we are meeting all objectives, then there is nothing to do. Need appropriate scope to flesh out current status of affairs and desired affairs. Doesn't think everyone would think that there isn't something that needs to be taken care of. Look at biological reference points.

Dr. Houde - Council is managing in the way of single species biological reference points. They are looking good. The predator/prey issues - menhaden problems - want to define what appropriate biomass of predator/prey is to sustain forage service of menhaden stock. Might want to think capacity to store or move nutrients out of Chesapeake Bay; something other than just reference points.

Dr. Kray - Sees 4 options: 1) developing an overarching ecosystem plan for all species, 2) should we develop one for each FMP, 3) should we do nothing, 4) developing a multi species plan with ecosystem management tied to it.

Dr. Houde - Is "no option" a viable alternative?

Dr. Kray - Doesn't think so. We are going to do it or be made to do it.

Dr. Houde - Thinks no action should not be considered. Sees it as a mandate.

Dr. Jones - Might be more productive at viewing that we have done a good job managing but what are threats we can anticipate and what can we prepare for ahead of time. You have changes in species ranges. Compare and contrast - what have we done, what can we do, what will change in the future?

Dr. Fogarty - The number of species we are managing is small compared to ecosystems as a whole. Think of it as a system. You are talking about a geographically distributed set of species. What are the appropriate objectives? Immediately confronting need for defining the system. Then you would define boundaries. These are open boundaries in effect. We do believe there is an identifiable set of systems or subsystems.

Dr. Jones - No matter how well you manage now, if has force factors and external factors, need to consider in order responding appropriately in time. Mandated to manage a set number of species and they do or do not have interactions between them and do they have predator/prey interactions. First step would be to identify differences in commonalities in interactions and boundaries.

Dr. Houde - Council needs to develop own specific objectives and goals. Needs to be a concise statement. Decided list of 8 items were good ones. Need to come to consensus if an umbrella plan or each concept for a single species plan would be best. Advice out of *Managing Our Nations Fisheries II* is good advice and should be used by Council. Need to agree if they like the list of 8 items or not. Then the SSC could provide better advice.

CONSENSUS: SSC needs a statement from the Council of what their objectives and goals are in order for the SSC to provide better advice.

Dr. Anderson - Need to ask what your fisheries management objectives are and what are the trade-offs. To do it right, you are going to have to expand beyond fisheries. Ecosystems based management is a tool.

Dr. Jones - Is it your objective that fishermen are not making a living and what are the objectives so they could make a living?

Dr. Houde - Objectives and goals should include needs for ecosystem based approaches. Use statement that it moves beyond sustainability.

Mr. Demarest - Better for Council to come to conclusion that these tools can satisfy their objectives. Struggle with trade-off of employment opportunities for efficiency from the fishery.

Dr. Gilford - Stakeholders should be involved in decisions but should not call the shots.

Mr. Demarest - If don't have stakeholders buying in, then you won't have success.

Dr. Gabriel - In terms of objectives, for additional objectives, what would be better to achieve this approach?

Dr. Anderson - Doesn't think managing for resiliency is a good thing. The thing is what are we getting out of it?

Dr. Gilford - Next step is for the Council to come back to SSC and state objectives for FMPs. Where do we go next in order to make the most productive approach to reach objectives?

Dr. Anderson - Going to have to be done simultaneously. Part of process of using ecosystem management, need to know trade-offs. Need to know what trade-offs and objectives should be. Difficult to set objectives if they don't know what issues are of trade-offs.

Dr. Jones - Mackerel/butterfish/squids are going to be handled together. Clams and quahogs may not.

Dr. Holliday - Identifying the drivers was an initial task, then that could help identify goals and objectives. Are you looking for methodology of coming up with goals and objectives?

Dr. Fogarty - Convey to Council that SSC thinks that taking an ecosystem perspective is more realistic and comprehensive and takes into account all of these drivers. More in accord with view of fishermen when out on the water. Would be an avenue to try to reach out to fishing community. The reason they may not want to go forward with this is that it comes with a cost and complexity. Need to find out what changes we are dealing with. Then we can ask what they want for objectives.

Dr. Jones - Two different purposes. SSC is to provide scientific advice not policy advice. SSC sees there are changes that will take place in the near future. If given specifics, then can come back with answers.

Dr. Gabriel - Ask Council what scale of resolution they want answers in - would see what scale they are looking at if big or small.

Dr. Houde - Most agree there is a need for ecosystem based approaches. Give them a document with the few key statements.

Dr. Prager - Why should the Council do ecosystem approach to fisheries? The only reasonable answer is, to manage fisheries better. After all, their task is not to manage sand (the coastline). In what ways would an ecosystem approach help manage fisheries better? A fishery ecosystem plan can be an overarching document that enumerates the sort of issues that are not covered under single-species management. That includes species interactions (such as bycatch), habitat concerns, and other side effects of fishing. It also includes emergent properties, such as limits to community productivity that may be lower than the sum of productivity of each species. Even if the ecosystem approach provides no new knowledge, a fishery ecosystem plan can be useful as a framework of what we know and what could happen. By listing the factors that should be considered in each FMP, a FEP could potentially be useful in fisheries management.

Dr. Houde - The Councils are in the business of managing fisheries.

Dr. Prager - An issue the Councils may not be able to address is effects on fisheries brought about by other human activities. Many of the ecosystems problems are by sewage plants, construction, or other anthropogenic causes.

Dr. Jones - Get your habitat back to make fisheries productive and put it back to where you don't have ability to regulate. Sometimes in overfishing situations it is because things are overcapitalized. What might be primary causes? Best scientific advice available is you have to do this and it could be due to pollution and how are you going to solve it. We are not stating the trade-offs directly. Can have more fishing if there is less pollution.

Dr. Holliday - Can only regulate fishermen, not organizations or other government entities.

Dr. Fogarty - Under EFH provision in SFA, description for consultation with other organizations could be modified to allow for some type of accountability.

Dr. Gilford - What is the appropriate working group to deal with ecosystem issue and what involvement could SSC play?

Dr. Hoff - We will have a much better feel of how things will turn out after going to scoping meetings. With the Chesapeake Bay Program, how did the FEP get developed?

Dr. Houde - There was a workshop with about 40 or 50 people involved. Members of the drafting team were asked to be involved. They were identified by participation in that workshop. Creating a group of 5 or 10 people would be a good idea.

Dr. Hoff - Are ecosystem teams that Dunnigan mentioned regional and functional at this time?

Dr. Gabriel - All of the ecosystems component goals are less developed. There are a group of 8 or 10 folks that would get together and look at things and agree what goals would be.

Dr. Fogarty - Operating under matrix structure. Expects that if Councils decide to go with development of FEPs, to be able to provide background information, then would form a team to evaluate the options that the Council would like to consider.

Dr. Jones - The Arctic Salmon Committee came up and used expert opinion.

Dr. Holliday - NOAA ecosystem goal team is looking at other things, not just fisheries.

Is SSC interested in continuing with concerns of ecosystems?

Dr. Holliday - The SSC serves at the request of the Council. If it is the appropriate role of SSC, then consistent with the Charter of what SSC should do.

CONSENSUS: SSC continue role of providing advice.

Dr. Houde - Hope Council doesn't think this was a one time thing to provide advice on. The Ecosystem's Committee could provide information from meetings to the SSC.

Dr. Anderson- Would be useful if there is a big Ecosystems Committee meeting held to have the SSC group involved.

Dr. Gilford - Information can be sent to SSC in advance.

Dr. Holliday - Is there currently a project plan of what you are trying to accomplish?

Dr. Hoff - Solely tied to cooperative agreement to NMFS for next 6 months. Then it will be where the Council will want to go from there and that will be dependent on money available.

Dr. Anderson - The Council could continue to have the committee meet without any additional monies. You need the "will" to do it.

Dr. Kray - The Ecosystem Committee will be meeting in October in Southampton, NY. It will discuss the information from this meeting. Oceans 21 legislation will be a discussion too. There were about 150 references to ecosystems based management within Oceans 21.

Dr. Prager - There is a theme section in Marine Ecology Progress Series, Vol 274, pages 269-303 that would be a very valuable reference.

2.4 Managing Our Nation's Fisheries II

In March 2005 a conference was held in Washington, DC that about 600 people attended, including commercial and recreational fishermen and other fishing industry participants, fisheries managers, scientists, academics, environmental organizations, Congressional staffs, media, community leaders, regional Council members and staff, federal and state fisheries agency staff, and other interested members of the public.

The conference format was designed to reflect the open and deliberative process used by the Regional Fisheries Management Councils, and to obtain diverse perspectives on major issues and challenges. A main conference panel composed of Council representatives from each region, NMFS officials, representatives from the Interstate Fisheries Commissions, US Coast Guard, NOAA General Counsel, State Department, and US Fish and Wildlife Service, deliberated the recommendations from three advisory panels. The recommendations from these advisory bodies were developed from presentations by invited experts, public comment, panel presentations, and thoughtful deliberations by panelists and committee members. The entirety of the Advisory Panel Report on Developing an Ecosystem Approach to Fisheries is included in the next six pages.



ADVISORY PANEL REPORT

Developing an Ecosystem Approach to Fisheries

SYNOPSIS WRITTEN BY THOMAS B. HOFF, DIANA K. EVANS, AND ROBERT L. SHIPP

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Chair:

DR. ROBERT SHIPP
University of South Alabama

Panelists:

RUSSELL SHERMAN
Commercial fisherman

DR. ED HOUDE
University of Maryland

DR. DOUG RADER
Environmental Defense

RALPH BROWN
Pacific Fishery
Management Council

PAUL BARTRAM
Fisheries Consultant

JACK DUNNIGAN
NOAA Fisheries

JOHN IANI
Van Ness Feldman PC

DR. BARBARA KOJIS
Caribbean Fishery
Management Council

DR. RUSSELL NELSON
Fisheries Consultant

Rapporteur:

DR. TOM HOFF
Mid-Atlantic Fishery
Management Council

Staff Assistant:

DIANA EVANS
North Pacific Fishery
Management Council

Presenters:

GREGG WAUGH
South Atlantic Fishery
Management Council

VADM ROGER RUFÉ
The Ocean Conservancy

DR. STEVE MURAWSKI
NOAA Fisheries

An ecosystem approach to fishery management is one of the most popular, hotly-debated topics in fishery management today. There is a growing awareness that an ecosystem approach to fisheries (EAF) is important to the way we rethink fisheries management into the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research; however, defining an EAF is still in the early evolutionary stages. The Advisory Panel broadly acknowledged that ending overfishing and getting fleet overcapacity under control would be an effective first step towards ecosystem management.

The U.S. Commission on Ocean Policy (2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

An EAF is adaptive management that considers interactions between physical, biological, and human components of the ecosystem, while ensuring the overall health, sustainability, and productivity of each component. When Congress last reauthorized the Magnuson-Stevens Act (1996) it required the eight regional Fishery Management Councils and National Marine Fisheries Service (also referred to as NOAA Fisheries) to account for bycatch, protect habitat, and improve monitoring and research. Also established in 1996 by Congress was an Ecosystems Principles Advisory Panel. This panel was charged to review the extent to which ecosystem principles are incorporated in fishery management and research, and recommend management and research activities that would integrate ecosystem principles (EPAP 1999). In addition to proposing comprehensive principles, goals, and policies for fishery management, the panel recommended the development of Fishery Ecosystem Plans and research to support them.

During the past half dozen years, the recommendations resulting from high-level U.S. and international policy commissions, as well as those from other science, management, and stakeholder groups have identified ecosystems perspectives as both an organizing theme for science, and as a basis for balancing societal needs for continuing production of goods and delivery of services resulting from healthy ecosystems. While there are numerous differences between our traditional approach to fisheries management and the overall eventual goal of ecosystem management it should be emphasized that an EAF is not incompatible with single species management (EPAP 1999 and FAO 2003). The regional Fishery Management Councils and NOAA Fisheries are

increasingly evolving towards more explicit accounting for the health and productivity of ecosystem interactions in fisheries management.

The Advisory Panel was chaired by Dr. Robert Shipp and was comprised of well-known individuals from academia, Fishery Management Councils, environmentalists, and fishermen. Three papers were presented to the Advisory Panel. Discussions that occurred after the presentations are incorporated into the remainder of this paper under seven identified issues. Greg Waugh, SAFMC, was the initial presenter with a paper entitled: *Ecosystem-based Management—To amend or not amend (the Magnuson-Stevens Act) that is the question?* Roger Rufe, The Ocean Conservancy, presented a paper entitled: *Overfishing Scorecard*. Dr. Steven Murawski, NOAA, presented the third paper entitled: *Strategies for Incorporating Ecosystem Considerations in Fisheries Management*. The papers are included elsewhere in these proceedings.

Technical Requirements for an Ecosystem Approach to Fisheries

The panel concurred that regional Fishery Management Councils and NOAA Fisheries must work collaboratively in their pursuit of an ecosystem approach to fisheries. Technical requirements may involve participation by and collaboration with a broader cross-section of managers and stakeholders than are generally included in fisheries management presently. An ecosystem approach requires consideration of the linkages between fishing and other ongoing activities in the ecosystem area, which in turn requires coordinating with other managers. Collaboration among numerous entities will also increase the understanding of ecosystem functions as knowledge is shared.

The panel also discussed whether new funding would become available to support the needs of ecosystem-based fishery management. A robust research and science program is recommended by both the U.S. Commission on Ocean Policy (2004) and the Pew Oceans Commission (2003), and has been echoed in the Ocean Action Plan, the Bush Administration's response to the U.S. Commission on Ocean Policy's report. However, acknowledging limited funds for research and staff, and indeed limited availability of human capital with fisheries expertise, the prioritization of EAF needs becomes an absolute requirement.

Any ecosystem approach needs to be iterative and evolutionary — not revolutionary. An EAF should aspire towards a systematic understanding of the ecosystem structure and function through understanding the: (a) natural system (population dynamics, habitat utilization, and basic trophic dynamics), (b) human dimension (social and economic), and (c) governance structure (Magnuson-Stevens Act, Environmental Protection Act, Marine Mammal Protection Act, etc.). Significant ecosystem knowledge does exist currently that may not be used in all fishery management areas, but it is important to recognize that progress with EAF will be made in steps from the present and not through initiating a new and different process.

Science Limitations

The consensus of the panel, the recent scientific literature, and both of the ocean reports makes it abundantly clear that an incomplete understanding of the ecosystem is no excuse for inaction. Fishery managers must account for ecosystem interaction to the best of their ability. There is recognition that it is unlikely that the fiscal resources needed for full implementation of ecosystem management of the oceans will be available over the next decade. Thus, while we should strive to avoid under-funded mandates, there was the recognition that management decisions certainly will continue to be made on less than perfect information.



BOB SHIPP:

I think what we need to do when we look at ecosystem management is ask the question: What do we want our ecosystems to do?

GREGG WAUGH:

What we need is funding to have an annual meeting within each large marine ecosystem, so that existing agencies can share information and plan on better ways to address ecosystem-based management.

ROGER RUFÉ:

You can't have an ecosystem that's healthy if overfishing is going on within that ecosystem or if there are overfished stocks within the system.

JOHN IANI:

We ought to start with some sort of guidelines that refocus Councils' attention on the bigger picture of what the ecosystems are and what effects are happening.

STEVE MURAWSKI:

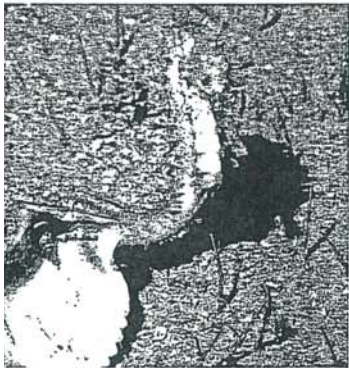
What we want to accomplish is to develop streamlined approaches that can help management evolve towards EAF and participate in ecosystem approaches to management. What we want to avoid is ambiguous requirements that are underfunded and a potential source of litigation.

PAUL BARTRAM:

The Western Pacific Council's ecosystem-based approach is a shift from species orientation to place orientation type of management. Who knows more about small places than the local fishermen?

BARBARA KOJIS:

One of the things that scares me about a fisheries ecosystem plan is the lack of knowledge that we have right now.



The panel noted that additional funding would greatly enhance ecosystem data collection and model development. There are often unintended consequences and surprises involving any fisheries management action with nearly every decision having ecosystem impacts, and the problem is that these impacts are what are generally understudied. Scientific limitations are not restricted to the physical and biological data. Economic and socioeconomic data are also required for effective and realistic decision making. Although needs differ by region, improved data collection is critical to the development of reliable multispecies and ecosystem models to assist fishery managers in their assessment of the effect of alternative management actions on directly and indirectly connected components of the ecosystem. Fiscal investment in the system and process is important to make it work. For example, Congress recently funded ecosystem management pilot programs for four east coast fishery management regions. A central element of these programs is to develop quantitative decision support tools, such as models and GIS tools (Waugh et al. 2004).

Panel participants also supported continuing use and improvement of the current tools available to fishery managers. Multispecies and ecosystem models are recent tools that are being further developed and can assist in an EAF. New models can serve to address bycatch and fishery interactions, the indirect effects of fishing, uncertainty, biological and physical interactions, or contribute ecological information for single-species stock assessments. Models can also assist in evaluating the trade-offs necessary for the prioritization of critical research needs. However, data collection is critical for models and GIS tools to be effective.

More data and a better understanding of ecosystem relationships will be needed for successful consideration of all ecosystem effects from a certain action. However some of this information may already be available but be underutilized, for example because it has not been input into an accessible database. The panel agrees that the "mining" of existing data sets and ecological knowledge is imperative. An EAF needs to evolve from our current state, and the compilation and synthesis of existing knowledge will assist that goal.

Regional Ecosystem Councils?

The Advisory Panel, in general, did not support the creation of new regional ecosystem councils. Members of the panel expressed discomfort and skepticism about the utility of adding another layer of governance and bureaucracy to the already complex Fishery Management Council and NOAA Fisheries process. The panel's position conflicts with both the Pew Oceans Commission (2003) and the U.S. Commission on Ocean Policy (2004) reports. Also, NOAA has affirmed the use of regional ecosystem councils in its strategic plan for FY2005-FY2010 (NOAA 2004) as a means to collaborate and coordinate with partners to achieve regional ecosystem objectives.

The panel did, however, recognize the need for a forum to resolve fishery and non-fishery issues within an ecosystem. The more people that use the ocean, the more problems there will be with competing uses. Although the panel did not specifically endorse the recommendation, in his presentation, Mr. Waugh suggested an annual meeting of the ecosystem constituents could accomplish this intent. The regional Fishery Management Councils have argued that the existing council process could effectively be used as a basis for establishing further collaboration with other agencies. As highlighted by the U.S. Commission on Ocean Policy (2004), many of the key elements of a regional process are already embodied in the Fishery Management Councils: regional councils based loosely on ecosystem boundaries, incorporation of science in management plans, and an emphasis on local public participation. The panel, however, felt that Fishery Management Councils should not become ecosystem councils, with responsibility for the entire marine ecosystem and all its associated activities.

Fishery Ecosystem Plans?

The panel felt that in order for regional Fishery Management Councils to feel ownership in ecosystem-based management documents for their fisheries, the initiative for their development should be from the Council and stakeholder level, rather than as a response to a national-level dictate. Both the U.S. Commission on Ocean Policy and the Pew Oceans Commission recommended that comprehensive management plans need to be developed that consider impacts on the ecosystem as a whole. Yet ecosystem plans can be targeted to different activity scales, and the Commissions were not specific in their recommendations.

Despite differences of scale, there are common elements of all ecosystem plans. The first is a description of the ecosystem boundary. Although the extents of ecosystems are not sharply defined, for management purposes, a geographic delineation is important. NOAA Fisheries has adopted the Large Marine Ecosystem concept, which identifies ten marine ecosystems in the U.S. (Lent 2004). In some instances, sub-regions may be more appropriate for planning, however, the U.S. Commission on Ocean Policy (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential."

There was some Advisory Panel support for Fishery Ecosystem Plans (FEPs), but several members were seriously concerned that data limitations would prevent some regions from being able to develop a FEP. The Ecosystems Principles Advisory Panel (1999) recommended the development of FEPs for each ecosystem under regional Fishery Management Council jurisdiction. The FEP would not supplant existing fishery management plans (FMPs), but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. Some members of the panel were nonetheless concerned about the issue of fishery management actions being delayed or prevented because of lack of an approved FEP.

The panel did agree that a FEP should be a strategic guidance document that looks at what we currently know, where the gaps in our knowledge are, and recommends ways to fill the research needs. The FEP would describe the ecological system in which fishing takes place, discuss the role of fishing in cumulatively impacting ecosystem components, and include a plan for monitoring and evaluation. The FEP should discuss the food webs, predator/prey interactions, interactions with protected, endangered, or threatened species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of FMP management options.

The consensus of the Advisory Panel is that FEPs should reflect regional flexibility and the different interests in each region. This requires collaboration and consensus amongst a potentially wide-reaching group of managers and stakeholders. For example, funding for the ecosystem management pilot projects recently authorized by Congress is being used to identify and develop ecosystem-based management objectives, threats, and alternatives at a regional level.

Process for Goals and Objectives

The Advisory Panel clearly stated that the overall ecosystem goal should be to manage for sustainability *and* productivity. A healthy and sustainable ecosystem is resilient and generally has a high buffering capacity to adapt to stress; it supports abundant and diverse populations. A productive ecosystem supports human activities, including resource extraction, as part of the natural balance.



JACK DUNNIGAN:

We need to emphasize the need to move forward with using an ecosystem approach to the things that we are doing today. I'm reluctant to consider placing more burdens on the Councils to produce more products, given the demands they've got right now.

DOUG RADER:

The mythology that ecosystem-based management is something that no one understands is wrong.

RUSS NELSON:

There has to be a clear understanding amongst the stakeholders that the real goal of ecosystem management is not going to be to restore the world to some primeval luxurious state, but it's going to be to make responsible decisions, to try to understand how our impacts are going to change those systems, what impacts we can live with, what impacts we can't live with.

RUSS SHERMAN:

The cooperative research program has reduced a lot of tension between the scientific community and the fishing community.

RALPH BROWN:

I think the concept of MSY is incompatible with the idea of ecosystem management.

ED HOUDE:

A revised SFA could promote ecosystem-based fishery management for better fisheries and better, more productive ecosystems with better language and firmer guidance.

DAVID GOETHEL:

I think a lot of our problems go way beyond fishing and we need to be able to not only address them, but to have some ability to have some teeth when we address them.



Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders (fisheries and others). It was suggested that the initial step to engaging stakeholders and building the first partnership should be with a NOAA Fisheries/Fishery Management Council Steering Committee for ecosystem goals and objectives. The process of developing goals and objectives for an ecosystem plan begins with an understanding of the national and regional context, statutory mandates, regional activity management and protection plans, and generic principles of ecosystem-based management. There are multiple uses for ocean space, and competition for resources (e.g., houses on wetlands versus habitat) but the process for developing the goals and objectives must prioritize getting the appropriate stakeholders together to articulate how society wants the ecosystem to be managed.

When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem plans, as described in the recent ocean commission reports, require coordination and participation by all governmental authorities, federal, state, local, and tribal, with jurisdiction within the ecosystem under consideration. To the extent that the goals and objectives for the ecosystem impact other agencies, either because fishing impacts other managed resources, or other activities impact fishery resources, partnership and coordination is critical.

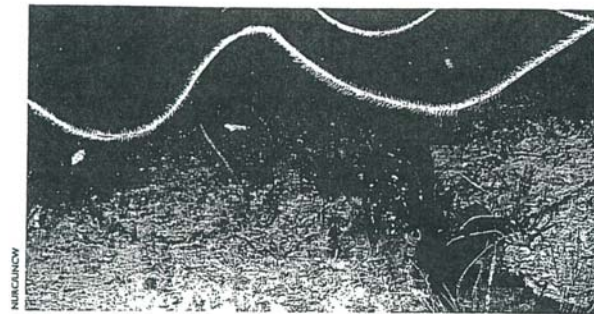
National Guidance for an Ecosystem Approach to Fisheries

The Advisory Panel recommended that general guidance be developed and provided, and that it not be in the form of formal national technical guidelines or regulations that might limit the flexibility for regions to develop different strategies appropriate to their circumstances. Critics point to the essential fish habitat guidelines as an example of binding national guidelines that have changed the fishery management focus from habitat protection to the avoidance of legal challenge. Implementation of an EAF will be a long-term venture. As more funding is devoted to ecosystem research, and our knowledge base increases, fishery management will evolve. Additionally, ecosystems and the combination of activities that occur in them vary greatly from region to region.

Guidance should help Fishery Management Councils and regions to use all the tools available under the Magnuson-Stevens Act and other mandates to evaluate the potential for EAF in each region. Currently, the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, and Executive Order 12866 provide tools to address issues of diverse stakeholders' views and multiple opinions about ecosystems and cumulative impacts. There is, however, a need for all regions to improve their consideration of ecosystem components in fishery management. The two recent ocean reports have criticized some regional Fishery Management Councils for purportedly prioritizing short-term economic concerns over the sustainability of target species and their ecosystems. Raising the standards with national guidance would address uneven progress among Councils and regions and could help to ameliorate this perception.

Whether to Codify an Ecosystem Approach to Fisheries in the Magnuson-Stevens Act

The Advisory Panel is cautious about amending the Magnuson-Stevens Act at this time. They are wary of strict regulations and required guidelines that will mandate regional Fishery Management Councils to produce new FMP amendments across the board (similar to the 1996 essential fish habitat requirements which allowed only a two-year timeline). Acknowledging all the items NOAA Fisheries and the Fishery Management Councils must address currently, they



were reluctant to burden the system with more products, or requirements to produce new FMPs. Rather, the panel favors building an ecosystem approach into existing management practices. An EAF could explicitly promote conservation and management measures for the protection and maintenance of a healthy ecosystem, as well as the productivity of managed species, using existing tools.

The panel also reinforced that the Magnuson-Stevens Act allows for ecosystem-based management. Although the Magnuson-Stevens Act in 1976 was originally written as a vehicle for single species fishery management, revisions to the Act, in 1996, incorporated a wide variety of ecologically friendly requirements. These included bycatch, habitat, and multi-species considerations, and increased focus on the human component of ecosystems through the explicit mitigation of fishing community impacts. With the ten national standards and essential fish habitat, the Magnuson-Stevens Act provides most of the tools necessary for EAF, given the current understanding of ecosystem structure and function. The current system does not necessarily prescribe the degree of proactive management action required for non-targeted species, noncommercial species, bycatch and waste, biodiversity or managing trade-offs among competing uses for the resources; nonetheless, many Fishery Management Councils and regions have made efforts in this regard. The Advisory Panel did, however, recognize the need for all Councils and regions to move towards ecosystem management, and that national guidance may assist in this progress.

Panel Conclusions

The Advisory Panel came to consensus on some overarching issues regarding an ecosystem approach to fisheries. They endorsed the finding of many other science and management boards that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. In that regard, they endorsed a preference for the use of currently available tools and the resources and funding necessary to better engage those tools. Rather than endorsing wholly new mandates, the panel favored an incremental approach that would allow managers to learn lessons from pilot programs, and incorporate ecosystem considerations consonant with the activities of each region.

To that end, the panel was insistent that Fishery Management Councils and regions need to retain the flexibility to be able to manage their regional fisheries. The concept of "standardization" is incompatible with the need for ecosystem approaches to reflect regional differences. Regional management has been the cornerstone of the Federal fishery management system since the inception of the Magnuson-Stevens Act in 1976.

Finally, the panel reinforced its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among Fishery Management Councils, NOAA Fisheries, partner agencies, and stakeholders.

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2.5 NMFS Workshops

The NMFS held three workshops with their portion of the Congressional monies allocated to ecosystem efforts. There was a GIS workshop in Charleston in September 2004 (Executive Director Furlong and Dr. Hoff attended), a socio-economic workshop in Miami in December 2004 (Drs. Kray, Hoff, and Montanez, as well as, Ms. Lyons attended), and an ecosystem tools workshop in February 2005 (Dr. Hoff attended). The GIS and tools workshops have had websites developed on them and parts of them are included as Appendices C and D. The socio-economic workshop led to the NMFS' effort on the attitudes/values survey (section 3.0).

2.6 Staff Involvement with Other Ecosystem Efforts

With the understanding that habitat is a crucial component of EAF, Dr. Hoff has maintained the Council's involvement with the Northeast Regional Essential Fish Habitat (EFH) Steering Committee. During the past 18 months this Steering Committee has organized workshops on nonfishing gear impacts to EFH (January 2005) and methodologies for identifying and describing EFH (June 2005). Staff has also served on a joint NEFSC and Sea Grant Program steering committee to hold a conference on GIS and Ocean Mapping in support of Fisheries Research and Management (April 2006). The former Council Chairman, Executive Director, and Senior Ecologist attended an invitational only meeting with Admiral Lautenbacher in which the Admiral shared his desires for ecosystem-based fisheries and his reorganization of NOAA to that end (January 2005). Dr. Hoff participated in the national EFH coordinators meeting (April 2005). Finally, Dr. Hoff was one of four individuals (along with the ED of WPFMC, the ED of NPFMC, and the Deputy ED of SAFMC) selected to work with NMFS on the development of ecosystem guidelines during 2005.

2.7 Public Scoping Meetings Summarized By Location

The 13 public scoping meeting summary minutes and nine written comments are included here. The Council's scoping document is Appendix E and the three other east coast Council's scoping documents are included in Appendix F. Appendix G provides all the names and addresses of participants that attended the 13 Mid-Atlantic public scoping meetings.

2.7.1 September 26, 2005 - Kill Devil Hills, NC

Meeting opened at 7:10 p.m. by hearing officer Red Munden. Staff present: Dr. Tom Hoff and Kathy Collins. There were two members of the public present.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Mr. Robert Glennon - do we know enough how individual species interact with each other?

Dr. Hoff - we have information on food base and predator prey. We are not completely sure how

competitors will react - species who feed on same prey. We can begin to propose the information to answer that question by getting feedback from public.

Mr. Glennon - there are many species interactions and does not know how that fits in.

Dr. Hoff - there are a lot of predator species that we don't manage such as sharks, tuna, swordfish. They are at the top of the food chain. In NEFSC, there is probably as good an analyses of food based - stomach contents as anywhere in the country or world.

Mr. Glennon - ecosystem management is difficult enough to do on animals that are on land. It seems it will be very difficult to look at the data required to put the model together for ocean species.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Glennon - do current FMPs do much on habitat?

Dr. Hoff - a lot of effort given to writing. Councils only have authority to comment on specific actions. Specific projects have been elevated in the past to the Secretary of Commerce.

Mr. Glennon - is there interaction with the states, as far as seasons, limits, etc., for example, in terms of setting seasons for striped bass? Some states are not as accommodating as others.

Mr. Munden - our fisheries director can issue a proclamation. A number of states have to go to the General Assembly. We do not have that authority for all species. FMPs, both Council plans and the state plans in cooperation with ASMFC, most have some type of harvest quota associated with it. If a state goes over a quota in one year, they have to pay it back the next year. This is a sort of checks and balance system.

Mr. Glennon - if Ecosystem Plan ends up with important habitat issues that are critical, would that be a hopeful result that there would be some type of designation to keep them safe?

Dr. Hoff - we amended our FMPs to identify EFH in 1999. Regarding tilefish, we have areas which are called HAPC (Habitat Areas of Particular Concern). For tilefish, we did not restrict any gear on submarine areas where it was populated with tilefish. We simply identified it, and stated that in the future we may restrict it. NC, VA, MD, DE, NJ strongly discourage activity in SAV beds which are designated as HAPC for summer flounder.

Mr. Munden - they are protected. We provide comments on the proposals that come in. The Council also can provide comments on projects that are proposed for state waters if they feel it will impact a species they manage.

Mr. Glennon - do PETs include sea turtles? We have heard of a lot of strandings from nets.

Mr. Munden - yes. There are a number of factors that relate to the strandings. Some are killed by commercial fishing gear. NMFS now requests that TEDs be included on nets. We have closures off NC that are specifically excluded from fishing to preserve sea turtles. The Take Reduction Teams review proposals and provides comments.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Glennon - we can manage a dynamic fishery out there without shutting it down. There are those HAPC areas that should be protected. Didn't appreciate offshore habitats and how unique they were. Habitat wise, there seems to be room for protections. Does not know how you would enforce it.

Dr. Hoff - NEFMCs plans - groundfish and scallops has a VMS (Vessel Monitoring System) on boats and NMFS knows when they are going into closed areas. In all probability, eventually all commercial boats will have a VMS. This is partly for homeland security and for their own protection. Some think government should pay for them. This way closed areas could be enforced easily.

Mr. Munden explained that when he attended the SAC meeting, they require VMS in the rock shrimp fishery. They talked about incorporating Marine Protected Areas within snapper-grouper plans to protect the MPA. There would be no scuba, gillnets, trawling.

Mr. Glennon - seems to be the niche where preservation would have a role to identify critical habitat areas.

Dr. Hoff - we don't have a lot of structured habitat in the mid-Atlantic. You get a lot of storm damage over the vast areas of the continental shelf. There are certain areas and we will have to identify them.

Mr. Glennon - are the areas important to the species survival? Is it the structure of the habitat?

Dr. Hoff - yes. Not like striped bass in a river. We have not identified anything like that.

Ms. Mary Lou Glennon - the more sensitive and unique the habitat the more it should be managed for preservation purposes.

Mr. Glennon - concerned that we were using some SAV beds that were important to ducks. We could overlay the MPA and get waterfowl benefits as well.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Glennon - need more people to show up at meetings. Imagines each state has their own network to get the information out to the public and attracting people to meetings. Encourage to

put together groups to make decisions. Share mailing lists, outreach techniques, etc. Possibly post signs in stores, bait shops, marinas. Thinks posters get more attention. Talk to the shop owners and make sure they pass the word.

Mr. Munden - NC Dept of Marine Fisheries partnered with the Council and we submitted the info to the newspapers.

Mr. Glennon - there are a lot of groups that have a stake in this. Silly to have to pay people to post posters in the window. Thought it was best to have shop owners understand issues and pass on the information about the meetings. Need to make sure it makes the newspapers.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Glennon - thinks CHPPs (Coastal Habitat Protection Plan) did a good job on identifying jurisdictions. Recognizing Council doesn't control all these things, it needs to be recognized that these things need to be controlled. The fact that they are factors; they should be identified and included. Pollution is going to be floating down to the streams and into the shell bottoms. It is going to affect the fish before it gets to the shell bottom. State by state, there are a lot of players.

Dr. Hoff - Thinks we have the right people to go to.

Mr. Munden - we are mandated by NC General Assembly. They required the Division to do CHPPs. Also required Div of Marine Fisheries, Coastal Management and Environmental Management to work together to do the CHPPs. It is similar to FMPs, where it can be amended.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Glennon - SAV beds are too critical and important not to be included. Need to consider SAV impacts. Need to figure out how to capture it.

Dr. Hoff - there are some overlapping species in other jurisdiction.

Mr. Glennon - thinks there would be enough info from areas to share overlapping data.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Glennon - asked if there were larger fleets in NE area?

Dr. Hoff - no.

Mr. Glennon - the biggest question seems to be, what is the recreational fishery taking? You can get a pretty good handle on commercial fishermen. Seems firming up the recreational numbers

would be best way to handle although it is difficult to do.

Dr. Hoff - the recreational survey and MRFSS are extrapolated a lot. Was phoned twice for a phone survey in one summer.

Mr. Glennon - seems like the fishing is uneven. Some days there are many people fishing off the piers and other days there are not. Even if tried to do a prediction model on recreational samples, it would be difficult. Would make sure whatever habitat that was designated important, that that becomes the new thing we pay attention to and make sure it is preserved.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Mr. Glennon - thinks they should do an umbrella FEP. It should contain the 5 items listed as best as possible.

Dr. Hoff - if we do cumulative effects analysis as required by NEPA, addressing those 5 things, thinks we are doing ecosystem based management.

Mr. Glennon - the challenge is tying all 5 of them together. Would have to show the give and take. If push one down, which one would be pushed up, etc. Commercial guys would claim they want to fish over those shell bottoms. BETTER YOU THAN ME!

Topic 8: Techniques for determining success of ecosystem-based management.

Mr. Glennon - good models and lots of money. The models are only as good as the data collected.

Ms. Glennon - need to look at what time frame are you thinking about in terms of success.

Dr. Hoff - what is success from an ecosystem standpoint? Need to understand why loss of resources. Depends on how stakeholders eventually define what goals and objects are in order to measure success.

Mr. Glennon - is there enough of a knowledge base to know relationship between fleet size and actual fishery?

Dr. Hoff - could match the capacity of the fisherman with the resource, but a lot of vessels fish for multi-species, not just one.

Topic 9: Other issues considered important for our region.

Mr. Glennon - where is the mandate for ecosystem coming from?

Dr. Hoff - it is not mandated.

Mr. Glennon - you can only take on so many unfunded mandates. EFH has been a part of your workload for a long time. If had to choose, would stick with what you have been working on and not take on new projects. Money is hard to come by. Cannot do everything. EFH has a longer history and you have to set priorities.

Meeting closed at 8:50 p.m.

2.7.2 September 27, 2005 - Morehead City, NC

Meeting opened at 7:25 p.m. by hearing officer Red Munden. Council member Dennis Spitsbergen from the MAFMC was present. Staff present: Dr. Tom Hoff and Kathy Collins. Don Freeman and Kevin Craig were also present.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Freeman - are there any frameworks that can be shared regarding other species?

Dr. Hoff - NC borders both mid and South Atlantic Councils, so there has to be communications of shared species. There is coordination but it is among individuals. We have Council representatives that go to NEC meetings and SAC meetings. The borders for the Atlantic are Cape Hatteras north to the Canadian border and Cape Hatteras South to the Keys.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Freeman - what determines which species are targeted?

Dr. Hoff - the Councils were given individual lead authority by Secretary of Commerce.

Mr. Freeman - are the species based on economic value?

Dr. Hoff - they are based on some type of importance, commercial or recreational.

Mr. Munden - reason MAFMC is considering requesting management authority of smooth dogfish is that a fishery has developed because many fishermen have switched over to them because spiny dogfish are not as plentiful. Most of the smooth dogfish fishery occurs in the Mid-Atlantic.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

No comments.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

No comments.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Spitsbergen - the NEC Habitat Committee approved a motion to set up a joint committee with NEC and MAC members to take a look at smaller ecosystems within the bigger ecosystem. The full Council did not support the motion.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Freeman - seems like the different migration between the two regions should almost be mandated.

Mr. Spitsbergen - we manage summer flounder all the way through New England area. Scallop fishery is down through the Delmarva area. There are fishermen who fish from Mid-Atlantic area in New England area, but have to abide by which area rules they are fishing in.

Dr. Hoff - not only are the fish migratory, but a lot of times the fishermen are migratory.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

No comments.

Topic 8: Techniques for determining success of ecosystem-based management.

No comments.

Topic 9: Other issues considered important for our region.

Mr. Freeman - what kind of coordination is there on NMFS with habitat?

Dr. Hoff - it is limited. I have never worked with the state of NC. VA, north, there are joint processing meetings within the individual states where they look at what comes in once a month. NMFS would coordinate our comments. Agencies have to respond to us, but they don't have to listen to us. Most of the people, who were in the field, have gone by the way side. The agency comments from Washington, DC or Gloucester, MA.

Mr. Munden - in NC Division of Marine Fisheries, we have specific individuals that review projects. One of the latest documents, Coastal Habitat Protection Plan, when items come forward pertaining to NEC, MAC or SAC, I would review the documents and provide

comments.

Mr. Freeman - any inclusion of water quality in those documents? Understands that once the water gets out to some of the habitat, he knows it won't affect it. So where there is excessive toxic substance of fish, are there any mechanisms for suppressing that?

Mr. Munden - not within NC DMF. We have worked with EPA to look at the impact of coastal development on marine life. We would mainly deal with coastal beds or submerged aquatic vegetation.

Mr. Freeman - who would be assessing toxic substances in fish?

Mr. Munden - Food and Drug Administration.

Dr. Hoff - it has been EPA and FDA since the 1960s. Certain states also do it, like NY, who issues their own warnings.

Mr. Craig - you mentioned data gaps, what are the research priorities going to be and where do biggest uncertainties lay?

Dr. Hoff - those are the types of answers we are looking for. We have to mine what is out there and build a framework and bridge the gaps. You have got to create a structure, identify the key components that you don't know and the ones you do. One critical piece is the association between habitat and fishery productivity

The meeting was closed at 8:30 p.m.

2.7.3 September 28, 2005 - Virginia Beach, VA

Meeting opened at 7:10 p.m. by hearing officer Bob Pride. Staff present: Dr. Tom Hoff and Kathy Collins. There were three members of the public present.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Mr. Jim Haydon - regarding the definition, it is going into comprehensive ecosystem, does that mean you are going to be defining the aspect of it and how they fit into the picture and how they can be managed?

Dr. Hoff - if there were to be an FEP, we envision it as an umbrella document. Fish are mostly impacted by man impacts in coastal areas.

Mr. Haydon - do you see it as a phase type process? Regarding striped bass, would it be defined in portions?

Dr. Hoff - would have to look at striped bass in relationship to habitat and also association between salt fronts and depth of the water.

Mr. Pride - NMFS will look at models based on the science.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Chris Moore - seems as we move towards ecosystem management we would move away from socioeconomic issues.

Dr. Hoff - does not believe that would happen. Thinks socioeconomic is important.

Mr. Haydon - there is a tremendous impact from man on almost every species fishable. It is according to what many fishes for and forages for. That all has to be looked at and bycatch.

Mr. Pride - dogfish sharks have made an impact on fish species. Under an ecosystem approach, may decide not to allow for increased spawning since there is a large biomass of juvenile males.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Haydon - looking at too sterile of an environment. Man may not know what impact he has on environment. They must be told. They don't understand limits.

Dr. Hoff - management today is for conservation and management as opposed to preservation. Council believes we should be conserving and managing. We need people to stand up and say what part of the ocean, if whole or part of, needs to be conserved.

Mr. Pride - some conservation groups say don't take any fish out of the ocean.

Mr. Moore - should conserve and manage.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Haydon - regarding best form for public involvement, almost has to be on a regional basis because many of the species are only regional. Would have to define goals and objectives for various species.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Pride - in VA, local governments are responsible for interpreting problems, they can come up with own recommendations. Put together a type of best practices manual for home owners.

Need to make it a part of local government practices. Negotiations come together when you create guidelines.

Mr. Haydon - things need to be similar and not extremely different in order for them to work. Need to show why it is necessary to do each thing. It would take a lot of time and political savvy.

Mr. Moore - a caution would be that there are competing agendas within agencies and by bringing in another set of agencies that might create a problem. They may be opposed to each other.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Haydon - the main consideration is the purpose of the ecosystem management is primarily marine life and things that affect it. There should not be boundaries. Species interact everywhere.

Mr. Moore - should form an informal partnership with other Councils.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Haydon - thinks it behooves the two Councils to work out their differences. Successes would have to be pointed out and would need to work toward same objectives. Try it for a few years and see how it works.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Mr. Haydon - would have to have an umbrella like FEP. Would need all of the background information. Would need an umbrella to cover all of the aspects that might come up under any aspect.

Mr. Moore - does it appear that an FEP could be a living document as look at each species?

Dr. Hoff - you are supposed to update a NEPA process every 5 years. If you do a good EIS the first time, all you would have to do is include new information and knowledge.

Mr. Haydon - are there a set of guidelines people can utilize and see what they need to add to it?

Dr. Hoff - when we produce the documents, we are concerned about other bureaucrats that make sure we have checked out everything.

Mr. Moore - have you looked into a way to make the FEP more user friendly?

Dr. Hoff - yes. We have a brochure which would help explain questions better.

Mr. Pride - are we talking about a background document as opposed to an FMP?

Dr. Hoff - that is the Council's call.

Mr. Pride - first go around may just be an informational document.

Dr. Hoff - have one large document with all of the information and then you can draw upon certain issues. It wouldn't be frameworked.

Topic 8: Techniques for determining success of ecosystem-based management.

No comments.

Topic 9: Other issues considered important for our region.

Mr. Haydon - looks at it based on individuals and jobs and what they have facing them, education and knowledge concerning these types of issues. Most people don't understand. Monies are not readily available and who is going to educate the Senate.

Mr. Moore - if developed a species plan that took a more direct ecosystem approach, is there a chance for a judicial challenge of that plan because there is no wording to take it into effect?

Dr. Hoff - our wording would be that we are meeting NEPA while doing ecosystem management.

Mr. Haydon - it is going to be hard for fishermen and stakeholders to accept new guidelines.

The meeting was closed at 8:15 p.m.

2.7.4 October 3, 2005 - Jamaica, NY

The meeting was not opened because there were no members of the public present. Hearing officer Pat Augustine represented the Council and Dr. Tom Hoff and Jan Saunders represented the staff.

2.7.5 October 4, 2005 - Southampton, NY

The meeting was opened at 7:00 p.m. by hearing officer Gordon Colvin. In attendance were: Karen Chytalo, Greg DiDomenico, Richard Wilson, Emerson Hasbrouck, Jackie Stent, Tara Froehlich, James Fletcher, Lisa Suatoni, Byron Young, Sonja Fordham, Dave Wallace, Don Myers, Mary Beth Tooley, Tara Duffy, Keith Dunton, Damien Orisio, Walter Burak, Lyndie Hice, Lora Clarke, Kestrel Perez, and John R. DiGiacomo. Harry Mears and George Darcy

represented NMFS. Council members present were Ron Smith, Bob Pride, Gene Kray, Pat Augustine, Jim Ruhle, Jeff Randall, and Fran Puskas. Staff present: Dan Furlong, Jan Saunders, and Tom Hoff.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Lisa Suatoni: There is a clear need. Ecosystems are currently at risk. Fishing pressures have caused decreased fish population. Both Commissions view ecosystems as their corner stone for making changes. They have a long way to go. Efforts are conceptual and other organisms should be considered. Disturbing trends are likely not being changed. They are eager to help the Council with this project.

Jim Fletcher: Science has been proven over and over incorrect. The Council still believes the best science is the only science. Solar cycles and estrogen have not been addressed. Shoreline development has not been addressed. We need to address what we have done wrong. Surfclams has been successful-but at what cost?

Emerson Hasbrouck: Enough Council attention, as the Council moves forward the process needs to look at other impacts other than fishing. Many of our species are dependent on estuaries. 75% of population is within 50 miles of the coast. There is a relationship of summer flounder and SAV beds, however most SAV in NY are gone.

Richard Wilson: Focus on ecological issues, especially estuaries, rebuild stock, hatching and restoring in estuaries. This is easier to monitor scientifically. The Council is paying attention and this should evolve.

Greg DiDomenico: The Council has missed the cumulative impacts of management and some type of consideration needs to be made by individual Council members in knowing regional practices, gears, user group, etc. Council's attention on ecological issues, there is some regulatory authority that is not under the Council's authority. Single species management has missed some socio-economies.

Karen Chytalo: To build on something Emerson said, better coordinate and integrate FMP with estuaries. Lots of information is already being collected.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Byron Young: Must consider the non-consumptive uses of ecosystems like windmills, pipelines, etc.

Greg DiDomenico: Broadly defined goals, don't tie us down by technical definition. That is not the way to proceed; they need to be modified based upon each fishery and the needs of public.

Richard Wilson: Conserve and manage. Again go back to the estuaries, look where the fish come from.

Emerson Hasbrouck: I agree with the goals for the Magnuson Act of conservation and management, not simply preservation.

Jim Fletcher: Ecosystem is not what it should be. We have been practicing fisheries management in terms of science. We lead with genetically defective fish. We are saying nothing of conservation. What is the desired ecosystems state? We are not there. The last 25 years has been the exact reversal of what it should be.

Lisa Suatoni: The definition is clear and agreed upon. It broadens the focus to include the entire ecosystem. It is concerned with interactions, predator-prey, impact of land use, etc. Need to focus on long-term economics yield.

Topic 3: Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Jim Fletcher: NMFS scientist gave me the answer "the dog ate my homework" There is more than NMFS and it is not being brought into this discussion. They tell us it is the best science. NMFS science is not the only science.

Richard Wilson: Public involvement is best forum, go to the communities. Drawbacks are that people don't know this type of meeting is going on. If it might be possible, post these in the post office to inform the public. Good to set high goals regarding zero mortality but it may not be maintainable.

Greg DiDomenico: The best thing to do to collaborate with the public; continue what the Council is doing with regards to meetings such as this. I would say all the different government structures need to collaborate more than they do now. Public does not know about limited entry, etc. Process needs to be slow, deliberative, collaborative and regional.

Byron Young: The people interested must also reach out for a holistic approach. That will be the hard part. We interact with fishermen easily. It will be the other types of stakeholders that will be hard.

Karen Chytalo: There needs to be a better variety of stakeholders. Make use of what are available, i.e. mailing lists, etc. Need regional and sub-regional groups.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Karen Chytalo: Again, it's making use of a regional group, water shed efforts, estuaries; it is an integration of values and needs to develop a holistic approach. Important to integrate everyone's data.

Richard Wilson: The Council needs to realize they are part of a larger picture. Identify the agencies to be coordinated through a central communication and meet on an established regular basis.

Emerson Hasbrouck: Work with the National Estuary programs.

Jim Fletcher: University students think it's all science, but it is not. They get a mind set from their professors. Congress passed a law on federal flood insurance, do away with it! Part of the problem is government and the EPA. Chlorine used in treatment plants-deadliest chemical known to man.

Lisa Suatoni: Council should work closely with NGO.

Gordon Colvin: The Council should think about what processes the Council uses to engage others.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMC's.

Jim Fletcher: Drawing lines in the water does not make sense. We don't understand what we are dealing with. For us to believe science is totally frustrating. Manage from where the water shed starts and go out to the 200-mile zone. If you do away with Federal flood insurance-do away with 2/3 of problems.

Emerson Hasbrouck: I suggest that if we take a watershed approach; extend as far inshore as far as the watersheds go.

Richard Wilson: The other FMC should relate on an informal basis. Go as far as the scientists deems necessary, not what the politicians say.

Greg DiDomenico: Follow what is happening now.

Byron Young: Be aware of climate change.

Bob Pride: Chesapeake Bay needs guidelines and uses the best practices. Ecosystems approach should include the best practices approach.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Byron Young: Maybe we are not using the right approach. Look very carefully going through this process and it may hurt but may end up better. All needs to think outside the box.

Richard Wilson: I don't know what management measures need to be incorporated. But you should also measure the results to see whether they are doing what you want them to do. Results need to be measured and compared within the Council.

Emerson Hasbrouck: 2 issues, 1 is the quandary between MSY and OY. There needs to be flexibility, if there are a couple of species that interact with each other. How do you manage both of them for MSY? The 2nd issue is there needs to be something for the definition of overfishing. The 2nd question is that's a good question, good luck.

Jim Fletcher: Management actions are not given time to take effect. We will never know where we are because we always go with what the scientist says, needs to be changed. The fisherman got along fine with regards to the north and south. The Councils put a division between the fishermen. If you continue you will run the fisherman out of business.

Lisa Suatoni: The actual management measure may not be quantitatively different from the single species but may change qualitatively. Science of multi-species is growing quickly. The Mid Atlantic Council can take action here. The approach will require bycatch monitoring. Documentation for habitat changes will be required. TAC's may need to be lowered to be risk averse or reduce for importance as prey.

Greg DiDomenico: It is important to point out; Mid-Atlantic is doing things that are ecosystem based.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Jim Fletcher: One question, not based on current science, it is not science, at its best is generated by like-minded people. Part 2, the environmental policy; we are not concerned about the number of discards we have. We have not addressed bycatch in recreational fisheries. He believes NOAA has a policy to decrease commercial fishing nationwide and give fish to recreational fishermen.

Richard Wilson: You should have an umbrella type plan. Become an advocate to the fish. If the fish survive the rest of this will survive. There are bigger threats to fish that are outside Council control.

Greg DiDomenico: Each Council should implement the FEP; it should not be a mandatory requirement but should be part of the FMP.

Karen Chytalo: Take incremental steps, not every model needs to compute out perfectly. Don't need all data. Use adaptive approach.

Greg DiDomenico: Know that forage base discussion is coming. FEP needs to provide guidance for FMP.

Topic 8: Techniques for determining success of ecosystem-based management.

Byron Young: The young people can contribute to future successes, challenge the university systems etc. It is an interactive process.

Greg DiDomenico: The tool that needs to be implemented would be a much more accurate assessment.

Richard Wilson: Identify problems to identify tools after you identify the management system. If we have these tools, more people will have to understand how it works.

Jim Fletcher: Need to look at historical patterns for ecosystem management.

Topic 9: Other issues considered important for our region.

Jim Fletcher: Sarcastically proposes to use RSA to fund Federal scientists. If we go into ecosystem management, MMPA, ESA, birds-all will collide. Will we as a Nation, allow the top predators (and thus competition of man) to be harvested?

Richard Wilson: Rebuilding is the best approach. Focus on the food chain. Individual species approach is a good approach. What Council is doing is the best way now. Collaborate whenever you can.

Karen Chytalo: There are other resources out there if you just look around.

Gordon Colvin: Any summary comments?

Richard Wilson: The last item, even if you are not fully funded there are communities that would participate financially.

John Rod DiGiacomo: Read two statements, which are attached.

Meeting adjourned at 9:00.

2.7.6 October 6, 2005 - Long Branch, NJ

Meeting opened at 7:15 p.m. by hearing officer Bruce Freeman. Dr. Tom Hoff represented the staff. There were fourteen members of the public present: Al Ristori, Steve Spinelli, Joe Occhipinti, Bob Semkewyc, Art Hilliard, Allen Hilliard, Ron Santee, Marty Haines, George Bachert, Tom Buban, Hal Hagaman, and Willies Egerter.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Ristori – single species management doesn't make much scientific sense. We can't have all species at their individual MSY levels. He urged ecosystem approach over 30 years ago when he was a Council member. Dogfish are going to bite us – they eat everything. EAF is long overdue and we need it NOW.

Mr. Art Hilliard – this spring there were a lot of dogfish and we couldn't fish. Do you consider economic impacts? He has seen more striped bass than he has ever seen in his lifetime. Want more studies on predator/prey.

Mr. Buban – this plan is a disaster. NMFS is for commercial fishermen. Need to help the recreational fishermen. How can we trust you?

Mr. Egarter – species by species management is wrong. Dogfish can wipe out an entire year class and now they are being caught all year. They eat scup, black sea bass and summer flounder.

Mr. Hagaman – put a limit on dogfish.

Mr. Hilliard – 20 year rebuilding plan for dogfish, but need to check it every year. Can't keep the same number for 20 years.

Mr. Occhipinti – should get information from meetings like this.

Mr. Santee – does this plan involve area closures? He is opposed to them. Ocean dumping has screwed up lots of spawning areas. They are now forced to fish areas that will be closed areas. Sediments that are being dumped will spread out.

Mr. Buban – you are not talking about habitat.

Mr. Haines – wherever there is beach replenishment, you don't catch summer flounder. Dredging has also cut off lots of flounder.

Mr. Bachert – Corp has no idea that fish like rocks and structure.

Mr. Haines – socioeconomic issues must be considered in FMPs. Management doesn't consider areas, for example porgies in Sheepshead Bay don't get large. Some places a 14" fluke is hard to catch since don't get large fish. Management is eliminating people fishing from piers and jetties. They are killing more fish because the sizes are too big.

Mr. Occhipinti – should use recreational captains for data.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Egerter -- NJ has a good reef program and it builds habitats.

Mr. Santee -- should close the Mud Dump and put rock on the dump site and then close the area for production. It would create good habitat.

Mr. Egerter -- habitat and structure have been leveled by commercial draggers. The reef sites should be set aside and protected.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Egerter -- advocates the use of public forums like this one. Advisory Panels should be used even though the AP advice is often not considered. The information that an AP provides should be used more.

Mr. Hagaman -- the public should be more involved before decisions are made.

Mr. Haines -- the management should give regulations an opportunity to work before new ones are added in. There is never enough time to see what works.

Mr. Spinelli -- there is lots of culling for larger fish, especially summer flounder. There is lots of commercial bycatch and waste. He has seen lots of whiting and ling floating on the surface dead after a commercial trawl goes through. Need more observers on commercial boats. The recreational fishermen are providing logbooks and information and he wants that information to be used.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Bachert -- beach replenishment is a seriously problem. Also ferry boats pump 10,000 gallons of water through per minute and lots of fish get sucked in and chewed up.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Bachert – Council authority needs to go into the bays at the least.

Mr. Egerter – Council authority should go into where the life stage starts. How do you reclaim the damage that has already been done?

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Ristori – the needs to be better coordination between Mid-Atlantic and New England. There have always been problems where the Council's don't have authority for example winter flounder. The Mud Dump fishery has collapsed, i.e., the whiting out there have gone the way of the dodo bird. The giant BFT fishery won't come back because there is no food now. Whiting and ling should not be in the NEFMC because they have been extremely mismanaged by New England. This is a disgrace, but a result of the 2 Councils having extremely different agendas.

Mr. Egarter – MAFMC management often benefits the New England area because so many of our fish move north as they grow. Size limits only really benefits states to the north of New Jersey.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

No comments.

Topic 8: Techniques for determining success of ecosystem-based management.

No comments.

Topic 9: Other issues considered important for our region.

Mr. Ristori – the first thing that you need to do, is to get management of the forage species. There has been nothing done on management of sand lance, anchovies, and herring. During the 1970s and 1980s there were huge populations of sand lance, but we just don't know what happened to that species. There has been nothing done on ecosystems in the past 25 years.

Mr. Santee – if there is no money, is it likely that this would require a salt water license or user fees? He is opposed to that.

Mr. Hagaman – to go to ecosystem management it will be very hard, since don't know many of the interactions among the species.

Mr. Haines – first need to address pollution and ocean dumping, and then have to address where have all the sand lance gone. You have to bring back ALL species and then things like whiting can take some of the pressure off of black sea bass and summer flounder.

Meeting closed at 9: 40 p.m.

2.7.7 October 11, 2005 - Alexandria, VA

Meeting opened at 7:10 p.m. by hearing officer Jack Travelstead. Dr. Tom Hoff represented the

staff. There were seven members of the public present: Chris Krenz, Ken Hinman, Sonja Fordham, Dennis Heinemann, Andrea Geiger, Roberta Elias, and Amanda Leland.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Hinman provided a prepared statement (attached). Gave general observations and specific recommendations on the conservation of forage fish relating to question 1 being the issues being missed by the Council in its single species approach and the need for more attention to predator/prey interactions and question 6 relating to types of management measures needed to address these issues. Ecosystem based management is a natural outflow of our increasing knowledge of the ocean and our expanding circle of concern for all marine species and their environment. It is a natural progression in the evolution of fishery management. An ecosystem is not made up of separate species but of the relationships among those species. It takes these relationships into account. This is neither a criticism of single species management nor a performance of the Councils; rather it stems from the fact that species by species approach can not address certain critical issues and problems, real or perceived, it can not be ignored. The current process lacks direction. There is no consistent guidance on what information is needed or how it should be used. An ecosystem based approach need not be complicated. We support the ecosystem panel's advice to take an incremental approach being with protecting key predator/prey relationships. We encourage the Council's to apply ecosystem principals, goals and policies. There are three actions that are important: 1) predator/prey interactions need to be considered, 2) bycatch, and 3) protecting habitat. Greatest missing piece of this puzzle right now is predator/prey. Conserving forage fish is paramount. We are anxious to assist the Council in developing a process for harmonizing the management objectives and synchronizing the management regulations in SMB and related predator species within the Council's FMP. There are four elements that are essential to expanding upon the forage fish FMP's: (we would like a change in the Council's management structure relating to better integrating the various committees that have jurisdiction over species that are the key connections within the aquatic system both scientific and management: 1) protecting and maintaining the species ecological role, including preservation of an adequate supply of forage for predators as the principle plan objective, 2) expanding the information base to fully describe and comprehend the links of associated species, 3) adding a definition of ecosystem overfishing as a compliment to traditional overfishing criteria including ecologically relevant reference points, 4) establishing a precautionary total allowable catch that explicitly provides a buffer against overfishing.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Heinemann -- What is meant by "productive ecosystem" or "ecosystem production"? I'm not sure what that is.

Dr. Hoff -- That is the statement that came out of the conference in March that deals with both emphasizing productivity of the ecosystem that it will support human extraction of some means.

Mr. Heinemann -- So the activities you are referring to are extraction activities....

Dr. Hoff -- including resource extraction

Mr. Heinemann -- So, do you have in mind a goal for ecosystem based management from the Council's perspective?

Dr. Hoff -- I don't. At this point, the answer to that would be "I don't believe so". What we are doing, this is the first attempt by the Council at formal ecosystem management and this specific grant that we have went to the four east coast Councils, was to engage the public in discussions on these nine topics. So in terms of, right now I would say that the Council has a blank sheet in front of it.

Mr. Travelstead -- Very much so, I don't think anyone has a predetermined feeling for how this should go. That is why we are holding the scoping meetings is to hear from the public what your perceptions are, where we should be headed. Take it from there.

Mr. Heinemann -- In incorporating ecosystem based management goals and objectives do you think there's any latitude with Magnuson to go beyond the goal of maximum sustainable yield.

Dr. Hoff -- I think you have that latitude right now. MSY can be reduced for ecological, economical, and social issues in order to come to an OY level. The Council is going to sit and wait to see what comes out of Congress.

Ms. Leland -- I was confused by this question. Should it be conserving and managing or preserving. One is the means to the other. Ecosystems should be preserved. We should be conserving and managing the species or preserve the ecosystem, we should do both. There is a paper recently which states the purpose the ecosystem based management is to preserve ecosystems so that they will provide services. This gets at a fundamental difference in how you approach management whether or not the primary purpose of management is as it is under the Magnuson Act where the extraction of resources and where we are trying to conserve those resources for future generations as opposed to preserving those resources and then extracting what you can without harming the preservation. There is no latitude under Magnuson approach. Magnuson is tied into exploitation and trying to conserve for future generations. Does the Council feel it really needs to be able to do a lot more than it has been doing with a single species approach and limited ecosystem considerations?

Mr. Travelstead -- I don't think Dr. Hoff can answer that from a Council prospective. He can provide his own personal opinion. We are interested in do you think Magnuson needs to be changed or reauthorized in some way to allow the Council to do more in ecosystems or do you think we already have the authority to proceed with ecosystem management?

Ms. Leland -- I am not an expert on Magnuson so I don't know if you have the authority or the latitude to give, I suspect not from what I know about it. I don't see in the reauthorization that that's on the table. One thing that is apparent for me is that I think we have to do a lot better job managing the extraction of resources from the oceans because the way in with we have done it now, thus far, it has had significant ecosystem impacts on habitat, on other species, on the forage species, on other prey species, bycatch species. There is a whole slew scientific papers out there that have demonstrated ecosystem impacts of fishing. We clearly, if we are going to conserve, protect, perhaps preserve ecosystems we have to do a far better job. There is a lot of people who think that is not possible with the current single species approach hence the need for an ecosystem based approach. I am skeptical as to whether or not that could be reached in incremental fashions as suggested earlier in an evolutionary way as opposed to a revolutionary way. No one has a really clear idea as to how to put all the elements of an ecosystems based management together yet and I don't think we will know evolutionary versus revolutionary change or we can do it evolutionarily until somebody comes up with a model for how to put it all together.

Mr. Hinman -- It is a government issue that is why the report is called ecosystem based fishery management. Even though we are trying get out of the little box of single managed species the whole process is still in a box. I recognize that Councils under the Magnuson Act have jurisdiction over managing fisheries/fishing and not an authority over regulating a lot of other activities that affect the ecosystems that eventually need to be brought into this whole picture, whether evolutionary or revolutionary. We are limited right now with the authorities, the same limits the Councils face with essential fish habitat where the Councils only have jurisdiction over fishing activities that impact habitat and not many others. I just want the Council to understand, to recognize we are trying to get into managing or protecting and observing the ecosystem, we are trying to get into controlling a lot of other activities that we do not see that, okay that is where we need to start or is that an overwhelming goal and we can't get started or whatever. We must begin now to do what we can do.

Ms. Leland -- What is the goal of ecosystem based management? There is a fundamental difference in having to do ecosystem systems based management for the concept of managing, which could be taken any number of ways. It could be maximizing yield for all species or for the goal of as stated here at the bottom of this box. The goal of ecosystem based management is to maintain ecosystem in a healthy, productive manner. There is some really good stuff in this report. But it doesn't get at the question as to why we are doing this. What is the purpose of doing this? Is it just to change the management? The reason I am moving this direction, is because we want to have a better position than we do currently. When the Council is reviewing what the ecosystem based management is or what the ecosystems approach to fisheries is, it is important to include in that the concept of what the goal is. The goal should be explicitly stated. This is good for the fisheries and ecosystems as a whole. I have provided the *Scientific Consensus Statement on Marine Ecosystem-Based Management* that was signed by over 200 scientists (attached).

Ms. Elias -- supports healthy fisheries and healthy ecosystems. She fully supports the scientific consensus statement.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Hinman -- It seems premature at this point to include in this stakeholder process mineral extractors, energy producers, aquaculture, etc. It is obvious that those interests are going to enter the process at some point but that point is not in this process, the Council process in figuring how fisheries can be managed in an ecosystem context. I think that is down the road having those interests involved and talking about living marine resources and how what those resources should look like.

Ms. Leland -- In that whole mix of stakeholders, the environmental community that Tom mentions is not included in your document as stakeholders.

Ms. Elias -- You must continue to fully involve the public and keep them in the overall process.

Mr. Heinemann -- I am not comfortable with the premise of the first sentence in the introductory paragraph, the development of goals and objectives should be a regional bottom up process. There are many bodies that produce that statement, NOAA, Councils, FAO, the national framework, a couple of workshops going on right now, a lot of people are trying to figure out what ecosystem based management is or what an ecosystems approach would be and those groups have come to an agreement regarding a large number of elements that would be necessary or that are logical candidates for ecosystem based management and they have each taken their own staff, principals and objectives. If ecosystem system based management is going to be successful in our country we would need a top down, bottom up process. A top down selection of principals, overarching goals and objectives and then a bottom up involving stakeholder's implementation of that. Without a top down provision of overarching goals, principals and objectives you could have widely divergent things happening in different regions. You could end up with one region that focused on the preservation and another that focused entirely on extraction. If the absolute maximum yield out of the ecosystem, just taking the single species approach to the entire ecosystem is not reasonable. If you were to use a terrestrial analog you could end up with one region that looks like the Rocky Mountains with a wide variety of areas managed for different purposes from extraction to complete protection. Without any top down control you could end up with another region that would look like the mid-west prairies that are entirely without production and there is no preservation at all. If the nation is going to have a coherent approach to fisheries management incorporating ecosystem principals in the larger context of ocean management and ocean governments there has to be top down element as well.

Mr. Hinman -- Councils should be the advocates in an ecosystem based approach. The Council should be advocates for the fish, NMFS should be the advocates fish and for PETs. The Council recognizing the limited ability to effect all those other federal decisions that affect habitat. The Council, the fishermen, the environmentalists and others who participate in that process, the

advocates within the government for protecting the habitat has been identified as essential for supporting the fisheries. Unless we restructure the whole federal government that is really what we need. They can be the advocates that bring the public to support these ideas.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Krenz -- Thanks for this forum of public input. I want to clarify that Oceans 21 is not part of Magnuson-Stevens Act. However, what is in Oceans 21 is linked to Magnuson-Stevens. In Oceans 21 we use the scientific consensus statement for all our ecosystems based management and that is what we are using and it comes directly from that definition and we have scientists from around the world. One section in Oceans 21 is a section on regional governments, includes the regional Councils, we see this as something that is built upon current work to look at mechanism or activities outside the Councils purview. It was based upon many different uses that are going on and how to coordinate those uses. There is so much talk about the frustrations in Councils that as our ecosystem declines from things such as pollution, habitat degradation, etc., it really stuck me that this is a great place to start... to address those issues and empower the Councils to address those issues. These regional ocean partnerships are not set in stone and it not mean to change how Magnuson-Stevens work and the Fishery Management Council work. There is a spot for an Executive Director of each Fishery Council on each regional ocean partnership. We feel that this is a great opportunity to have the Councils come and say "hey, you are really messing up things for us.

Ms. Leland -- The issue raised in #4 actually I was pleasantly surprised to see that this was even included in the document. My impression thus far is that the Fishery Councils are resistant to the idea that they need to engage on a larger level with other jurisdictional issues, agencies, or otherwise. It brings up the larger question of how do we deal with all these different activities that are going on and who has jurisdiction. Oceans 21 is not really, is definitely a stretch beyond where we are now but it is not that big of a stretch. The Bush Administration has the ocean action plan some what endorses partnerships i.e., Great Lakes partnership. It is a strategic plan that they are working through right now. I am pleased the Councils are considering these issues that are outside your purview. The model for regional entity is great.

Mr. Hinman – look at the Chesapeake 2000 agreement. They set the goals and are dealing with widespread issues like farming and transportation.

Mr. Heinemann – if you have comprehensive management, agencies at all levels MUST work together. No one has all the solutions, but Councils can make great strides all by themselves. Fishing effects on the ecosystem are the largest impacts to the ecosystem.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Hinman – need to have a joint Council process.

Mr. Heinemann – something that is missing is the need to include human use. Need the social,

political and economic systems. We manage "uses" not the ecosystem. You can not just use ecological boundaries – need to take into account the human activities i.e., scallop openings of closed areas. The problems are very complex.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Hinman – please remember my earlier comments. The New England FMC approach is less successful in ecosystem approaches for fisheries management.

Ms. Fordham – certainly would like to second Mr. Hinman's comments about the NEFMC approach being very unsuccessful.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Mr. Hinman -- fully supports the development of an FEP. Wants the FEP to be adaptive. Compiling all the background information on ecosystem is a daunting task so begin with the food web.

Ms. Elias -- go ahead and do an FEP. Use historical data and a precautionary approach. The FEP should lay out the strategic approach.

Mr. Hinman -- EAF is just a different way of looking at what we have and therefore why EAF is different than NEPA is because it is NOT single species approach.

Topic 8: Techniques for determining success of ecosystem-based management.

Mr. Krenz -- ask the scientists and use the attached consensus statement.

Mr. Hinman -- models currently exist i.e., ecosym, ecopath, multispecies VPAs.

Mr. Heinemann -- even if you have in place the tools and an FEP, you will need to have standards and mechanism for incorporating the information into management. You need to use the information to set OY for single species and then suites of species. I don't see the mechanisms or guidelines being available now.

Ms. Leland -- the techniques and success rests on the goals of EAF -- the basic, fundamental goals.

Mr. Hinman -- ecosystem "health and integrity" are monitored by various tools and indicators, but you all need to know the starting point.

Topic 9: Other issues considered important for our region.

Ms. Leland – why aren't you doing EFH now?

Ms Fordham – I am not an expert on ecosystem-based management, but I am familiar with the work of the Mid-Atlantic Council. I agree with many of the comments made tonight by my colleagues, particularly the idea that the Council can take many steps toward ecosystem-based management now, without new Congressional mandates or money.

Based on other comments heard tonight, I take this opportunity to point out that species-specific management has been less than successful in many cases for a variety of reasons, including lack of an ecosystem approach as well as habitat degradation and simple failure to accept or act quickly enough on scientific advice for catch limits. As you know, species-specific management has been most successful when scientific advice, particularly with respect to reducing fishing mortality, has been heeded (regional examples include summer flounder and blacktip sharks). We therefore hope that the Council will view species-specific management as a component of ecosystem-based management and not see the trend toward this approach as a signal to move away from or discount the importance of setting science-based limits on catch and establishing protection for essential fish habitat. The nation as a whole has a long way to go toward achieving these basic, relatively straight forward objectives; we hope progress in that regard will continue while we move toward operating within this larger, ecosystem context. It is important to keep in mind that an ecosystem approach is likely to dictate that such decisions (on catch and area protection) be made in a more precautionary manner.

We offer a specific recommendation for strengthening the Council's approach to ecosystem-based management. We urge, as we have in the past, better coordination between the Councils and the National Marine Fisheries Service (NMFS) Protected Resources Division, particularly with respect to fish on the "Species of Concern" list. We fear that the Council and state fishery managers are being sheltered from a lot of bad news on a number of the region's fish species including Atlantic halibut, Atlantic sturgeon, cusk, wolfish and several elasmobranchs. These species are not yet "P.E.T" (protected, endangered or threatened) species, but are serious risk of becoming so, primarily due to bycatch problems that are not being addressed by the Councils or the NMFS representatives that work on/with the Councils. We hope that improved integration of these bodies will benefit not only the fish species at risk but also marine mammals and sea turtles.

Lastly, as you might imagine, we hope that the Council will not go along with the popular notion that ecosystem-based management should include culling, driving down or eliminating certain charismatically challenged species based simply on economic value and/or real or perceived dietary preferences. We urge the Council to instead look to scientific advice and consider the complexity of the relationships among myriad species in the marine ecosystem.

Mr. Heinemann – Current processes are missing 3 things: 1) adaptive management, 2) precautionary approach, and 3) geographic or place management. As we deal with ecosystems, the decisions become more complex. There are not always analogs available and therefore we need adaptive approach. We can't really do EAF management right now because we don't have the complex models we would like to have. As you move towards EAF, the uncertainty will

become greater. The greater the complexity, the more a precautionary approach is NEEDED. Finally, area management is an essential part because humans act on area.

Ms. Elias – you must continue to rely on strong science.

Mr. Hinman – plug for science and the fact that science and allocation must be separate, in order to maintain the integrity of science.

Mr. Heinemann – seconded Mr. Hinman's last statement.

Meeting closed at 9:25 p.m.

2.7.8 October 12, 2005 - Ocean City, MD

The meeting was opened at 7:15 p.m. by hearing officer Howard King. Staff present: Dr. Tom Hoff and Kathy Collins. There were five members of the public present.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. King - Council has its responsibilities and Congress has its priorities. Who is taking the lead to drive us towards ecosystem management?

Dr. Hoff - believed it may be a result of the PEW Report and Oceans Commission Report that came out last year. The NGOs connections with Congress are helping the move towards ecosystem management.

Mr. King - is NMFS providing the funding to move in this direction?

Dr. Hoff - believes there will not be funding for next year. There are other concerns for Congress - the Budget deficit is huge, the war in Iraq, hurricanes.

Mr. Monty Hawkins - wouldn't doubt that there would be no funding. How often is the salt water registry mentioned in the Bill?

Dr. Hoff - that is in the Administration Bill. Doesn't believe it is in the Senate version.

Mr. Hawkins - thinks the Council has missed a great many opportunities through ecosystem management to better our fisheries. He lived and fished in the time during greatest collapse of fisheries. In 1991, the summer flounder quota was so low that trawling ceased past 11 miles. Certain bottom trawl gear impacts are sole influence. Thinks the great decrease in habitat on the bottom had a far greater impact. Most fishing gear impacts are outside 3 miles.

Mr. King - if those areas are identified, would they be protected under HAPC?

Dr. Hoff - Council could have that done. Might want to consider some types of fishing gear restriction in those areas.

Mr. Hawkins - thinks everyone would benefit and thinks trawl fleets would see better production.
Dr. Hoff - most resources in mid-Atlantic area are highly migratory.

Mr. Hawkins - the Council has not paid enough attention to bycatch. What is up with red hake in the scallop fishery? We are down to 3 to 5 fish a year. Doesn't see any support from MAC on any sort of artificial reefs.

Ms. Margaret McGinty - understands that habitat has been based on frequencies of occurrence. Survey data are all that exists?

Dr. Hoff - guidelines lay out 4 levels of data for essential fish habitat. NEFSC has some ecosystem type of surveys going on.

Mr. Hawkins - everyday I have to report where I fish. You know where a lot of structured bottom is. VTR data (Vessel Trip Reports) could show you a lot of information that is not used.

Dr. Hoff - you can do fishing effort searches. You can know where boats are fishing all the time especially as in the groundfish or scallop fleets where VTR data are provided.

Mr. Hawkins - regarding managing for maximum economic benefit through ecosystem production, thinks you could drive this.

Mr. Steve Doctor - elasmobranch - seems to be a reciprocal relationship between dogfish and groundfish. Now that dogfish quota has been decreased, Council could look at dogfish plan and see where the analysis should be done. Could have groundfish or dogfish or somewhere in the middle. Needs to be looked at. Thinks it would benefit multi-species relationships.

Ms. McGinty - does The Ocean Conservancy have a part in the data analysis?

Dr. Hoff - yes. All of the assessments in NEFSC are done in a two or three day meeting then it is peer reviewed. Prior to the peer-review you have working groups that assemble, review, and analyze the data and any knowledgeable individuals from industry or NGOs can participate.

Mr. Doctor - you are going to have to accept a reduction in summer flounder and black sea bass fishery if you continue to maintain the dogfish fishery.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

No comments.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

No comments.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

No comments.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Hawkins - the smaller you cut the pie, the easier it would be to understand - Cape Hatteras to Canadian border is too large an area. Could boil an ecosystem down pretty small when looking at individual species.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Hawkins - need to have more flexibility for the Council to design a plan to allow for best ecosystem yield, for example: dogfish - raising the catch limits.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Mr. Doctor - should create an umbrella-like FEP. Should be charged with looking at cumulative effects. Might need to create a separate document from FMPs and use it as an overview. Maybe could partner with Universities and farm it out.

Mr. Hawkins - agrees that an umbrella-like FEP should be developed, but sees it as a huge document.

Ms. McGinty - instead of starting new documents, why not use framework of the FEP from the Chesapeake Plan to beef up management plans.

Topic 8: Techniques for determining success of ecosystem-based management.

Mr. Hawkins - suggested to use VTRs. There are mounds of data. Could modify VTR to faster gather information on HAPCs. Somebody needs to talk to the old time fishermen! They have a wealth of information to share. An FMP that rebuilds can dig deeper. Strongly thinks flourishing fisheries have greater biomass explained by present practice.

Topic 9: Other issues considered important for our region.

No comments.

Meeting closed at 8:35 p.m.

2.7.9 October 13, 2005 - Annapolis, MD

The meeting was not held for lack of public attendance. Those present were hearing officer Kenny Keen and Dr. Tom Hoff represented the staff. Margaret McGinty was the one member of the public present. She had participated the previous night in Ocean City, MD. She is an employee with the MD DNR and was very interested in the public positions on the scoping document. She stated that the MD DNR would develop written comments on the document. The Agency's comments were submitted on October 31, 2005.

2.7.10 October 17, 2005 - Cape May, NJ

Meeting opened at 7:05 p.m. by hearing officer Bruce Freeman. Dr. Gene Kray of the Council also attended. Dr. Tom Hoff represented the staff. There were 16 members of the public present: Eleanor Bochenek, Tom Siciligno, Grant Murray, Greg DiDominico, Frank Coslo, Ed Goldman, Anna Macan, Chris Petroccelli, Richard Payne, Michael Woods, Michael Doebley, Tom McCloy, Brandon Muffley, Erling Berg, and Sam Foxworthy.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Mr. Siciligno – ecosystem efforts should be very broad based and should extend into the headwaters.

Mr. Doebley – you must follow the process, like NEPA, so there aren't lots of lawsuits. The Councils need to continue to do outreach to all their stakeholders.

Mr. DiDominico – don't want to repeat the fiasco of EFH with this ecosystem effort.

Mr. Berg – what is the timeframe for implementing ecosystem work, is it 2008 or 2012?

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

No comments.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Payne - need to develop the historical basis in order to make determinations as to what the

goals should be.

Mr. DiDomenico – Council needs to develop their goals and objectives, but you must manage in the estuaries.

Ms. Bochenek – the Council has done a real good job in fishery conservation, but we now need to go to the headwaters and we need better enforcement. Lots of the critical habitat is in state waters.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Ms. Bochenek – there should not be national goals. There is not enough feedback.

Mr. DiDomenico – they definitely do NOT support different Ecosystem Councils and another layer of government.

Dr. Kray – we will have to interact with ASMFC and the states. Everyone must be engaged.

Mr. Freeman – States rights will often be an issue. Can't look at political boundaries.

Dr. Kray – wants everyone to be aware that Oceans 21 legislation addresses the new proposed Ecosystem Councils.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. DiDomenico – the Council has done a real good job with fishing mortality and fishing gear impacts. Now they need to move on to other items.

Mr. Goldman – Council and Commission only manage fishermen. We now need to go to other agencies and formally engage them.

Ms. Bochenek – agree with both of the previous speakers. The Council needs to think internationally also i.e., mackerel.

Mr. Siciligno – the international arena is very important i.e., the US has done a lot of conservation on tuna but NO ONE else is doing much. The definition of ecosystem needs to be done formally.

Mr. Foxworthy – the situation is getting critical. There are lots of things going on and we need to talk with other entities. There needs to be an increase in everyone's level of awareness.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Ms. Bochenek – ecosystems have to go inshore, and all the way up through the headwaters.

Mr. Goldman – need to be concerned with the NE Council since Amendment 13 doesn't care one bit about NJ fishermen. Arrangements need to be formal.

Mr. Payne – there needs to be formal relationships. As water temperatures change, you need to be able to speak with other guys in the room.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Freeman – NEFMC and MAFMC have very different strategies for fisheries management. How do we deal with those differences?

Ms. Bochenek – keep working with the way the Mid-Atlantic works. New England has very serious problems with inadequate management. There has to be common ways to discuss things, but you do NOT need to merge the two.

Mr. Doebley – management measures should NOT have no fishing MPAs.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

No comments.

Topic 8: Techniques for determining success of ecosystem-based management.

Ms. Bochenek – need to address global warming and its effects on fish stocks. Need to build that into the monitoring programs.

Mr. Siciligno – the total stock assessments need improvements. Both commercial and recreational fishermen do not believe the numbers. In order to judge success, you have to go back to the basics.

Mr. Goldman – need to look at forage species. Have to consider horseshoe crab eggs for the sustainability of birds. Need to consider how many menhaden are needed in Chesapeake Bay for striped bass and weakfish.

Topic 9: Other issues considered important for our region.

Mr. Siciligno – perhaps the Council level is not the right level. Perhaps it needs to be at a much higher level because the Councils do not have the necessary clout. Has to be national and then the Councils can deal with things.

Ms. Bochenek -need a strong scientific basis for management in order to know what is going on

in the environment. NEED lots of money pumped into the system to get the information to manage properly.

Dr. Kray – with the grant that we were give, we were charged to get the public involved. We were never told what the goal should be or what it is. Congress wanted the public engaged with the four Councils and then they will report back to NMFS. NMFS should provide a template. The Council will manage their regions and coordinate with other agencies. Let the Council work within the guidelines.

Mr. DiDominico – the absolute best way to strengthen EAF is to keep it within the Councils. Don't want a new layer of government.

Mr. Berg – is anyone else doing this ecosystem work or is the US at the forefront?

Mr. DiDominico – in summary, the regional Councils need flexibility based on national guidelines. There should be no new Ecosystem Council. The public has to buy in to make it work. FEPs should guide the science. Goals and Objectives need to be very broadly defined. There should NOT be any EFH type guidelines. There should not be new MSA amendments that require strict new guidelines.

Mr. Muffley – the general public does not trust our single species management and ecosystem management will be much more complex. The data requirements will be overwhelming. There is work on multispecies models, like the Chesapeake Bay one for striped bass, bluefish, weakfish and menhaden. But we are a long way away from tackling EAF.

Mr. Payne – many groups have been collecting data on EAF. You have to reach out to them all.

Dr. Kray – asked NMFS Chief Science officer, Dr. Steve Murawski, when we will know when we are doing ecosystem approach to fisheries. Dr. Murawski said it will not happen over night and that it will be evolutionary. We will NEVER have all the data, but we can move towards EAF.

Mr. McCloy – you can not flip a light on and get to ecosystem tomorrow. It simply will NOT happen. It is an evolution to get there. The public needs to keep that in mind.

Meeting closed at 9:40 p.m.

2.7.11 October 18, 2005 - Lewes, DE

Meeting opened at 7:10 p.m. by hearing officer Rick Cole. Dr. Tom Hoff represented the staff. There were three members of the public present: Glenn Salvador, Caz Salvador, and John Mateyko.

Dr. Hoff presented the scoping document. He explained there are 9 topic areas for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

No comments.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Mateyko – favors ecosystem management. Stresses that you have to consider mortality from ALL the sources, pollution, overfishing, contaminants, etc. Wants the Council to assemble large slices of information so you could track to the sources of pollution and then look at what sources we have some control over. Let me use the Council's knowledge to impact the political system. He wants a focus on public education and what the public has to do to restore the ecosystem. Therefore he is in favor of preserving the overall ecosystem.

Ms. Salvador – agrees 100% with Mr. Mateyko.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Mateyko – there is a real teaching opportunity here. Use the waters since they have a very high public awareness. The ocean is like a canary in the mine. You can teach long term sustainability. If an ecosystem collapses, it will have major economic impacts on communities like Lewes. It will impact everyone who lives in the community.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Mateyko -- the Council needs to explicitly address Sussex County Plan due in 2007. Now is the time to be informed. The Governor has an office of "Livable Delaware". The Council needs to communicate our concerns to the state government.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Mateyko – the boundaries of the ecosystems should be left to science. The watersheds should be the boundaries.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Mateyko -- the communication needs to deliver a consistent message between the two Councils.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

No comments.

Topic 8: Techniques for determining success of ecosystem-based management.

No comments.

Topic 9: Other issues considered important for our region.

Mr. Mateyko – you can't responsibly avoid ecosystem management because we have the expertise and there needs to be changes to manage fisheries. The state of our environment and knowledge is changing. It would not be responsible to manage otherwise. There is tremendous potential to reach public awareness through fish contaminants and personal health. The health of the environment, in general, is a large public concern for Americans. There is a public mandate to meet the audience wherever they are at.

Meeting closed at 8:20 p.m.

2.7.12 October 19, 2005 - Newark, DE

Meeting opened at 7:10 p.m. by hearing officer Dr. Eugene Kray. Dr. Tom Hoff represented the staff. Dr. Peter Rowe, the Director of NJ Sea Grant, was the lone public attendee.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Dr. Rowe – ecosystems can't be based on political boundaries. He supports an evolutionary approach to EAF. It is a logical, natural movement from single species. Anthropogenic impacts have to be better addressed.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Dr. Rowe – understands the difficult charges to the Council to fully utilize the stocks. Maybe we shouldn't be fishing at MSY, but rather at a lower more conservative level. There is a growing controversy with MPAs and there will need to be a common ground developed. MPAs are critical for some species like groupers.

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Dr. Rowe – the key is to educate people and then those people become part of the process in appropriate bottom up management. Federal agencies need to evolve and work together and not compete with one another. There needs to be practical decisions made between MPAs and the

MSA. Federal flood insurance is a disaster when people keep rebuilding with taxpayer money. Perhaps there should be something like "One and Done".

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Dr. Rowe -- the current rules need to be changed for coastal development. Ecosystems will need programs like the Integrated Ocean Systems.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Dr. Rowe – there should be formal relationships between LMEs. That will generate more actions. As far as going inshore, it should be as far as possible with the States fully cooperating whenever possible.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Dr. Rowe – discards of undersized fish is a big problem. Recreational fishermen mistrust MRFSS. Is there some way that Sea Grant can get involved? It would be nice if everyone had the same management measures, but we also need to retain flexibility. There should be good interactions among the Councils.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Dr. Rowe -- an FEP would be very helpful to move towards an ecosystem approach.

Topic 8: Techniques for determining success of ecosystem-based management.

Dr. Rowe – larvae and juveniles need good connectivity with recruitment. What is the bottleneck for the adult population? Do the fishermen understand the science? Sea Grant could get into this issue and could help get the two groups to talk together better. Research-Set-Aside program and the associated partnerships are real important.

Topic 9: Other issues considered important for our region.

Dr. Rowe -- this topic will provide more thought. I hope Congress will continue this program and provide more money.

Meeting closed at 8:05 p.m.

2.7.13 October 24, 2005 - Philadelphia, PA

Meeting opened at 7:00 p.m. by hearing officer Dr. Eugene Kray. Dr. Tom Hoff represented the

staff. There were seven members of the public present: Patrick Flanigan, Doug Taylor, Frank Fisher, Jonathan Ortiz, Adam Nowalsky, and Michael Doobley.

Dr. Hoff presented the scoping document. He explained that there are 9 topic areas that are the focus for discussion.

Topic 1: Adequacy of current approaches for addressing ecosystem considerations.

Mr. Taylor – in 1995 or 1996 there was a world fishing study by National Geographic documenting fishing gear impacts to the bottom. Why have we not stopped dragging and ruining habitat?

Mr. Nowalsky – many things are being missed. What is the ecological impact of harvesting the prey? When rebuild one stock, what are the impacts on other species? You can't build every single species back to historical highs. The environment can't support striped bass, weakfish, bluefish, summer flounder – all at their MSY level on only bunker which is fished heavily by man. The Council has not paid enough attention to bycatch. While we many not have coral in the mid-Atlantic, there are lots of other structure, like mussel beds, wrecks, etc. Commercial fishermen drag over the bottom and destroy structure. Trawls with cookie sweeps are fishing around rock piles. The trawls stir up the bottom and sediment the rock piles. The Council has not paid enough attention to these things.

Mr. Taylor – scientific studies are often not incorporated into management.

Mr. Doobley – the Council has not done enough on predator and prey.

Mr. Flanigan – it will be a decade until get to EAF from moving from single species. Don't want tonight's meeting to fall into an anti-commercial discussion. Commercial vessels are highly specialized for single species. This results in high discards and high grading which will be a problem for EAF.

Mr. Nowalsky – agrees the commercial clam fleet is highly specialized, but most commercial fishermen do become generalized and can fish for 4 or 5 species. Moving towards EAF really won't affect them. The large companies will be more affected.

Topic 2: Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Mr. Doobley – conservation and management is the desired state. There needs to be a balancing of the stocks health and the environment, so that people are not restricted. EAF is more than the sum of the parts. There is an ecosystem analogy to a car. EAF is the engine. Council is ok on habitat. We need to do a better job on predator/prey. It will be 3 to 5 years before we could begin to quantify. We don't even have the basic pieces in place. There is a need for lots of money from Congress. Work EAF in gradually and incrementally. We will grow into it. Need

more data and more money. Go slow and set realistic goals.

Mr. Nowalsky – the desired state should be conservation and management. Managers must consider moving to multi-species. May not be responsible management to humans. Buy-in by humans has to benefit humans. MPAs with their current goals and objectives will simply shut some people out. Can't sustain the environment with MPAs.

Dr. Kray – MSA requires the Council to manage for MSY. The question becomes what to manage when you have rebuilt stocks. ASMFC and their science committee are working on a model for 4 species, but what are the other types of models available?

Mr. Taylor – lots of information like all the nutrient data out of the Mississippi River. Do we use that for EAF?

Topic 3: Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Mr. Flanigan – agrees that we need a national overlook but also need regional perspective. Simply can't eliminate the FMCs. Need local involvement. Need to balance the needs of the participants in the Council forum.

Mr. Doobley – the Council process is the best forum. Councils can't always reconcile competing uses. The can't NOR should it always try to. Need to engage the stakeholders.

Mr. Nowalsky – this is a good forum and is the right process. Stakeholders should be asking how they get involved. For example there are only 7 people in this room. The only time stakeholders come out if they are negatively impacted. It would be much better to give a positive impact for them to be involved. Many stakeholders need to be validated. Need to talk about data collection for the importance of science.

Mr. Taylor – make use of volunteers.

Topic 4: Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Mr. Taylor -- expand the FMCs to include all the stakeholders.

Mr. Doobley -- there are reasons for Agency specialization. There should not be formal organizations for expanded government. He doesn't like the term "biodiversity".

Mr. Flanigan -- viewing this topic as outside the scope of this scoping process. Government always working on procedures for operations with other agencies. Will have to work on this mechanism as we evolve. This should NOT impact our primary goal of resource extraction.

Mr. Nowalsky -- no new government level. Engage other agencies to move forward.

Topic 5: Boundaries of sub-regional ecosystems with the areas of the various FMCs.

Mr. Flanigan – inshore of 3 miles the Council should NOT be involved with. The Council should develop a formal process with the other FMCs.

Dr. Kray – how do we get state involvement with their waters, i.e., estuaries are very important for summer flounder. How do we engage those States?

Mr. Flanigan – keep Council authority at 3 to 200 miles and do NOT reach into state levels.

Mr. Doobley – agree on keeping Council jurisdiction 3 to 200 miles. It is important to keep states rights. There needs refinement of LME's which need to be the boundaries of the fish. There should be no major overhaul in boundaries.

Topic 6: Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Mr. Nowalsky – hard quotas and reduction in overcapitalization works for commercial fishermen, but is not appropriate for recreational fishermen. Seasonal restrictions are like limited access. Management measures must be looked at by user group. Coordination among the Councils is important.

Mr. Flanigan – this is a real big question. Neither Council approach is incompatible with EAF. Mid-Atlantic is better for the resource, but New England management may be better for fishing families. The big problem is how to enable access to small user groups i.e., part time scallopers?

Mr. Doobley – in the short-term you need to focus on predator/prey and habitat. Doesn't see no fishing MPAs as an appropriate tool. "Much of science is advocacy work". MPAs redistribute effort. Ask the question if you can achieve the same goal without closed areas? Thinks there are ways to reconcile the NE and MA efforts.

Topic 7: Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Mr. Nowalsky – the idea of an FEP should be supported, but can't take away from current efforts. It is a reasonable goal if not negatively impact what are currently doing. Where you draw the line in defining ecosystems is the most difficult problem.

Mr. Doobley – don't need an FEP and all the work associated with it. Need more of an articulated policy or banner. Need to catalog what you are currently doing. Then as money becomes available, put it under the overall banner. Put the pieces of the puzzle together under the banner.

Mr. Flanigan – need transitional period, with education. Should evolve under the umbrella during the next decade. He sees litigation as a serious problem. (He is a lawyer!)

Topic 8: Techniques for determining success of ecosystem-based management.

Mr. Nowalsky – "better efforts . . ." is an understatement of epic proportions. Managers need a large toolbox with as many management measures as possible. Need good information and better data. Number one need is better stock assessments. National saltwater fishing license provides means of monitoring. Everything should be done to quantify fishing effort, but NOT a saltwater fishing license. Use the trip reports from party and charter boats for effort. Query the user groups. Stakeholders are generally happy to help and scientists indicate sustainability for their successes.

Mr. Flanigan – decisions can always be second guessed. Strength is the procedures that allow for input. How strengthen – procedurally. EAF requires information. There needs to be more real-time feedback.

Mr. Taylor – how often do you use college studies?

Dr. Kray – we use the Research-Set-Aside program and believe we get bigger bang for the buck.

Mr. Doobley – you need more tools. When the data are robust enough use new models. Use more fishery dependent data. Spawning success, wide range of age classes, increase in dock side value, selling more boats – lots of ways to determine success. The NGOs are using a philosophy of preservation and trying to come up with intrinsic values of savings. What ever happened to "sharing" the resources?

Mr. Flanigan – the Council should look at the cost of diseconomies or inefficiencies of single species management versus EAF.

Topic 9: Other issues considered important for our region.

Mr. Flanigan – if you don't have the money -- then it has to go on the back burner.

Mr. Taylor -- when an NGO sues, they should pay for the necessary research.

Mr. Nowalsky – talk to stakeholders and get them involved. Let them define if you are successful. OY should only be reached if the ecosystem supports it. If you are managing species and they are doing well, then you are doing EAF.

Meeting closed at 9:15 p.m.

2.7.14 Written Comments received on Scoping Document



Robert L. Ehrlich, Jr., *Governor*

Michael S. Steele, *Lt. Governor*

C. Ronald Franks, *Secretary*

October 31, 2005

Mr. Daniel T. Furlong
Executive Director, MAFMC
Room 2115, Federal Building
Dover, DE. 19904.

Dear Mr. Furlong:

We have compiled comments addressing the nine topics that you presented concerning MAFMC's evolution toward an ecosystem approach to fisheries management. They are stated under each of the nine topic areas. Please let us know if you have any questions, or would like clarification on any of the comments.

Thank you for taking the effort to solicit input. We hope that these comments will be productive and useful in the process.

Sincerely,

Nancy Butowski and Margaret McGinty
Maryland Department of Natural Resources
Fisheries Service

MAFMC Evolution towards an Ecosystem approach to Fisheries Management (EAF)

Comments:

Communication:

If we are going to be embarking on a public campaign to garner support for an ecosystem approach to fisheries management, we need to do so in an educated and effective way. Recent studies in effective public communications, suggest that the most effective communication is achieved in 15 - second sound bites. If ecosystem based management – whatever it is to be- is going to be communicated to the public so that it will be embraced, we need to devise an effective marketing strategy. But in order to do this, we need to communicate the definition of ecosystem approach to fisheries management in a clear and concise way, and in a way that relates to something that they can tangibly affect. Conceptual diagrams are very effective in communicating definitions and ideas and should be developed.

Topic Areas:

1. *Adequacy of current approaches for addressing ecosystem considerations.*

Fishery management has traditionally focused on single-species management (SSM) and a comparison would be beneficial in communicating what's been done and what needs to occur for an ecosystem-based approach to fishery management (EBFM).

Although EBFM will build on the single-species format, it cannot be just a linear extension of single-species thinking but requires a change in a conceptual framework and a change in philosophy of fishery management. EBFM needs to foster thinking which sees the single species in relation to the processes that affect ecosystems rather than numbers of individuals. It must be a process that looks at general or larger-scale relationships, an exercise in long-term, precautionary thinking. The issues already addressed in SSM (such as ecology, socioeconomics, bycatch, etc.) all need to be expanded and placed in the new conceptual framework.

Habitat and trophic interactions should be incorporated into management plans, especially now that we are seeing dramatic shifts in habitat due to anthropogenically driven perturbations, which are driving attendant changes in food web dynamics.

Essential Fish Habitat has been delineated in the mid Atlantic region based on catch data. These areas should be further delineated to identify Habitat Areas of Particular Concern (HAPC). These HAPC should be surveyed to determine what habitat types exist within the boundaries in order to characterize the areas and assess habitat diversity. The habitat characteristics should then be related to fish production. These data would allow managers to account for habitat effects on mortality and/or recruitment in order to incorporate better estimates of these parameters in stock assessments, and develop the best measures to protect these HAPC.

2. *Nature of ecosystem based management and the goals to be achieved in addressing ecosystem issues.*

Our short-term goals should be to continue to use SSM approaches and expand the SSM approach to include how fishing/removals affect the function and structure of the ecosystem. Over the long-term, we need to develop quantitative objectives such as BRPs for the ecosystem. The transition to ecosystem-based management will require more monitoring and ecological studies in order to address the trade-offs between balancing a system and economic and political driven policies.

An ecosystem approach begins when all stakeholders convene to define their goal and mission. The council needs to define who those stakeholders will be and then gather them in a group to reach

consensus on the goals and objectives. Literature on ecosystem based management suggests that if common goals and objectives can not be developed, the ecosystem based management process will not work. Coming to consensus on the goal will likely be an iterative process. Stakeholders could be convened to develop a common goal. The goal can then be assessed by technical staff to determine if it is realistic. If not, the technical staff can educate the stakeholders on the processes that limit achieving the goal. The stakeholders can then attempt to develop a refined goal that is more feasible. This process could continue through several iterations until a feasible and acceptable goal is established.

3. *Nature of public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.*

Representatives of the public and all stakeholder groups should be recruited to become involved in the decision making process – in its entirety. The process needs to be transparent and remain transparent, even when answers are unclear and confusing. Often times it is tempting to “use” these stakeholder groups to promote specific agendas. However these same groups are quickly dismissed when their attitudes or desires conflict with these agendas. Every discussion and meeting in the ecosystem approach process should be open to all participants and should be conducted by trained, unbiased facilitators, who are skilled to listen carefully and read between the lines so that every opinion is clearly communicated and understood.

Developing a website would be a good communication tool for a lot of stakeholders and conducting quarterly meetings on progress. Involving stakeholders on plan review teams is another avenue. Since the turnout for the MAFMC meetings (at least in MD) was not very good, there needs to be some regular media coverage.

The second question about competing requirements and agendas among agencies will require a different approach. There has to be clear communication pathways among agencies. This will require the development of some sort of flow chart with contact people who will act as liaisons and an established process for exchanging ideas and developing integrative agendas. The liaisons should be directed to work with their respective agencies to maintain open lines of communication. Checks and balances should be established to make sure that information exchange is occurring in an open and transparent way.

4. *Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.*

I would emphasize the need for established pathways for communication among agencies as well as an informed public and stakeholders

See comments to section 3. These partners should be brought to the table at the start – or at least kept in the loop – so that when their expertise is needed, they are informed of the process.

5. *Boundaries of sub-regional ecosystems with the areas of the various FMCs.*

Boundaries of the ecosystems should be determined based on conceptual diagrams/models that attempt to accurately depict trophic and habitat interactions. If these models suggest that inshore processes heavily impact a stock, then the boundaries need to incorporate these habitats.

Not only should the Councils interact with each other there should also be involvement with the ASMFC for inshore issues. As far as formal or informal, define the one that will work best and go with it.

6. *Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.*

By adopting an ecosystem-approach to fishery management the Councils broaden the scope of consideration when developing management actions. As long as the goals and objectives are well integrated for the entire LME, how the individual Councils implement the management strategies and actions (whether effort based or quota based) will be less problematic. It would be similar to how ASMFC operates. They put forth general requirements and the individual states determine the specific steps to implement the requirements. These steps differ by state.

7. *Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).*

A better avenue would be to develop a relatively short strategic plan for addressing EBFM that each of the Councils and ASMFC could adopt. It would include monitoring and modeling needs.

8. *Techniques for determining success of ecosystem-based management.*

Continue multispecies modeling efforts and explore ecosystem modeling. All modeling efforts need to be backed by monitoring data, especially fishery independent surveys. By advocating fishery independent surveys, there is a better chance of obtaining a long time-series of data, resulting in better models. The development of an extensive field program is not a trivial endeavor and funding agencies and the general public need to be aware of the expense and time commitment.

9. *Other issues considered important for our region.*

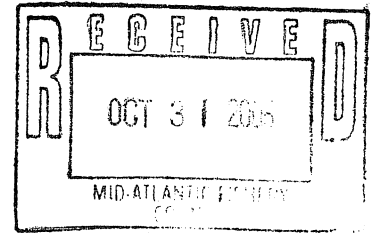
If no additional monies are available for EBFM, than Congress and the general public should be made aware of the limitations for success. Without funding you will have no choice but to treat EAF as EFH, i.e., an unfunded mandate that will rely on NMFS.



Conserving Ocean Fish and Their Environment
Since 1973

Tom
d/j
11/4/05

October 28, 2005



Mr. Daniel T. Furlong
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 S. New Street
Dover, DE 19904

RE: Ecosystem Approach to Fisheries Management

Dear Dan,

I attended the October 11, 2005 scoping hearing in Alexandria, Virginia, and submitted written comments. I am attaching another copy to be included in the record. In addition to those general remarks and observations, plus very specific recommendations for managing forage fish under an ecosystems-based approach to fisheries management, I am submitting the following response to the scoping document seeking comment on the MAFMC's Evolution Towards an Ecosystem Approach to Fisheries Management (EAF).

First off, we agree with the statement on page 2, taken from the Ecosystem Principles Advisory Panel's 1999 report, which references the breadth and complexity of a comprehensive ecosystem approach, but advises that "an initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem." We believe this advice should guide the MAFMC on goal-setting for EAF, recognizing both the council's responsibilities under the Magnuson-Stevens Act and the limits of its authority to the impacts of fishing activities on fish, associated species and their environment. The council should not be frozen into inaction by the inability to understand or control non-fishing impacts (such as weather and climate) on the ecosystem, nor should it be distracted from considering and addressing fishing impacts on the food web, as the EPAP advises, because of uncertainties about other factors.

Although one of the goals of EAF is to move beyond managing each single species in its own little box, the council must recognize the reality that, even under a broader ecosystems approach, it still must work within the fisheries box whose boundaries are drawn by the MSA.

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www.savethefish.org

There are proposals in Congress, in response to the ocean commission reports, to broaden the institutional framework of oceans governance, drawing lines of authority more in line with the ecosystems. But the council should neither wait for Congress to act, either re-drawing governance lines or requiring Fishery Ecosystem Plans (FEPs). It should and must begin to implement EAF now, with the knowledge and authority it currently possesses.

Nine Topic Areas for Discussion

1. Adequacy of current approaches for addressing ecosystem considerations.

As we stated in our hearing comments (attached), the need for an ecosystem approach does not arise merely from the failure of single-species management to effectively conserve ocean fish. It is a mistake to view it that way, or to think that, if the councils are meeting single-species objectives, then there is no change needed. On the contrary, the need for EAF is neither a criticism of single-species management nor of the performance of the councils. Rather, it stems from the fact that the species-by-species approach cannot address certain critical issues and problems - real or perceived - that cannot be ignored.

Chief among these are the forage needs of predators. The council's squid, mackerel and butterfish plan does not contain either the information or the management measures necessary to safeguard the role of these species in the food web.

2. Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The council's notion that sustainability and productivity are two different goals is wrong. While we agree that humans are part of the natural balance in ecosystems - indeed, the problem we're addressing here is getting us into balance - we cannot productively use marine resources if we don't do so on a sustainable basis. Having said that, we should not be thinking of transposing our MSY goal to an ecosystem. The EPAP stated a goal of "maintaining ecosystem health and sustainability." Ecosystem health means much more than being "used," even if it is done sustainably. In certain cases, it will no doubt mean giving precedence to maintaining a species ecological role over its allocation for human use. Overall all, however, it will likely result in more stable economies dependent on marine fisheries.

The council asks the question, "What is the desired state of our ecosystem, i.e., should be conserving and managing or preserving?" This should not be an either/or question. Conserving and managing species or other components of an ecosystem is a means to an end, the end being to preserve healthy ecosystems, including key relationships among species.

3. Nature of the public decision making process within the Council for addressing management tradeoffs, consistent with identified goals.

We agree that the the council's process of developing goals and objectives should be regional and bottom-up, but it should not include stakeholders, such as "mineral extractors, energy producers, aquaculture, transportation, etc.," whose objectives have little to do with those laid out in the MSA (and its national standards). The council should view this process as developing goals and objectives to benefit its constituents, which are fishermen, the communities they support, and the public interest in healthy fishery resources.

The council made a good start by creating an Ecosystems Committee. However, it has lacked focus and, without the incentive of an FY2004 Congressional grant to study the issue, that committee has spent little time on ecosystem matters. We reiterate here our previous call for the council to create an Ecosystems Advisory Panel to bring the public into this process for the long-term.

When, under EAF, key relationships are established among managed species, the council should hold joint meetings of species-specific science and management committees to share information, discuss problems and propose alternatives for resolving them.

4. Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

As for reconciling competing requirements and agendas within the government, we believe the councils, and even more so NOAA Fisheries, should be the advocate for the fish among federal agencies. The agency should elevate concerns about non-fishing activities; when it does so - which is not often enough - it has a fair batting average of protecting fishery interests. Councils should be advocates for the fish, for EBFM within the administration/federal government.

Issues such as the North Atlantic oscillation are not under the authority of the MSA. The council should focus on fishing impacts to fish, inter-

species relationships and habitat.

5. Boundaries of sub-regional ecosystems with the areas of the various FMCs.

The MSA allows for joint council plans for species under the jurisdiction of more than one council, or allows the Secretary to designate a lead council. This option should be available in developing multi-council FEPs.

6. Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with identified goals.

See attached Blueprint for Amending FMPs for Key Forage Species.

7. Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

We agree that an FEP should be an umbrella document that guides fisheries management under existing FMPs, but it should not be limited to identifying gaps in our knowledge and proposing research. It should provide guidance on how to adapt current management given our knowledge of ecosystem processes, particularly the application of the precautionary approach.

The FEP should not strive to "provide all the background information on our ecosystem," but rather begin by focusing on the significant food web.

The current list of 5 requirements under NEPA (targeted fisheries; bycatch; habitat; PET species; communities – socioeconomics) is not a substitute for an FEP, because each of these elements is addressed through a single-species orientation. Ecosystem-based fishery management, through an FEP, is a very different way of looking at species and their interactions within the system, and each of these elements needs to be looked at in terms of how targeted catches and bycatch, for instance, impact associated species and the food web, directly and indirectly.

8. Techniques for determining success for ecosystem-based management.

New multispecies models are needed. The council should look to use models currently under development (e.g., MSVPA, Ecopath with Ecosim, spatial modeling), and explore the value of each, not rely on any single

one until its utility is proven. Models developed to use existing data sets are most valuable, since they can provide a retrospective analysis of the ecosystem under differing conditions, not just a snapshot of the present status, which would lack context.


The council should develop "indicators" to use in establishing ecological reference points, e.g., balancing prey populations with predator needs in both time and space. The council should also develop some ecosystem-based decision criteria, including triggers for action.

9. Other issues considered important for our region.

Statutory Changes: Science-based conservation decisions (chiefly setting of fishing mortality rates and optimum populations sizes) should be separated from allocation-based management decisions. The increased uncertainties under EAF and the associated need for precaution, coupled with more conflicts and trade-offs among a broader group of stakeholders, demands that science be not only improved, but insulated from political decisions to protect its integrity.

Funding: As with EFH, the council in implementing EAF is required to regulate fishing activities that impact the ecosystem. Council needs to sit down after the scoping process, look at what needs to be done and what can be done now, under current authority and existing levels of funding, and begin there, rather than waiting for Congress to act.

Thank you for considering our comments.

Sincerely,


Ken Hinman
President

Enclosure

**COMMENTS TO MID-ATLANTIC COUNCIL ON AN
ECOSYSTEM-BASED APPROACH TO
FISHERIES MANAGEMENT**

October 11, 2005



We commend the Mid-Atlantic Fishery Management Council for taking this important step toward implementing an ecosystem-based approach to managing its fisheries. We'll be submitting detailed written comments on the 9 topic areas contained in the scoping document at a later date. Tonight, I'd like to limit my remarks to a few general observations and some specific recommendations regarding the conservation of forage fish.

Ecosystem-based management is a natural outflow of our increasing knowledge of the ocean and our expanding circle of concern for all marine species and their environment. It is not a departure from past practices, but a natural progression in the evolution of fishery management.

There's a Chinese saying that nature is not composed of things, but of relations. Likewise, an ecosystem is not made up of separate species, but of the relationships among those species. Ecosystem-based management, simply put, takes those relationships into account.

Let's be clear. The need for an ecosystem approach does not arise merely from the failure of single-species management to effectively conserve ocean fish. It is neither a criticism of single-species management nor of the performance of the councils. Rather, it stems from the fact that the species-by-species approach cannot address certain critical issues and problems – real or perceived – that cannot be ignored.

The question of whether we should manage our fisheries in an ecosystem-based manner is a moot one. We are already doing it. At nearly every management meeting I attend, at this council and others, there is some discussion and theorizing about what is going on outside the box of single species stock assessments and regulations. The problem is, the process lacks direction. There is little consistent guidance on what information is needed, or how it is to be used. We would like to offer some suggestions on how the council might begin this process.

The Magnuson-Stevens Act gives each council authority over fishing within its jurisdiction, and that's where implementation of an ecosystem-based approach, as far as the councils are concerned, should confine itself – to the effects of fishing on the food web as well as on essential fish habitat.

The NMFS Ecosystems Principles Advisory Panel advises that “a comprehensive... approach would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. However, the approach need not be endlessly complicated. An initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem. Fishery management decisions made at this level of understanding can prevent significant and potentially irreversible changes in marine ecosystems caused by fishing.”

We support this incremental approach, beginning with protecting key predator-prey relationships. We join the EPAP in encouraging the councils to apply ecosystem principles, goals and policies to the conservation and management measures of existing Fishery Management Plans. Three actions are particularly important, the panel says. First among these – “each FMP’s conservation and management measures should consider predator-prey interactions affected by fishing allowed under the FMP.” (The other two actions are reducing bycatch and protecting habitat.)

Energy production in the ocean food web is bottom-up. The mid-trophic level – made up of the fish we call “forage” fish - is vitally important for converting primary production into flesh and providing prey for predators. Though there populations are large, there are few individual species that perform this important ecological role. Conserving forage fish, then, is paramount. As we fish down the food web, transferring effort from high value apex predators to their prey, we risk slowing or preventing the recovery of overfished predators, or even subjecting otherwise healthy and well-managed populations to “ecosystem overfishing”.

The most important forage species in the waters of the United States are krill, squid, and a variety of small, silvery schooling fish that include herring, sardines, anchovies, menhaden, butterfish and alewives.

We are anxious to assist the council in developing a process for harmonizing management objectives and synchronizing management regulations for squid, mackerel and butterfish and related predator species within the councils Fishery Management Plan.

To that end, we have developed a Blueprint for Amending FMPs for Key Forage Species, a blueprint that features four elements, or standards. We believe each FMP should contain:

A BLUEPRINT FOR AMENDING FMPs FOR KEY FORAGE SPECIES

- 1st. Explicitly feature protecting and maintaining the species' ecological role, including preservation of an adequate supply as forage for predators, as the principal plan objective.**

Elevating protection of the species' role as forage to a plan priority would require adoption of specific management measures to ensure an ecologically-balanced allocation of fish among fisheries and natural predators. There is substantial precedent for doing this. The Washington State Forage Fish Management Plan emphasizes the role of forage fish in the ecosystem and considers catch on a secondary basis: "The ability of forage fish to provide a source of food for salmon, other fish, marine birds and marine mammals will be a *primary* consideration." The recently completed NOAA Chesapeake Bay Fishery Ecosystem Plan – the first FEP developed in accordance with the EPAP's Report to Congress - recommends: "Consider explicitly strong linkages between predators and prey in allocating fishery resources. Be precautionary by determining the needs of predators *before* allocating forage species to fisheries."

- 2nd. Expand the FMP's information base to fully describe and comprehend the links among associated species, incorporating available information on ecosystem health and integrity.**

An expanded database would provide scientists with a more comprehensive analysis for use in making an ecosystem-based assessment of the status of the population, and assist managers in making informed decisions on allocating an adequate portion of the standing stock to predators. Most FMPs contain only a superficial portrait of the species' ecological role. This information should be

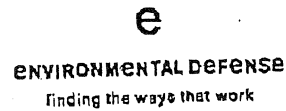
expanded and enhanced to describe the significant food web with quantitative and qualitative assessments of interspecies relationships, temporally and spatially, as well as at different life stages.

- 3rd. Add a definition of “ecosystem overfishing” as a complement to traditional overfishing criteria, including ecologically-relevant reference points (targets and thresholds).**

Generally speaking, ecosystem overfishing occurs when reducing one component of the food web adversely impacts another, or precipitates harmful changes in the environment. This new definition would facilitate setting an Optimum Yield (OY) that properly takes into account ecological factors, as the Magnuson-Stevens Act requires, while establishing measurable criteria for achieving an optimum ecological yield. Technical guidelines for implementing an ecosystem overfishing definition should account for ecological linkages and include calculable reference points and triggers for action. After passage of the Sustainable Fisheries Act Amendments in 1996, a team of scientists was assembled to standardize criteria for the overfishing definitions required in every FMP. As the Councils move toward an ecosystem-based approach to fisheries management, including eventual development of Fishery Ecosystem Plans, it would be useful now to convene a similar panel to develop ecological reference points (benchmarks and thresholds) for defining ecosystem overfishing in FMPs.

- 4th Establish a precautionary total allowable catch (TAC) that explicitly provides a suitable buffer against ecosystem overfishing.**

Collecting, synthesizing and analyzing ecologically-relevant data and developing ecological reference points to guide management decisions takes time and will always contain a degree of uncertainty. Conservative fishing mortality targets and thresholds, as interim measures, would minimize risk to other components of the food web as our knowledge and understanding of the ecosystem improves. The NMFS EPAP advises that “(i)n practice, changing the burden of proof will mean that, when the effects of fishing on either the target fish population, associated species, or the ecosystem are poorly known, fishery managers should not expand existing fisheries by increasing allowable catch levels or permitting the introduction of new effort.



October 31, 2005

Mr. Daniel T. Furlong
Executive Director
Mid-Atlantic Fishery Management Council
Room 2115
Federal Building
Dover, DE 19904

Dear Mr. Furlong:

We write today with comments regarding the Mid-Atlantic Fishery Management Council's (MAFMC, or Council) scoping process on "Ecosystem Approaches to Fisheries Management." We welcome this opportunity to address several important ocean governance concepts raised in the scoping meeting document entitled "MAFMC's Evolution Towards an Ecosystem Approach to Fisheries Management (EAF)." Specifically, we address the following discussion topics presented in the document: the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues; the nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals; and mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity. Our discussion is divided into three sections:

- a) ecosystem-based management: what is it and why do it?;
- b) the need to engage the public in the decision-making process; and
- c) mechanisms for regional ocean governance that bring together multiple ocean authorities for coordinated regional planning and management.

a) Ecosystem-based management: What is it and why do it?

In its final report, the U.S. Commission on Ocean Policy (USCOP) emphasized that "our oceans... are in trouble and major changes are urgently needed in the way we manage them."¹ A fundamental recommendation for ensuring a brighter future with "oceans...[that] are clean, safe, prospering, and sustainably managed,"² is a shift to ecosystem-based management, a new approach that considers the relationships among all ecosystem components and is based on biogeographical, rather than political, boundaries.³

¹ USCOP, page 4.
² USCOP, page 4.
³ USCOP, page 62.

Using existing authority, some regional fishery management councils are already making strides in building effective ecosystem-based management programs. Among the most impressive are those of the South Atlantic Fishery Management Council (SAFMC), where extensive habitat protection policies and programs are being supplemented with multispecies planning and management, to culminate this year in a draft comprehensive fishery ecosystem plan. That plan, and its implementing comprehensive fishery management plan amendment, is being built in close collaboration with the relevant state, interstate and federal agencies, and will also go far to protect deepwater corals and other sensitive and important habitats from both fishing and non-fishing threats.

We are encouraged that the MAFMC has also shown interest in moving towards an ecosystem-based approach to fisheries management. In so doing, it will be important to establish a clear definition of ecosystem-based management in order to guide decision-making. Included in the MAFMC's scoping document are a few example definitions, including those of the U.S. Commission and the Ecosystems Principles Advisory Panel. While these definitions recognize the need to be managing in an ecosystem context, they lack any specific statement regarding the goal or purpose of ecosystem-based management to provide for healthy and sustainable resources and ecosystems. Without such a statement, the definition could be interpreted to mean that the entire ecosystem is to be managed only for maximum yield, with no criteria for ecological sustainability.

We respectfully request that the Council consider and follow the "Scientific Consensus Statement on Marine Ecosystem-Based Management," endorsed by over 200 leading U.S. scientists and released in March 2005. This document defines ecosystem-based management as "an integrated approach to management that considers the entire ecosystem... [and] the goal... is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need."⁴ By clearly articulating this goal, the statement provides for the better future envisioned by the U.S. Commission. Furthermore, its extensive support amongst ocean and coastal scientists nationwide ensures credibility and provides a sound scientific foundation for decision-making, another key theme of the U.S. Commission report.⁵

b) The need to engage the public in the decision-making process

We are encouraged that the scoping document addresses the need for "a collaborative and participatory process" in conducting ecosystem-based management. The U.S. Commission highlighted the need for "ocean governance [that] is effective, participatory, and well coordinated among government agencies, the private sector, and the public."⁶ Similarly, we are supportive of a public process that includes the wide range of ocean and coastal stakeholders, including public interest groups. However, we were discouraged to note that environmental groups were not listed as part of a "broad cross-section of stakeholders" in the scoping document. We respectfully request that in the future the Council recognize environmental and other non-extractive user groups as important ocean stakeholders.

c) Mechanisms for regional ocean governance

Implementing ecosystem-based management will require a combination of both top-down and bottom-up governance components. As mentioned earlier, an overall goal for healthy, productive, and resilient ecosystems needs to be established in order to guide decision-making. But determining how this goal is reached within an ecosystem context will necessitate regionally-based management strategies. The U.S. Commission concurred with such an approach, stating that "broad national guidelines can provide a measure of consistency and help ensure minimum standards for performance while allowing

⁴ Scientific Consensus Statement on Marine Ecosystem-Based Management, page 1.

⁵ USCOP, page 11.

⁶ USCOP, page 4.

each region to tailor its approach to meet unique needs."⁷ While the system of regional fishery management councils, including the MAFMC, provides a forum for implementing ecosystem-based fisheries management, no similar regional mechanism exists for the more "holistic approach" called for in the scoping document in order to deal with inter-jurisdictional, cross-sector issues.

To fill this governance gap, the U.S. Commission recommended the establishment of regional ocean councils to "facilitate the development of regional goals and priorities and improve responses to regional issues."⁸ Comprised of representatives of all appropriate levels of government (e.g., federal, state, tribal and local), the councils would address a wide range of ocean and coastal issues within defined ecosystem-based, geographic regions.⁹ Current authorities, including those of regional fishery management councils, would not be superseded or diminished.¹⁰ However, to be effective, these authorities, we believe, would need to be implemented in a manner that furthers the regional ecosystem goals established by the regional ocean councils.

Support from the Bush Administration is helping several regions to move in the direction of a more coordinated and integrated approach to regional ecosystem-based management, as recommended by the U.S. Commission. The Great Lakes Regional Collaboration, established by President Bush under executive order in May 2004, provides a model. Recognizing that in the Great Lakes "there [was] no overarching strategy to deliver coordinated restoration and protection efforts,"¹¹ the collaboration brings together federal, state, community, tribal, regional, scientific, industrial and non-governmental interests to develop a Great Lakes Restoration and Protection Strategy and provide a forum for coordinating and enhancing the strategy's implementation. As the effort continues to develop, how effective it will be remains to be seen. But to be sure it has provided a new opportunity for the many different authorities and stakeholders to develop a dialogue and determine regional priorities for improving the Great Lakes ecosystem.

In addition to the Great Lakes, the Bush Administration voiced its support for a regional partnership in the Gulf of Mexico as part of the U.S. Ocean Action Plan, released in December 2004. Furthermore, the Committee on Ocean Policy's Subcommittee on Integrated Management of Ocean Resources includes "foster and highlight regional collaboration efforts" as a priority,¹² and is currently working with interested parties in New England and the Pacific Northwest to advance regional governance.

Leaders of the bipartisan House Oceans Caucus in the U.S. House of Representatives also have recognized the need for enhancing regional ocean governance. H.R. 2939, the Oceans Conservation, Education, and National Strategy for the 21st Century Act, would establish regional ocean partnerships, modeled after the Great Lakes Regional Collaboration. The partnerships would include representatives from federal, state, and tribal governments, including the executive directors of the regional fishery management councils, who would develop strategic plans in order to "protect, maintain, and restore the health of marine ecosystems, and to provide for the ecologically sustainable use and management of ocean and coastal resources."¹³ The plan would then be implemented, consistent with existing legal authorities, by the governmental entities represented on the partnerships. The act would also provide \$1

⁷ USCOP, page 87.

⁸ USCOP, page 86.

⁹ USCOP, page 91.

¹⁰ USCOP, page 90.

¹¹ Framework for the Great Lakes Regional Collaboration, page 1.

¹² Priorities for the Subcommittee on Integrated Management of Ocean Resources.

¹³ H.R. 2939, section 402(b).

billion annually to coastal states and local governments for funding the development and implementation of strategic plans.

We are encouraged that the scoping document identifies the need for enhanced regional ocean governance in order to address the multiple uses impacting ecosystem health and productivity that are outside the purview of the Council and the Magnuson-Stevens Act. With support from the Bush Administration and Congressional leaders, a window of opportunity for addressing this need exists. As a key authority, the Council's support will be helpful for establishing a regional governance mechanism that can help bring together the many jurisdictions in the mid-Atlantic region. We respectfully request that the Council consider supporting the establishment of a regional ocean council in the mid-Atlantic.

Thank you for considering our comments and requests regarding the ocean governance concepts presented in the scoping document. We appreciate this opportunity to share our views and look forward to a continued dialogue on improving the health and stewardship of our ocean and coastal ecosystems.

Sincerely,

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- Cc: Mr. Jack Dunnigan, Director, Office of Sustainable Fisheries, NOAA
Mr. Paul J. Howard, Executive Director, New England Fishery Management Council
Mr. Robert Mahood, Executive Director, South Atlantic Fishery Management Council
Mr. Wayne Swingle, Executive Director, Gulf of Mexico Fishery Management Council
Mr. Vince O'Shea, Executive Director, Atlantic States Marine Fisheries Commission



Natural Resources Defense Council

October 31, 2005

Mr. Daniel T. Furlong
Executive Director
Mid-Atlantic Fishery Management Council
Room 2115
Federal Building
Dover, DE 19904

Dear Mr. Furlong:

We commend the Mid-Atlantic Fisheries Management Council (MAFMC) for undertaking a scoping process on "Ecosystem Approaches to Fisheries Management" (EAFM) and we welcome the opportunity to provide comments. This letter supplements a letter we are submitting (under separate cover) with the Ocean Conservancy and Environmental Defense, which focuses on ocean governance as it relates to EAFM. In this letter we focus on the need for EAFM, the goals and nature of EAFM, and immediate actions that the Mid-Atlantic Fisheries Management Council can take to move towards this more integrated management approach.

1) The need for EAFM: adequacy of current approaches for addressing ecosystem considerations:

There is widespread agreement that ocean ecosystems have been seriously altered by human activities (e.g., Pauly et al., 1998; Jackson et al., 2001; Pauly et al., 2002; Worm et al., 2005). As a result, marine biological diversity and valuable ecosystem services are at risk (Pew Ocean Commission, 2003; U.S. Commission on Ocean Policy, 2004). In response, numerous scientists and expert panels have called for the adoption of marine ecosystem based management (EBM) - identifying it as essential to reversing the trajectory of decline (Sherman, 1994; Pew Ocean Commission, 2003; Pikitch et al., 2004; U.S. Commission on Ocean Policy, 2004; Scientific Consensus Statement, 2005; Pandolfi et al., 2005).

Ecosystem Approaches to Fisheries Management (EAFM) represent fisheries management from the perspective of EBM - or, fisheries management in an ecosystem context (Link, 2002a). Because of a failure to sustain catches, in addition to a growing recognition that heavy fishing pressure has impacted marine biota in many unintended ways, numerous fisheries experts are expanding their perspective beyond the individual components to include the interactions between them. Over the past decade, considerable attention has been directed at defining and developing EAFM (e.g., Sissenwine and Daan, 1991; Sherman, 1994; Christensen et al., 1996; Botsford et al., 1997; NRC, 1999; NMFS, 1999; Murawski, 2000; Link, 2002a,b; FOA, 2003). In addition, the National Oceanic Atmospheric Administration (NOAA) and the National Marine Fisheries Service (NMFS) have recently demonstrated commitment to its implementation (NMFS, 1999; NOAA, 2004). However, despite these efforts, the application of ecosystem approaches to fisheries management is limited (NMFS, 1999).

While the MAFMC's scoping document states that "many of the management issues facing the Council currently deal with ecosystem-type ideas", their application remains conceptual. For example, currently, no fishery management plans (FMP) in the Mid-Atlantic region explicitly model the quantitative relationships between food web components or interactions between fish populations and the environment. Furthermore, no fishery management plans contain direct management guidance (quantitative or qualitative) relating to such interactions.¹ In addition, the manner in which the MAFMC utilizes scientific uncertainty in its management (in terms of stock assessments and fishery effects on ecosystems) is generally not consistent with EAFM which requires a precautionary approach. Scientific uncertainty should be quantified and applied to management guidelines in the form of buffers.

2) Goals and important elements of an EAFM

Defining a clear goal to EAFM is a critical step in moving towards fisheries management in an ecosystem context. The MAFMC's scoping document states that "The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability and productivity." It is not clear, however, how this goal is distinct from the current, long-established goal of achieving "maximum sustainable yield" on a continuing basis and thus lacks the holism of the ecosystem perspective.

EAFM was born from the recognition that heavy fishing pressure impacts ecosystem products and services beyond the targeted fish - and on which fish depend - thus necessitating a shift in management to include the ecosystem. The statement of goals should clearly articulate this important shift in perspective. We request that the Council consider adopting the definition and goals contained in the "Scientific Consensus Statement on Marine Ecosystem-Based Management" (2005) which states that the goal of EBM is to "maintain an ecosystem in a healthy, productive and resilient condition so that it can provide services humans want and need."

Successful attempts to implement EAFM will include some of the following important elements. First, fishery management plans will need to be expanded to include important ecosystem interactions (e.g., multiple species interactions and tight coupling of population dynamics with large-scale physical processes, such as influences from the Gulf Stream). Second, scientific uncertainty associated with stock assessments (e.g. from natural variation, imperfections in catch statistics, and estimation error association with biological parameters) should be well characterized and utilized to modify primary management decisions in a manner that is consistent with the precautionary principle. Third, an improved bycatch quantification program will be critical to conducting accurate stock assessments and better characterizing ecosystem impacts. Fourth, identification, protection, and monitoring of important habitat should be performed. Finally, EAFM needs to integrate perspectives from all stakeholders.

3) Immediate actions that the MAFMC can take to move towards EAFM

The MAFMC can take immediate steps to incorporate EAFM into its management practices. A first, and feasible, step would be to conduct single species assessments with species "add-ins" which incorporate important biotic interactions. For example the necessary model structure and dietary information exists to better characterize important predator-prey relationships in the mackerel, butterfish, squid FMP. Specifically, the natural mortality parameter could be refined to include predator mortality. As fishing mortality is reduced and held at levels that can produce MSY, it makes sense to utilize existing information on natural mortality (e.g., impacts of predators) and refine its estimation. Moreover, because these species

¹ This conclusion was made following inspection of management plans and conversations with Council members, Council staff, and fisheries scientists.

are important prey for other fish (e.g., dogfish and summer flounder), managers could estimate what a sufficient forage base would be, and appropriately modify total allowable catch levels (TAC). A similar analysis relating to competition between bluefish and striped bass could be conducted.

Even in the face of scientific uncertainty, qualitative evaluations of these biotic interactions can be performed and utilized to modify primary management guidance. For example in the mid-1980s, the Illex FMP set one quarter of the TACs aside for marine mammal food. Although this management action is not currently implemented, it serves as a good example of how the MAFMC integrated ecosystem considerations into their management practices. Similarly, the Atlantic States Marine Fisheries Commission recently capped Menhaden catch in the Chesapeake Bay as a precautionary measure to provide adequate food for striped bass, bluefish, and weakfish; the cap is in place for five years, while further research on the matter is being conducted.

The South Atlantic Marine Fisheries Council (SAMFC) has outlined an extensive habitat protection policy in their draft comprehensive fishery ecosystem plan. We encourage the MAFMC to conduct a similar survey to identify and protect habitat areas of particular concern. Finally, to effectively manage fisheries in an ecosystem context, the MAFMC needs to improve their estimates of total fish mortality (targeted and untargeted). Bycatch monitoring should be routinely conducted by independent observers.

We thank you for the opportunity to provide these comments on a few important questions raised in the scoping process and look forward to supporting the Council as it begins to incorporate ecosystem approaches to fisheries management.

Sincerely,

Sarah Chasis

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President: Captain James A. House
Vice-President: Captain Robert Rocchetta
Treasurer: Captain Ken Holmes
Secretary: Captain Ken Birmingham

October 27, 2005

To: MAFMC
From: North Fork Captains Association

Please see the comments below titled to reflect the title in your Scoping Document on the Ecosystem Management of Fisheries:

Topic 1) Adequacy of current approach:

More attention needs to be paid to gear impacts, specifically bottom trawls, on habitat. Areas of the bottom have been "cleansed" of vegetation and structure leaving them devoid of normal plant life and structural irregularities that allow juvenile fish and prey to survive and reproduce. The recent banning of bottom trawls from a great area of the Pacific shows a realistic concern about habitat destruction.

Topic 5) Boundaries of sub-regional ecosystems..

The ASMFC, if not currently required, should be bound to develop EAF.

Topic 7) Issues that need to be addressed:

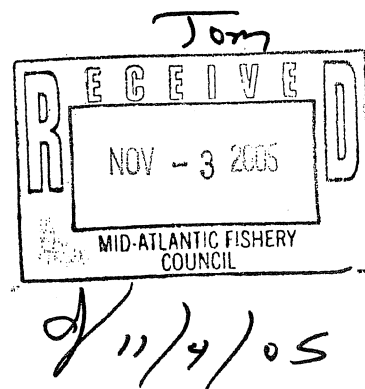
- 1) **Food Web** - The importance of the food web seems to be lacking in the vision of many policies. "No bait – no fish" certainly is a valid statement. The NEFMC has taken bold moves to protect the food web with their restrictions on herring harvests. This should be expanded. Whiting have been overfished in the NY area so that they essentially have not existed in historic numbers in at least 2 decades. The menhaden issue in the Chesapeake seems to be on the table but not fully resolved.
- 2) **Predator interactions** - All FMP's need to carefully and seriously consider the impact of the primary species being addressed in regard to its potential impact as a predator. The dogfish FMP seems to be working very, very well as we now see dogfish where they haven't routinely been observed. They are coming back too fast and certainly consuming anything they are able to get their teeth on (e.g. juvenile codfish, summer flounder essentially anything that moves). If the appearance of dogfish is due to an unusual migration, then perhaps the stock assessment was wrong since there certainly appears to be an overload of this species that is severely impacting the ongoing recovery of other marine species. It out of place to have this dogfish plan in place without an ecosystem approach.
- 3) **Bycatch** – There needs to be a serious effort to restrict and reduce bycatch. When I can go offshore and find a slick containing thousands of ling behind essentially any dragger that has hauled back, something is wrong.
- 4) **Fish stock assessments** – There is a large need for accurate stock assessments to better understand the ecosystem and for developing allocations. This will cost money and effort. An example that stands out is the proclaimed low stock numbers for scup which represent both prey and a significant fishery. There are more scup than in many, many decades, yet the assessment says that they are depleted!!

Respectfully,

James A. House, President

October 31, 2005

Mr. Daniel T Furlong
Mid-Atlantic Fishery Management Council
Room 2115
300 S. New Street
Dover, Delaware 19904



RE: Ecosystem Scoping Document

Dear Mr. Furlong,

Please accept my comments regarding the above referenced matter. My responses are in upper cased below each point prefaced with MJD.

I will be forwarding my comments via electronic mail followed by a fax transmission and postal delivery.

Thank you for the opportunity to comment.

Sincerely,

Michael J. D'Amico
P.O. Box 1803
Massapequa, New York 11758

**Scoping Meeting on the
MAFMC's EVOLUTION TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES
MANAGEMENT (EAF)**

I. Introduction

The Mid-Atlantic Fishery Management Council (along with the 3 other Atlantic Councils) was tasked by Congress in the FY-2004 appropriations to incorporate ecosystem considerations into fisheries management. The purpose of the Congressional outlay was to engage the 4 Councils and their constituencies in public debate on goal setting, the types of considerations to be included in ecosystem management, and to identify issues not covered under existing authorities.

The purpose of this scoping meeting is to address the first part of the Council's grant from National Marine Fisheries Service which calls for the Council to undertake public meetings with stakeholder groups and interested parties "to facilitate wide-ranging discussions with affected/interested parties and the general public in nine topic areas: (1) views regarding the adequacy of current approaches for addressing ecosystem considerations, (2) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues, (3) the nature of the public decision making processes within the Councils for addressing management tradeoffs, consistent with identified goals, (4) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity, (5) the boundaries of sub-regional ecosystems within the areas of the various FMCs, (6) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals, (7) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP), (8) techniques for determining success of ecosystem-based management, and (9) other issues considered important in any particular region." We will focus on these nine topic areas for much of this scoping meeting. There are questions after each of the nine topic areas discussed later in the document which are designed to initiate, but not limit, the debate.

A. Ecosystem Approach to Fisheries Management (EAF)

There is a growing awareness that EAF is important to the way we rethink fisheries management for the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research.

The U.S. Commission on Ocean Policy (USCOP 2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

The National Oceanic and Atmospheric Administration (NOAA; as well as the National Marine Fisheries Service within NOAA) have fully embraced the concept of EAF. The 2005 through 2010 strategic plan for NMFS has an objective to: "Protect, restore, and manage the use of the coastal and ocean resources through an ecosystem approach to management" (NOAA 2004).

The NMFS defines an ecosystem as: "a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics."

When Congress last re-authorized the Magnuson-Stevens Act (MSA in 1996), it required the eight regional Councils and NMFS to account for bycatch, protect habitat, and improve monitoring and research. Also established in 1996 by Congress was an Ecosystems Principles Advisory Panel (EPAP). This EPAP was charged to review the extent to which ecosystem principles are incorporated in fishery management and research, and recommend management and research activities that would integrate ecosystem principles (EPAP 1999). In addition to proposing comprehensive principles, goals, and policies for fishery management, the EPAP recommended the development of Fishery Ecosystem Plans (FEPs) and research to support them.

A comprehensive ecosystem approach to fisheries management would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. An initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem (EPAP 1999).

Are there questions about the purpose of this meeting, and do you understand that the majority of our time here tonight will be spent accepting comments on the nine topic areas listed above?

Are there any general questions about the Council or ecosystems?

B. MAFMC Current Management

The Council began single-species fisheries management nearly 30 years ago with their now very successful efforts for surfclams and it has 12 others species under their lead authority: ocean quahogs, Atlantic mackerel, butterfish, Loligo and Illex squid, summer flounder, scup, black sea bass, bluefish, dogfish, and most recently, tilefish. All of these species are being successfully rebuilt or are at their maximum sustainable yield. This Council is generally perceived as being responsible managers and as Roger Rufe (Executive Director of The Ocean Conservancy) pointed out in his scorecard at Managing Our Nations Fisheries II (Washington Conference March 2005) the MAFMC scored the highest of the east coast Councils.

During the evolution of the various FMPs the Council has amended its: Surfclam and Ocean Quahog FMP 13 times; Summer Flounder, Scup and Black Sea Bass FMP 13 times; Atlantic Mackerel, Squid and Butterfish FMP 9 times and the Bluefish FMP once. The Dogfish and Tilefish FMPs were recently implemented and are already undergoing management changes.

As the FMPs were amended they generally evolved from single-species to multi-species, and now many of the management issues facing the Council currently deal with ecosystem-type ideas. For example, the surfclam and ocean quahog FMP currently is dealing with the loss of the southern and inshore portion of the surfclam biomass which is most likely a function of global warming. For the Atlantic mackerel, Loligo, Illex, and butterfish FMP the Council is addressing bycatch issues in the Loligo and butterfish fisheries for scup, as well as, the fact that all four species are prey for marine mammals, highly migratory species, most fishes, and themselves. In the summer flounder, scup, and black sea bass FMP there are ecological issues of summer flounder juveniles strongly associated with submerged aquatic vegetation which is very vulnerable to man-made disturbances in the estuaries. Bluefish and striped bass are competitors with an inverse relationship between the two. Finally, tilefish are structure-oriented and while an HAPC (habitat area of particular concern) has been identified, there are no gear restrictions.

Council management of our fisheries resources has been based on the goals and objectives set through public participation under MSA and often times compromises have resulted in not the maximization of a certain parameter or output but rather the overall "optimizing" for society. Many of the current 10 National Standards that FMPs are required to meet under the MSA (i.e., 1 – overfishing, 2 – best science, 3 – managed as unit throughout its range, 5 – efficiency, 8 – communities, 9 – bycatch) and the essential fish habitat provisions require a more holistic approach that has evolved the fisheries management efforts towards EAF.

II. Nine Topic Areas for Discussion at this Scoping Meeting

1. Adequacy of current approaches for addressing ecosystem considerations.

The Council believes that the process needs to be more evolutionary than revolutionary and will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

MJD: I CONCUR WITH DR. SIESSENWINE'S STATEMENT.

Are there overarching ecological or socioeconomic issues that have been missed by the Council through its approach to single species management?

MJD: 1. THE SECTION (ABOVE) PROVIDES US WITH A GOOD OVERVIEW OF THE COMPLEXITIES OF THE PROBLEMS AND THE DIFFICULTIES IN SOLVING THEM. FOR MY PART I WILL MAINLY BE DEALING WITH ESSENTIAL FISH HABITAT (EFH) AND THE 'HOLISTIC APPROACH' TOWARDS EAF.

2. THIS COUNCIL USE TO LEAD THE WAY IN HABITAT PROTECTION ESPECIALLY IN REGARDS TO JUVENILE AND NURSERY AREAS. AS OF LATE YOU HAVE GOTTEN AWAY FROM IT AND I WOULD LIKE TO SEE YOU RETURN TO YOUR FORMER DAYS AS A LEADER IN THIS AREA.

3. I DESIRE TO SEE FULL HEADWATERS TO THE SEA APPROACH TAKEN WITH THIS EXERCISE - THAT INCLUDES DIADROMOUS FISH SPECIES - BEING COVERED IN THIS SCOPING DOCUMENT.

Has enough Council attention in the past been paid to bycatch, predator-prey, gear impacts, other man-made impacts, and PETs (protected, endangered, and threatened resources)?

MJD: I THINK THIS COUNCIL IS DOING THE BEST IT CAN WITH WHAT IT HAS BUT I DO URGE YOU TO RETURN TO YOUR FORMER DAYS AS A LEADER IN HABITAT PROTECTION.

2. Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability and productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

What is the desired state of our ecosystem i.e., should we be conserving and managing or preserving?

MJD: ALL OF THE ABOVE.

THIS COUNCIL'S WORK IN REGARDS TO CONSERVING AND MANAGING HAS BEEN EXEMPLARY. REBUILDING STOCKS TAKES TIME. WE DID NOT DEplete THEM OVERNIGHT AND WE WILL NOT RE-BUILD THEM OVERNIGHT.

WHEN IT COMES TO PRESERVING MORE NEEDS TO BE DONE AND OPPORTUNITIES MUST EITHER BE SEIZED WHEN THEY ARISE OR CREATED.

ONE EXAMPLE OF AN AREA THAT FITS THE PRESERVATION BILL IS HEN AND CHICKEN SHOALS (H&CS) OFF THE COAST OF DELAWARE. THIS IS AN AREA THAT THE RECREATIONAL AND COMMERCIAL FISHER'S USE ON THE FRINGES WITH LITTLE EXCEPTION OTHER THEN IT BEING UTILIZED PERIODICALLY FOR EXTRACTION OF QUAHOGS AND SURFLCLAMS. IT HAS BEEN SHOWN REPEATEDLY TO BE AN IMPORTANT AREA FOR MANY SPECIES BECAUSE IT HOUSES THE NATURAL STRUCTURE THEY NEED. GEOLOGICALLY IT PROVIDES A NATURAL BARRIER FOR THE COAST DURING STORM PERIODS AND IS USED AS A PROTECTIVE BARRIER FOR FISHER'S RUNNING IN AND OUT DURING THESE STORMS.

THE MAIN THREAT AT PRESENT TO H&CS IS ITS POTENTIAL USE AS A SOURCE OF SAND FOR DELAWARE'S BEACH REPLENISHMENT PROJECTS. THIS IS AN AREA THAT SHOULD BE PRESERVED AND MANAGED ACCORDINGLY. FISHING CAN HAPPEN HERE AS LONG AS THE NATURAL GEOLOGICAL STRUCTURE IS NOT COMPROMISED. I SEE NO REASON IT COULD NOT BE TURNED INTO A NATIONAL PARK MARINE PROTECTED AREA. DELAWARE DOES NOT HAVE A NATIONAL PARK DESIGNATION AND THIS WOULD PRESENT A GOOD OPPORTUNITY TO ESTABLISH ONE IN THIS STATE TO THE BENEFIT OF ALL.

What should the short/long-term goals and objectives be to get us to the desired ecosystem state?

MJD: IF THIS IS NOT FUNDED I CAN ONLY ENCOURAGE THE COUNCIL TO TAKE YOUR PIECE OF THE OVERALL ECOSYSTEM (3 TO 200 MILES & EFH) AND APPLY YOUR MANDATE AND BECOME MORE AGGRESSIVE WITH NEGATIVE IMPACTS TO EFH.

3. Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders – fishermen, mineral extractors, energy producers, aquaculture, transportation, etc. The Council believes (as was identified by the Ecosystem Panel at the March 2005 Washington conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering Committee for ecosystem goals and objectives. The Council reinforces its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among various Councils, NMFS, partner agencies, and stakeholders.

What is the best forum for the public involvement in the decision making process?

MJD: AT PRESENT IT IS THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA).

How should the Councils reconcile the often competing requirements and agendas among state and Federal agencies, often times even within the same agency, i.e., zero mortality for marine mammals as opposed to realizing the full potential of the Nation's fishery resources as part of Magnuson-Stevens Act?

MJD: INTER-GOVERNMENTAL COOPERATION WITH PUBLIC OVERSIGHT.

4. Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity. Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

Councils are mandated to manage fishing mortality and fishing gear impacts, while other manmade impacts can contribute greatly to resource declines (i.e., coastal development, pollution, cable routing, energy production, climate change) as well as loss of biodiversity. How should other non-fishery agencies be engaged formally or informally?

MJD: UNDER NEPA AND OTHER APPLICABLE LAWS – THAT INCLUDE BUT ARE NOT LIMITED TO - THE CLEAN WATER ACT AND THE COASTAL ZONE MANAGEMENT ACT MUCH OF THIS SHOULD BE HAPPENING ALREADY. THE PROBLEM CONTINUES TO BE A LACK OF WILLINGNESS TO ASSESS THE CUMULATIVE IMPACTS OF THESE MAN MADE IMPACTS ON THE ECOSYSTEM. HOPEFULLY THIS EXERCISE WILL HELP BRING US OUT OF THIS QUAGMIRE AND LEAD US TO GETTING SERIOUS ABOUT CUMULATIVE IMPACT ASSESSMENTS ACROSS THE AGENCY AND POLITICAL SPECTRUMS.

What issues/agencies are necessary to address the requirements of EAF that are beyond the Council/NMFS control to effect i.e., North Atlantic oscillation, head-water development, Federal flood insurance?

MJD: THE ANSWER TO THIS RUNS THE GAMUT FROM LOCAL, COUNTY, STATE, FEDERAL AND FOREIGN GOVERNMENTS. I WILL ELABORATE MORE ON THIS IN MY CLOSING STATEMENT.

5. Boundaries of sub-regional ecosystems with the areas of the various FMCs.

The "Northeast U.S. Large Marine Ecosystem (LAME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

The MAFMC ecosystem efforts will overlap with both the New England and South Atlantic jurisdictions. Should a formal or informal partnership be used with our sister FMCs?

MJD: I FOR ONE DO NOT WANT TO SEE THE SYSTEMS BE SEPARATED OR REGIONALIZED. IT WILL GET CONFUSING IF YOU DO. KEEP THE LME'S INTACT. FROM THERE EACH AGENCY SHOULD WORK WITHIN ITS OWN POLITICAL BOUNDARIES OVERLAYING THEM WITH THE NATURAL ONES. FOR EXAMPLE BLUEFISH ARE PASSING THROUGH BOTH THE NELME AND THE SELME. PARTNERSHIPS WITHIN THE AGENCIES – WHETHER FORMAL OR INFORMAL – IS PARAMOUNT TO KEEPING THE HOLISTIC APPROACH INTACT.

How far inshore of the Exclusive Economic Zone (EEZ) should the range of issues extend for purposes of EAF?

MJD: ALL THE WAY TO THE HEADWATERS. EVERY WATERSHED WITHIN EACH LME SHOULD BE CONSIDERED AN INTEGRAL COMPONENT OF THEM. TO DISMISS THE HEADWATERS TO THE SEA APPROACH WOULD BE TO DISMISS A SEGMENT OF THE SCIENCE THAT HAS TO GO INTO THE DECISION MAKING PROCESS ESPECIALLY WITH EFH.

6. Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

What types of management measures would be incorporated into EAF, consistent with the identified goals?

MJD: I AM CONFUSED AS TO THE IDENTIFIED GOALS AS THEY RELATE TO THIS QUESTION. I WOULD LIKE TO REQUEST THAT THE RECORD BE KEPT OPEN ON THIS QUESTION UNTIL I CAN GET FURTHER CLARIFICATION.

How should the NEFMC and MAFMC coordinate fishery management efforts within this one LME that we share, given that NE is generally effort-based while MAFMC has quota-based management regimes?

MJD: FOR THE PURPOSES OF EAF I WOULD ENCOURAGE YOU TO IDENTIFY YOUR COMMON DENOMINATORS AND PROCEED FROM THERE.

7. Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

The EPAP (1999) recommended the development of FEPs and the research to support them. The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

Should the Council create an umbrella-like FEP that provides all the background information on our ecosystem?

MJD: YES UNLESS IT IS REINVENTING THE NEPA WHEEL. FILLING THE DATA GAPS WILL TAKE TIME BUT FORTUNATELY WE HAVE THAT. WHAT WE MUST STOP DOING IS TRASHING ALREADY EXISTING DATA SUCH AS HAS HAPPENED WITH THE FORMER NMFS'S HABITAT OFFICE IN OXFORD, MARYLAND.

How would an FEP be different from the current National Environmental Policy Act (NEPA) requirements to address "cumulative effects" which focus attention on five areas: 1) targeted fishery and resources, 2) non-target fisheries or bycatch, 3) habitat, 4) PET species, and 5) communities— socioeconomics?

MJD: FEP'S SHOULD COMPLIMENT NEPA AND NOT COMPETE WITH IT. IF I AM READING THIS CORRECTLY THIS COUNCIL IS PROPOSING FEP'S TO ACT AS A GUIDANCE DOCUMENT WHEREAS NEPA IS LAW AND IF IT IS GOING TO HELP IN THE LONG RUN I'M ALL FOR IT. BUT FOR US TO BE SERIOUS ABOUT EAP'S WE NEED TO GET SERIOUS ABOUT ADDRESSING 'ALL DIRECT, SECONDARY, AND CUMULATIVE IMPACTS OF RECENT PAST, PRESENT AND FUTURE FORESEEABLE ACTIONS WHEN PROPOSALS ARISE THAT WILL POTENTIALLY HAVE A NEGATIVE IMPACT ON THE MARINE ENVIRONMENT.

8. Techniques for determining success of ecosystem-based management.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of NMFS into usable products for management.

What new tools are required for risk assessment, monitoring, and evaluation in an EAF?

MJD: I AM NOT CERTAIN ANY NEW TOOLS ARE NEEDED. IT SEEMS TO ME WE HAVE WHAT WE NEED AT PRESENT EXCEPT FOR THE FUNDING AND THE POLITICAL WILL TO SEE THIS BECOME A REALITY.

What techniques are available for determining success of ecosystem-based management?

MJD: ENFORCING EXISTING LAWS WHICH ARE DESIGNED TO MAKE CERTAIN WE HAVE ENOUGH FISH TO CATCH AND THAT THEY ARE SAFE TO EAT.

9. Other issues considered important for our region.

The initial Congressional funds run through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA (question 7) as a surrogate for ecosystem-approaches to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the nontargeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

How would you propose strengthening the Councils approach to ecosystem management?

MJD: CONGRESS PROPERLY FUNDING THE COUNCIL TO UNDERTAKE THIS ENDEAVOR. BUT REGARDLESS OF WHETHER CONGRESS FUNDS YOU OR NOT I WOULD HIGHLY ENCOURAGE THE COUNCIL TO CONTINUE TO USE THE BEST AVAILABLE SCIENCE AND ALL APPLICABLE LAWS TO CARRY ON DOING THE GOOD JOB THAT YOU ARE CURRENTLY DOING.

The Council treats EFH as an unfunded mandate and relies nearly totally on NMFS, thus if no new monies come to the Council, should we treat EAF as we do EFH?

MJD: WHAT IS TODAY UN-FUNDED MAY BE FUNDED TOMORROW. BEST TO PREPARE THE INFRASTRUCTURE NOW FOR WHAT WE KNOW IS INEVITABLE.

III. References are available upon request to the Council.

IV. Additional Comments

Thank you for participating in this scoping activity to engage our constituencies in public debate on ecosystems. This scoping hearing was recorded and summary minutes will be produced and submitted to NMFS as part of the cooperative agreement. Should you have additional comments on any of these issues, please provide them by October 31 to: Mr. Daniel T. Furlong, Executive Director, MAFMC, Room 2115, Federal Building, Dover, DE. 19904.

MJD: IN CLOSING I WISH TO REITERATE THAT ECOSYSTEM APPROACHES SHOULD BE ALL ENCOMPASSING; A HEADWATERS TO THE SEA APPROACH SHOULD BE TAKEN; OPPORTUNITIES NEED TO BE SEIZED AS THEY ARISE; AND INTER-GOVERNMENTAL COOPERATION IS IMPORTANT FOR THIS TASK AT HAND TO BE SUCCESSFUL.

HAVING SAID THAT THE QUESTION NOW BECOMES HOW DOES THE MAFMC GET THERE GIVEN ITS JURISDICTIONAL BOUNDARIES LIE MAINLY FROM 3-MILES TO 200-MILES OFFSHORE FROM NEW YORK TO NORTH CAROLINA?

ONE ANSWER TO THAT QUESTION MAY BE WITH THE AMERICAN EEL (AE), WHICH I AM USING AS THE KEYSTONE SPECIES TO ILLUSTRATE MY POINT.

THE AE IS A CATADROMOUS SPECIES BORN IN THE SARGASSO SEA. FROM THERE IT EVENTUALLY MIGRATES INTO THE FRESHWATERS THROUGH OUT ITS RANGE THAT EXTENDS FROM ICELAND TO BRAZIL. DURING THIS PERIOD IN THE FRESHWATERS THEY SPEND FROM SEVEN TO TWENTY YEARS OR MORE BEFORE RETURNING TO THE SARGASSO SEA WHERE IT IS BELIEVED THEY SPAWN AND DIE.

HENCE WITH THIS LIFECYCLE THE AE UTILIZES THE JURISDICTIONAL BOUNDARIES OF THE MAFMC DURING SOME PARTS OF ITS LIFECYCLE AND WHO ALSO FACES MANY OF THE SAME PERILS (OVER HARVESTING, POLLUTION, HABITAT DESTRUCTION, ETC.) THAT SPECIES MANAGED UNDER YOUR COUNCIL FACE AS WELL (ASMFC AE FMP 2000).

HISTORICALLY THE AE HAS HELD A FASCINATION WITH MAN DATING BACK TO THE EARLY GREEKS UP TO THE PRESENT DAY. PERHAPS THE MOST COMPELLING ASPECT OF THIS HISTORICAL PERSPECTIVE IS TO BE FOUND IN THE ASMFC' AE FMP WHICH STATES, "HISTORICALLY, THE AMERICAN EEL WERE VERY ABUNDANT IN THE EAST COAST STREAMS, COMPRISING MORE THAN 25 PERCENT OF THE TOTAL FISH BIOMASS (SMITH AND SAUNDERS 1955; OGDEN 1970)."

AS I STATED EARLIER I BELIEVE THAT WE MUST SEIZE UPON OPPORTUNITIES WHEN THEY PRESENT THEMSELVES OR CREATE THEM WHEN NECESSARY.

IN THE CASE OF THE AE THE COUNCIL HAS OPPORTUNITY BEFORE IT TO SHARE ALL OF ITS RELEVANT DATA WITH THE US FISH & WILDLIFE SERVICE (US F&WS). THIS AGENCY IS CURRENTLY SEEKING THIS TYPE OF INFORMATION IN ITS UNDERTAKING OF A STATUS REVIEW FOR POSSIBLE LISTING UNDER THE ENDANGERED SPECIES ACT. FOR MORE DETAILS PLEASE GO TO [American Eel Endangered List](#) LOCATED ON THE US F&WS WEB SITE.

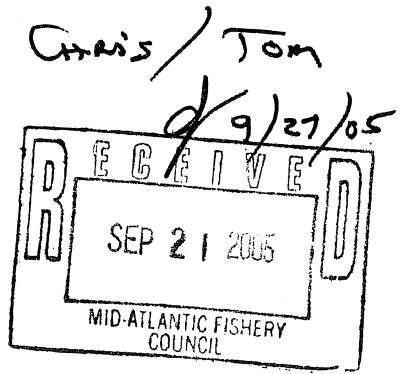
AS IS STATED BY THE US F&WS THEY ARE LOOKING AT THE STATUS OF THE AE THROUGH OUT ITS ENTIRE RANGE. THIS WOULD CARRY THE REVIEW FROM THE EASTERN ICELAND SHELF ([Large Marine Ecosystem Modules](#)) DOWN THE WESTERN ATLANTIC SEABOARD TO THE EAST BRAZIL SHELF ([Large Marine Ecosystem Modules](#)).

BY COOPERATING WITH THE US F&WS THE MAFMC WOULD BE ONE OF A HOST OF CONTRIBUTORS THAT MAY INCLUDE – BUT NOT BE LIMITED TO – THE ASMFC, GULF OF MEXICO FMC, GREAT LAKES MFC, NMFS, NOAA OCRM, EPA, US ACOE, USGS, USFS, NE

FMC, SE FMC, GOM FMC, AND CANADA. ALSO IT SHOULD NOT BE RULED OUT THAT RESOURCES OF OTHER FOREIGN GOVERNMENTS AS WELL AS THE UNITED NATIONS COULD ALSO WEIGH IN DURING THIS PERIOD.

WHAT CAN APPEAR TO BE A COMPLEX PROBLEM TO SOLVE CAN - AND SHOULD - BE MADE SIMPLE. THE OPPORTUNITY FOR THIS COUNCIL TO JOIN IN THIS EFFORT WILL HELP GIVE US A SNAPSHOT OF A SPECIES THROUGH OUT MULTIPLE ECOSYSTEMS AND MAY BE AN OPPORTUNITY THAT WILL NEVER PASS THIS WAY AGAIN.

CC: US CONGRESSIONAL DELEGATIONS OF NY, NJ, DE, MD, VA, & NC
GOVERNORS OF NY, NJ, DE, MD, VA, NC
EXECUTIVE DIRECTOR ASMFC
EXECUTIVE DIRECTOR GLFMC,
EXECUTIVE DIRECTOR GOMFMC
EXECUTIVE DIRECTOR DOC SE FMC
EXECUTIVE DIRECTOR DOC NE FMC
EXECUTIVE DIRECTOR DOC GOM FMC



Mr. and Mrs. Edward T. Smith
7605 Worcester Highway
Newark, MD
21841

Comments regarding EAF

9/18/05

Dear Mr. Furlong,

Under the nine topics for discussion, topic 1, in response to the two questions; yes, there are ecological and socioeconomic issues that have been missed by the Council. For instance, the sea bass pot fishermen are required to make frequent, expensive changes in vents and ropes, but the clam dredges that plow the bottom where sea bass dwell continue to do so without restriction. Has the Council paid enough attention to by catch, gear impacts, etc? Politics has the Council regulating some gear types, pots, more than others, dredges, for instance. Regulations address the insignificant by catch in pots more than the significant by catch on trawlers. We don't necessarily need more regulations on dredges and trawlers; we need less on the pots. We have seen a lost of the more ecologically friendly sea bass pot fishing to trawling and handlining. Also, fuel efficiency, certainly an economic issue, is not considered in regulations.

Topic 2- As far as managing for conservation and productivity, the Council is doing very well. Nothing is broken, why fix it?

Topic 3- Zero mortality of increasing populations of marine mammals is a ridiculous and impossible goal. It's only purpose seems to be to employ

certain environmental and animal rights organizations who threaten law suits to benefit their lawyers. It also brings a lot of business to that K Street "facilitating" organization, Resolve.

To involve fishermen in decision making processes, the Council needs to realize these people have to work for a living and don't have time for meetings. Meetings should be held closer to where the fishermen are and at more convenient seasons, such as winter for most fishermen. Most prefer early morning meetings to evening meetings. They also hate to drive in heavy traffic in unfamiliar cities. E-mail, instant messaging and other forms of modern communication should be used more.

IV. Additional Comments

EAF sounds like a very complicated, unnecessary waste of tax money for issues that are mostly beyond the control of the Council. Who comes up with this stuff? We don't need EAF; we need common sense.

Sincerely,

A handwritten signature in cursive script, appearing to read "Edward T. Smith".

Mr. and Mrs. Edward T. Smith

Hoff, Thomas B.

From: Furlong, Daniel T.
Sent: Monday, September 19, 2005 10:54 AM
To: Hoff, Thomas B.
Subject: FW: COMMENTS ON SCOPING MEETING ON EVOLUTION TOWARD ECOSYSTEM

FYI - comments on Ecosystem. Please incorporate these with other written input. Thanks!

-----Original Message-----

From: jean public [mailto:jeanpublic@yahoo.com]
Sent: Saturday, September 17, 2005 3:28 PM
To: Info
Cc: RODNEY.FRELINGHUYSEN@MAIL.HOUSE.GOV
Subject: COMMENTS ON SCOPING MEETING ON EVOLUTION TOWARD ECOSYSTEM

ONE WONDERS WHY THIS COUNCIL HAS BEEN IN EXISTENCE FOR THE LAST SIXTY YEARS AND IS JUST NOW GETTING AROUND TO AN ECOSYSTEM APPROACH. HAVE THE MEMBERS BEEN HIDING IN THE SAND?

IT IS CLEAR THAT NOT JUST "STAKEHOLDER" GROUPS ARE INVOLVED HERE WHEN THE GENERAL AMERICAN POPULATION ARE THE TRUE OWNERS OF THE FISH. THE MAJOR STAKEHOLDER IS THE AMERICAN POPULATION, NOT THE LOCAL COMMERCIAL FISH PROFITEERS WHO STEAL FROM THE AMERICAN POPULATION AND TAKE MORE FISH THAN THEY ARE ALLOWED TO TAKE AND WHO MAKE SURE THAT THE GENERAL AMERICAN POPULATIONS RIGHTS ARE TRAMPLED.

I THINK THIS COUNCIL WILL ATTEMPT TO MAKE ECOSYSTEM INTO THE SAME OLD CRAP THAT HAS BEEN GOING ON FOR SIXTY YEARS AND NOTHING NEW WILL EMERGE. CERTAINLY NOTHING HAS DISLODGED THIS COUNCIL FROM ALLOWING THE PROFITEERS TO RUN RAMPANT FOR THE PAST SIXTY YEARS!

THERE HAS BEEN CONSIDERATION AT ALL FOR THE NONHUMAN SPECIES. THEY ARE SEEN SIMPLY AS SOME COMMERCIAL FISHERMEN'S PROFITS.

IT CERTAINLY IS CLEAR THAT EVEN THOUGH MAGNUSON STEVENS TEN YEARS AGO REQUIRED ACCOUNTING FOR BYCATCH, HABITAT PROTECTION AND MONITORING IMPROVEMENT, NOTHING HAS BEEN DONE OR ACCOMPLISHED ALONG THOSE LINES.

MY QUESTION ABOUT THE COUNCIL IS WHY ONLY PEOPLE WITH FINANCIAL TIES AND PROFITEERING TO THE FISH INDUSTRY ARE THE ONES CATERED TO, WHEN THE GENERAL AMERICAN PUBLICS INTERESTS ARE DECIMATED?

THIS COUNCIL IS SUPPOSED TO PROTECT THE GENERAL PUBLIC'S INTEREST EVEN IF THEY DONT ATTEND AND EVEN IF THEY DONT WRITE. THEY STILL HAVE THE MAJOR INTEREST TO BE PROTECTED. AND THIS COUNCIL HAS CERTAINLY FAILED TO DO THAT.

THE CURRENT APPROACHES ARE DEFICIENT. THEY RELY ON INFORMATION FROM THE PROFITEERS, WHICH IS INFORMATION TURNED IN THAT WILL ONLY BENEFIT THE PROFITEERS. YOU CANNOT RELY ON THE PEOPLE LOOKING TO PROFIT FROM A RESOURCE FOR INFORMATION ON THAT RESOURCE. YOU GET SKEWED, INACCURATE, AND UNTRUTHFUL INFORMATION.

THE ECOLOGICAL INTERESTS HAVE BEEN SO OVERRIDDEN BY THESE COMMERCIAL FISH PROFITEERS THAT OUR REGION IS IN

A TERRIBLE STATE.

NOT ENOUGH COUNCIL ATTENTION HAS BEEN PAID TO OVERFISHING, INCLUDING BYCATCH, PREDATOR PREY; THE HORRIBLE ENVIRONMENTAL IMPACTS OF GEAR.

I BELIEVE THAT IF YOU MANAGE FOR SUSTAINABILITY, THE PRODUCTIVITY WILL TAKE CARE OF ITSELF. THE FOCUS MUST BE ON SUSTAINABILITY. THAT IS THE ONE CORE FACTOR.

THE PRODUCTIVITY HAS BEEN VERY VERY HARMFUL.

WE SHOULD BE PRESERVING. WE HAVE AN OBLIGATION TO OUR CHILDREN AND OUR CHILDREN'S CHILDREN TO HAVE FISH IN THE OCEAN. THE CURRENT STATE IS ONE OF TAKING IT ALL NOW.

I NOTE THAT EVEN IN YOUR PAGE 4 ON THIS SUBJECT YOU ONLY SPEAK OF THE STAKEHOLDERS AS BEING FISHERMEN, MINERAL EXTRACTORS, ENERGY PRODUCERS, AQUACULTURE, TRANSPORTATION, BUT THEY ARE ONLY PART OF THE STAKEHOLDERS. THE MAJOR STAKEHOLDER IS THE GENERAL AMERICAN PUBLIC. AND YOU COMPLETELY FORGET THEIR PRIMARY INTEREST. YOU OVERRIDE THEIR INTEREST FOR THE INTERESTS OF THE SMALLER PROFITEERING GROUPS. THE TAKERS ARE PARAMOUNT IN THIS COUNCIL. THE TAKERS - THE DESTROYERS - HAVE THE UPPER HAND WITH THIS COUNCIL - WHICH IS WHY THE STATE OF FISH IS SO SORRY RIGHT NOW.

WE NEED TO MAKE SURE THAT THE COUNCIL MEMBERS PROTECT THE GENERAL AMERICAN PUBLIC FIRST AND FOREMOST. AND THEIR CHILDREN. THEY ARE THE PRIMARY STAKEHOLDERS. NOT THE LOCAL GREEDY PROFITEERS PROFITING OFF WHAT BELONGS TO THE AMERICAN PUBLIC. THIS COUNCIL HAS BEEN SO DELINQUENT IN PROTECTING THE GENERAL AMERICAN PUBLIC THAT IT IS IN FACT A DISGRACE. A REAL DISGRACE.

FEDERAL AGENCIES ARE NOT THE ONES TO BE SATISFIED. THE INTERESTS OF THE GENERAL AMERICAN PUBLIC ARE THE ONES THAT ARE PRIMARY. I NOTE THAT IN MANY CASES THERE ARE STATE AGENCIES, LIKE THE NEW JERSEY DIVISION FISH & GAME THAT ARE TAKEN OVER BY ONE SMALL SEGMENT OF THE PUBLIC, AND THAT THIS SMALL SEGMENT REPRESENTS ONLY THE INTERESTS OF LESS THAN ONE PERCENT OF NJ. SUCH A SMALL SEGMENT CAN GAIN POWER, BUT THEIR DECISIONS IN NO WAY REFLECT THE GENERAL POPULATION OF NEW JERSEY OF 8,000,000. THIS IS AN EXAMPLE OF WHY THIS COUNCIL SHOULD NOT BE SATISFYING FEDERAL OR STATE AGENCIES. REMEMBER THE INTERESTS OF THE GENERAL AMERICAN POPULATION.

IT IS CLEAR THAT AN HONORABLE COUNCIL WOULD COME OUT IN OPPOSITION TO COASTAL DEVELOPMENT WHEN IT IS FULLY AWARE THAT SUCH DEVELOPMENT NEGATIVELY IMPACTS THE FISH STOCK. AND IN FACT THAT SUCH COASTAL DEVELOPMENT LEADS TO FLOODING LIKE RECENTLY HAPPENED IN NEW ORLEANS.

FOCUSING ON MAXIMUM SUSTAINABLE YIELD HAS RESULTED IN ACHIEVING MAXIMUM NON-SUSTAINABLE YIELD SO THIS COUNCIL HAS CERTAINLY NOT ACHIEVED THAT GOAL IN THE PAST.

I WOULD PROPOSE THAT TRUE ENVIRONMENTALISTS BE ADDED TO THIS COUNCIL IN GREATER NUMBERS AND THAT THE GENERAL PUBLIC'S INTEREST BE REPRESENTED. CUT DOWN THE MEMBERS WHO REPRESENT THE TAKERS, THE USERS, THE DEVASTATORS.

THE COUNCIL IS WRONG IF THEY THINK THEY HAVE DONE A "PRETTY GOOD" JOB WITH ANYTHING AT ALL. THE JOB THEY HAVE DONE IS DISGUSTING. THEY SHOULD HANG THEIR HEAD IN SHAME SINCE THEY HAVE CAPITULATED TO PROFITEERS OVER AND OVER IN MY OPINION. THIS IS ALL MY OPINION.

THESE COMMENTS ARE FOR MR. DANIEL T. FURLONG, EXEC
DIRECTOR, MAEMC, ROOM 2115, FEDERAL BUILDING, DOVER DE
19904.

B. SACHAU
15 ELM ST
FLORHAM PARK NJ 07932

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<http://mail.yahoo.com>

3.0 ATTITUDES/VALUES SURVEY

When the Council initially submitted its cooperative agreement application (Appendix A), it envisioned coordinating a small contract with an entity (perhaps a mid-Atlantic Sea Grant University) to approach how to solicit the participation of the public in the envisioned attitudes/values survey called for in the NMFS SOW. However, when NMFS organized a social sciences workshop and committed to developing the attitudes/values survey, the Council saw no need for an outside contract. This social sciences workshop in November/December 2004 was attended by: Drs. Kray, Montanez and Hoff, as well as, Ms. Lyons.

The Ecosystem Committee was presented with the results of the social sciences workshop at their December 2004 meeting and commented on the approach to the project coordinator, Dr. Kristy Wallmo. In August 2005, staff helped organize for Dr. Wallmo a wide-ranging group of individuals who reviewed the survey and again offered comments. The survey development duration was extensive, mainly because of Paperwork Reduction Act issues and the impacts of Hurricane Katrina in the fall of 2005. Finally on February 28, 2006 the survey instrument was provided to the Council and follows:

NOAA Fisheries Social Science Survey on Fisheries Management

Survey Objectives

NOAA Fisheries is conducting a survey of fisheries stakeholders concerning their attitudes and preferences for fisheries management. The survey will examine, and where appropriate, quantitatively measure

- (a) opinions concerning current fisheries management regimes
- (b) preferences for a variety of fisheries management objectives
- (c) a baseline measure of perceptions of Ecosystem Management.

Sampling Frame

The sampling frame for the survey consists of key stakeholders associated with fisheries management from states in the Atlantic and Gulf of Mexico regions. These regions were chosen to be consistent with the Ecosystem Pilot Projects being conducted by NOAA Fisheries in the North Atlantic, Mid-Atlantic, South Atlantic, and Gulf of Mexico.

NOAA Fisheries developed the sampling frame using mailing lists of fisheries stakeholders maintained by the following:

- NOAA Fisheries Office of Constituent Services
- NOAA Fisheries Office of Science and Technology

New England Fishery Management Council
Mid-Atlantic Fishery Management Council
South Atlantic Fishery Management Council
Gulf of Mexico Fishery Management Council

The frame will be augmented by merging the database held by ORC Macro that consists of commercial fisheries permit holders and vessel owners. This database was developed for use in the Commercial Fisheries Employment Survey.

A stratified random sample will be used to select the sampling population from the frame. The sampling frame has been cleaned to remove duplicates, entries with incomplete contact information, all congressional entries, all NOAA entries, and entries that are not associated with the Atlantic or Gulf of Mexico regions.

Survey Development and Implementation

The survey has been developed by the Social Science and Ecosystem Management (SSEM) Working Group^a, using input from the SSEM Workshop held in November 2004. Present at the workshop were social scientists from NOAA Fisheries, the US Fish and Wildlife Service, the New England, Mid-Atlantic, South Atlantic, and Gulf of Mexico Fishery Management Councils, and academic institutions. Draft survey instruments were pre-tested in qualitative focus groups held in Charleston, SC, and Philadelphia, PA. Revisions to the instrument were made based on focus group feedback. In November 2005 the survey received Paperwork Reduction Act clearance.

The survey implementation will begin in March 2006. Implementation will follow standard mail survey protocols described in Dillman (2000)^b. The implementation will consist of the following:

- Pre-notice mailing to inform respondents of the upcoming survey.
- First survey mailing approximately 3 – 5 days after pre-notice.
- Reminder postcard approximately 2 weeks after first survey mailing.
- Second survey mailing approximately 2 weeks after reminder postcard.

NMFS anticipates preliminary results in April 2006. A full report will be available by summer 2006.

3.1 NMFS March 2006 Survey






^a Working Group participants include Kristy Wallmo, Brad Gentner, and Steve Edwards from NOAA Fisheries, and Kathi Kitner and Vishwanie Maharaj from the South Atlantic Fishery Management Council.

^b Dillman, D. 2000. Mail and Internet Surveys. The Tailored Design Method. John Wiley and Sons, Inc., New York, New York.

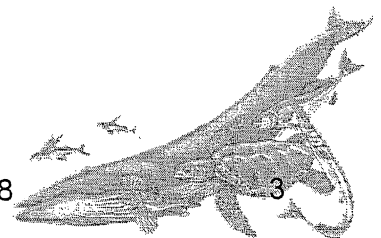
Section A: Interest in Fisheries Management.

NOAA's National Marine Fisheries Service is asking a sample of fisheries stakeholders about their attitudes toward Ecosystem Approaches to Fisheries Management, or EAFM. Please take a few minutes to complete the survey - we want an Ecosystem Approach to Fisheries Management to reflect the preferences of fisheries stakeholders. We would like to begin by asking you a few questions about your personal or professional interest in fisheries management. When completing the questionnaire please print clearly.

Your opinions are important!


-  **A1** During the past year, how many meetings of the following types have you attended:
- _____ Fishery management councils, subcommittee or advisory committees
 - _____ Environmental organizations
 - _____ Recreational fishing clubs or associations
 - _____ Commercial fishing trade organizations
 - _____ Other (please specify): _____
-  **A2** Do you or does anyone in your household make a living part-time or full-time from work directly associated with marine resources or the marine environment?
- Yes
 - No
 - I am unsure
-  **A3** Have you seen, heard, or read about fisheries management in the past 3 years?
- Yes
 - No
-  **A4** Have you ever altered your recreation or vacation plans because of fisheries management decisions or fisheries regulations?
- Yes
 - No
-  **A5** How concerned are you that fisheries management decisions will impact your life or livelihood?
- Very concerned
 - Somewhat concerned
 - Not concerned at all
 - I am unsure

Questions? call Kristy Wallmo at 1.301.713.2328




Section B: Current Fisheries Management in the Mid-Atlantic


In this section, we would like to know what you think about the current status of some marine fish and other animals in the Mid-Atlantic region, which includes the marine waters off the coast of North Carolina, Virginia, Maryland, Delaware, Pennsylvania, New Jersey, and New York. **Please answer the questions below based on your opinions and knowledge of the Mid-Atlantic region.**

 **B1** In your opinion, current management of this species is....

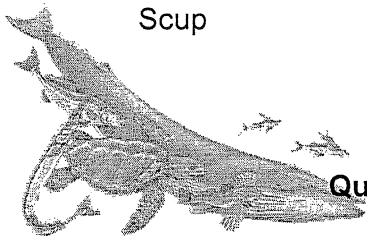
	Excellent	Good	Fair	Poor	I am unsure
Bottlenose Dolphin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sea Turtles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

 **B2** In your opinion, the status of this species is.....

	Stable	Threatened or endangered but recovering	Threatened or endangered not recovering	I am unsure
Bottlenose Dolphin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sea Turtles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

 **B3** In your opinion, current management of this species is....

	Excellent	Good	Fair	Poor	I am unsure
Summer Flounder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black Sea Bass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bluefish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilefish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mackerel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Squid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Butterfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surfclam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ocean Quahog	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spiny Dogfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



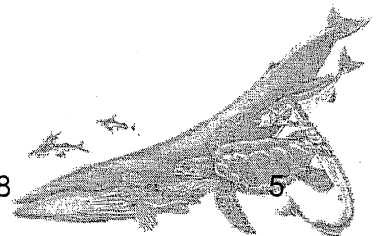
Questions? email us at Kristy.Wallmo@noaa.gov



B4 In your opinion, the status of this species is....

	Stable	Overfished but recovering	Overfished, not recovering	I am unsure
Summer Flounder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black Sea Bass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bluefish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilefish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mackerel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Squid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Butterfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surfclam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ocean Quahog	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spiny Dogfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions? call Kristy Wallmo at 1.301.713.2328



Section C: Your Preferences for Fisheries Management

A number of objectives can be considered when fisheries management strategies are developed for the Mid-Atlantic region, and, in some cases, objectives will be conflicting. Because not all objectives can be given equal attention, it is important for managers to understand which objectives are important to you.



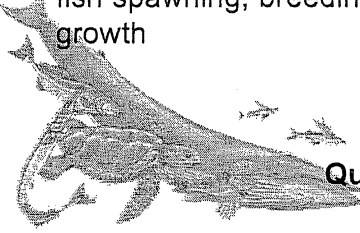
C1 Listed below are a number of potential objectives for managing the Mid-Atlantic region. Using the scales, please circle your opinion about:

- The importance of each objective for the Mid-Atlantic region, and
- The satisfaction level you have with the way current management addresses each objective in the Mid-Atlantic region

Importance of Objective	Your Satisfaction Level
1=Extremely Important	1=Extremely Satisfied
2=Somewhat Important	2=Somewhat Satisfied
3=Not Very Important	3=Not Very Satisfied
4=Not Important at All	4=Not Satisfied at All
5=I Am Unsure	5=I Am Unsure

Please circle a response in each column.

(a) Ensure that all stakeholder interests are represented in management decisions	1	2	3	4	5	1	2	3	4	5
(b) Maintain employment from marine-based industries	1	2	3	4	5	1	2	3	4	5
(c) Protect marine biodiversity	1	2	3	4	5	1	2	3	4	5
(d) Restore fish stocks that have been depleted	1	2	3	4	5	1	2	3	4	5
(e) Reduce pollution in the marine environment	1	2	3	4	5	1	2	3	4	5
(f) Protect sensitive species such as marine mammals and sea turtles	1	2	3	4	5	1	2	3	4	5
(g) Minimize any adverse economic impacts to stakeholders	1	2	3	4	5	1	2	3	4	5
(h) Protect habitat that is necessary for fish spawning, breeding, feeding, and growth	1	2	3	4	5	1	2	3	4	5



Questions? email us at Kristy.Wallmo@noaa.gov



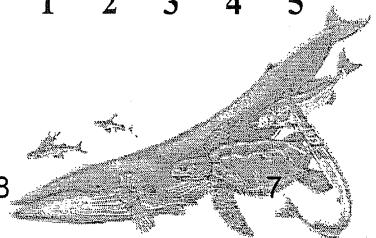
C1 Continued....

Importance of Objective	Your Satisfaction Level
1=Extremely Important	1=Extremely Satisfied
2=Somewhat Important	2=Somewhat Satisfied
3=Not Very Important	3=Not Very Satisfied
4=Not Important at All	4=Not Satisfied at All
5=I Am Unsure	5=I Am Unsure

Please circle a response in each column.

(i) Minimize bycatch	1	2	3	4	5	1	2	3	4	5
(j) Maintain public access to the marine environment	1	2	3	4	5	1	2	3	4	5
(k) Set aside a portion of the fishing quota for marine mammals and endangered species to eat	1	2	3	4	5	1	2	3	4	5
(l) Undertake research to understand the relationships among different parts of the marine environment	1	2	3	4	5	1	2	3	4	5
(m) Promote interagency cooperation in managing the marine environment	1	2	3	4	5	1	2	3	4	5
(n) Maintain the maximum sustainable yield from marine resources	1	2	3	4	5	1	2	3	4	5
(o) Reduce non-native species introductions	1	2	3	4	5	1	2	3	4	5
(p) Quickly adapt regulations when new scientific information becomes available	1	2	3	4	5	1	2	3	4	5
(q) Undertake activities to inform the public about the marine environment and how it is managed	1	2	3	4	5	1	2	3	4	5
(r) Allocate harvest privileges to fishermen using Individual Fishing Quotas	1	2	3	4	5	1	2	3	4	5
(s) Manage prey species so that predators have sufficient food	1	2	3	4	5	1	2	3	4	5
(t) Maintain fishing-dependent communities	1	2	3	4	5	1	2	3	4	5
(u) Ensure that regulations are monitored and enforced	1	2	3	4	5	1	2	3	4	5
(v) Reduce the total number of fishing vessels	1	2	3	4	5	1	2	3	4	5

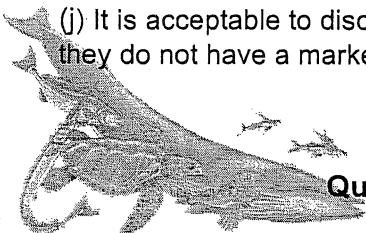
Questions? call Kristy Wallmo at 1.301.713.2328





C2 For the next set of questions, we would like you to read each statement below and place a check in the one box that most closely represents your opinion:

	Always	Sometimes	Rarely	Never	I am unsure
(a) It is acceptable to decrease fish harvest quotas in order to improve the overall health of the marine environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) It is acceptable to preserve marine-based employment opportunities even if doing so decreases the overall profits from marine-based industries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) It is acceptable to set aside some of the harvest quota in order to maintain a food source for higher level fish and mammals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) It is acceptable to use cost-efficient harvesting procedures even if doing so results in the bycatch of non-targeted species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) It is acceptable to use cost-efficient harvesting procedures even if doing so has adverse effects on protected marine species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) It is acceptable to allocate harvest privileges such as Individual Fishing Quotas even if doing so has adverse social effects on fishing communities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) It is acceptable to discard harvested fish due to regulatory restrictions, even when those fish may be marketable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(h) It is acceptable to prohibit certain types of fishing gear in order to protect essential fish habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(i) It is acceptable to close areas of the ocean to fishing in order to restore ecosystem health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(j) It is acceptable to discard harvested fish if they do not have a market value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Questions? email us at Kristy.Wallmo@noaa.gov

Section D: Ecosystem Approaches to Fisheries Management

In this section, we would like to ask you about your opinions of an Ecosystem Approach to Fisheries Management, or EAFM.

An ecosystem is a geographically specified system of organisms, including humans, and the processes that shape the system. Most scientists agree that an Ecosystem Approach to Fisheries management would consider the following elements:

- Extension of the single-species approach of current fisheries management to also consider ecological relationships such as predation, competition, and habitat.
- Consideration of the overall quality of the marine ecosystem.
- Consideration of humans as part of the ecosystem.
- Promotion of integrated, regional management of marine ecosystems with all relevant authorities and stakeholders.
- Use of the precautionary approach, e.g. make conservative decisions when information is uncertain or incomplete.
- Initiate activities to increase the knowledge base available for decision-making.
- Try to balance diverse societal objectives.

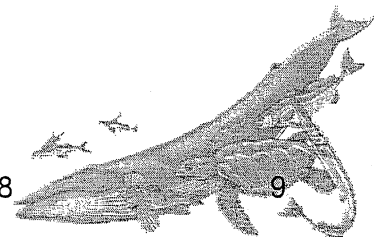


D1 For the next set of questions, we would like you to read each statement below and please check the box corresponding to your level of agreement with that statement:

In the Mid-Atlantic region EAFM...

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	I am unsure
...would improve the overall health of marine ecosystems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would increase the overall profits in the region's fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would benefit fishing communities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would improve the status of targeted fish stocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions? call Kristy Wallmo at 1.301.713.2328



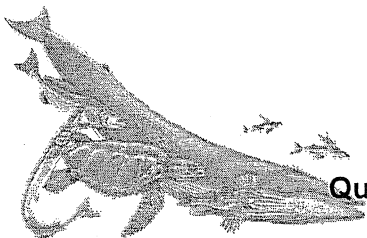


D2 For the next set of questions, we would like you to read each statement below and please check the box corresponding to your level of agreement with that statement:

In the Mid-Atlantic region EAFM...

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	I am unsure
...would increase the protection of Essential Fish Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would improve the status of marine mammals and sea turtles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would be more representative of all types of fisheries stakeholders than the current management system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would be too complex to use as a management system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...would be too costly to use as a management system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please use the space below to tell us any thoughts or opinions that you have about an Ecosystem Approach to Fisheries Management.



Questions? email us at Kristy.Wallmo@noaa.gov

Section E: About You and Your Household

In this last section, we would like to ask you a few questions about yourself.



E1 In general, how important are each of the following reasons for choosing to visit or live in a coastal community?

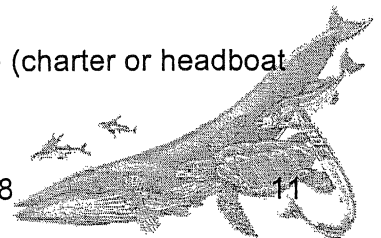
	Very Important	Somewhat Important	Not Very Important	Not Important at All
Visit family and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visit a natural area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreational fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
View marine animals (such as whales, sea turtles, manatees, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snorkeling or diving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Birding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy fresh local seafood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy being around a working commercial fishing marina/dock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other reasons (please specify): _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



E2 During the past year, how many days have you spent:

- _____ Recreational fishing in freshwater
- _____ Recreational fishing in saltwater
- _____ Collecting shellfish or other marine resources for personal consumption
- _____ Participating in marine-based recreation such as visiting a beach,
boating, sightseeing, snorkeling, scuba diving, whale watching, etc.
- _____ Commercial fishing in saltwater
- _____ Providing marine recreational services for hire (charter or headboat
fishing, whale watching, sightseeing, etc.)

Questions? call Kristy Wallmo at 1.301.713.2328





E3 How much do you trust each of the following to manage marine resources?
Please check the box that most closely represents your opinion:

	Trust completely	Trust somewhat	Distrust somewhat	Don't trust at all	I am unsure
Federal agencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State agencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Independent boards made up of local interests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Independent boards with business and environmental interests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



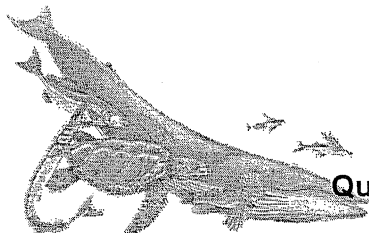
E4 What is the highest level of education you have completed?

- | | |
|--|---|
| <input type="checkbox"/> Less than 9th grade | <input type="checkbox"/> Some college (no degree) |
| <input type="checkbox"/> Some high school (no diploma) | <input type="checkbox"/> College graduate (bachelor degree) |
| <input type="checkbox"/> High school graduate (including GED) | <input type="checkbox"/> Advanced, Professional, or doctoral degree |
| <input type="checkbox"/> Associates degree or technical school | |



E5 Are you.....?

- Male Female



Questions? email us at Kristy.Wallmo@noaa.gov



E6 What best describes your employment status? Please check all that apply.

- Employed full-time
- Student (part-time)
- Employed part-time
- Student (full-time)
- Full time homemaker
- Unemployed
- Retired
- Other (specify) _____



E7 Which of the following categories best describes your household's total annual income before taxes in 2005?

- Less than \$10,000
- \$10,000 - \$14,999
- \$15,000 - \$24,999
- \$25,000 - \$34,999
- \$35,000 - \$49,999
- \$50,000 - \$74,999
- \$75,000 - \$99,999
- \$100,000 - \$149,999
- \$150,000 - \$199,999
- \$200,000 or more



E8 What is your ethnic background?

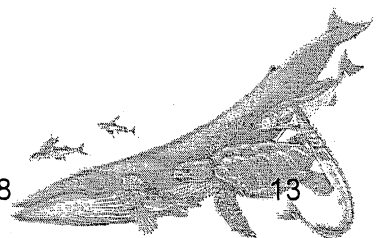
- Hispanic or Latino
- Not Hispanic or Latino



E9 What is your race (please mark all that apply)?

- White
- Black/African American
- Asian
- American Indian or Alaska Native
- Native Hawaiian or Other Pacific Islander

Questions? call Kristy Wallmo at 1.301.713.2328





E10 What year were you born?

Year: _____



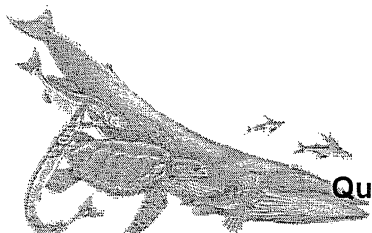
E11 Do you consider yourself to be...? Please check all that apply.

- Commercial fisherman
- Recreational fisherman
- Concerned Citizen
- Member of an environmental organization
- Member of a fisheries trade organization
- Fishery manager
- Fishery researcher
- Academic (teacher, researcher)
- Federal government agency personnel
- State government agency personnel
- Other (specify) _____



E12 How do you usually get information about fishing and other marine related activities and issues? Please check all that apply.

- Television
- Radio
- Newspapers
- Fishing websites
- Magazines
- Clubs/associations
- Email from friends
- Email from organizations
- Government announcements
- Other (specify) _____

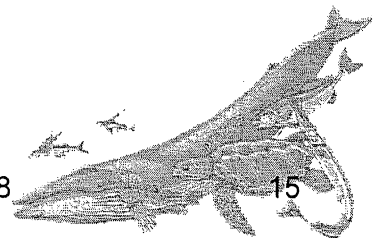


Questions? email us at Kristy.Wallmo@noaa.gov



E13 What local coastal or marine issues are important to you?

Questions? call Kristy Wallmo at 1.301.713.2328



4.0 TECHNICAL NEEDS

The data and information needs document that was developed at the NMFS sponsored Key Largo meeting (February 2005) on Ecosystem-Based Decision Support Tools for Fisheries Management is the best document compiled at this time. Dr. Hoff was one of the six authors of this report section which was peer-reviewed by the entire workshop with scientists from around the world. This workshop report section is included in its entirety here.

The NEFSC brochure entitled: *Ecology of the Northeast Continental Shelf* (Appendix I) that was produced in the fall of 2005 is a compilation of our technical knowledge for our Northeast US Large Marine Ecosystem (LME).

Data and Information Needs

- Preamble
- Collection
- Use
- Management
- Research

Data Needs Working Group: Preamble

- Data form a central and dual role as indicators of ecosystem performance, while providing a vehicle to inform the complex models necessary to evaluate tradeoffs associated with management decisions, I.e., gaming or MSE approaches
- EAF-EAM objectives must evolve through interaction and dialog between science and management. We must avoid the false dichotomy of prioritizing based on science vs. management vs. governance needs (i.e., avoid modeling for management vs. modeling for tenure)
- Data needs that support ecosystem approaches are more than the simple sum of single species information, including protected and high value species, and socio-economic issues. However, EAF/EAM data requirements are not necessarily different
 - among the fundamental issues may be emergent, conservative properties of ecosystems (e.g., properties of the system differ from properties of the parts)
 - there are known big data monitoring gaps
- Business as usual probably won't provide what we need, but there is no need to reinvent the wheel with respect to needs for data sharing, common research objectives, and regional considerations. Eg. There are existing models like the NSF LTER/LMER Program which requires some data collections common to all ecosystems, but also relies heavily on locally-adapted, process-oriented studies that are ecosystem-specific

Data Needs Working Group: Data Collection

- We must begin this process with an assessment of what data exist, and use this to help identify data needs and limitations. Finite resources prompt us to examine the relevance and efficiency of existing monitoring programs and data resources
 - We must prioritize data needs both for near and long-term efforts (these may differ) with complex, multiple objectives
 - Expand data back in time through collaborative efforts designed to get better records on ecosystem performance from an historical perspective
 - EAF-EAM questions and multiple modeling efforts should be used to guide data initiatives; objectives for science and management should be the basis for these questions. This will require a balance between formal hypothesis testing and time series monitoring
 - Design new studies with consideration of what is necessary for MSE and policy decisions, and supplement monitoring using intense process studies. Science-based adaptive approaches should be developed to help identify key unknown drivers
 - Focus on variability in space/time and life history
 - Process-level feedbacks need to be considered in selection of data streams

Data Needs Working Group: Data Uses

- Data perform the central role of moving our efforts from theory into practice. As such, their use provides the foundation for all that we have discussed in the workshop. These include, but are not limited to:
 - Development of functional relationships
 - Description of human dimensions and socio-economic indicators and relationships
 - Development of biological indicators and reference points
 - Recognition of spatial and/or temporal contrasts
 - Development of science based adaptive approaches
 - Development of EIS guidelines for data analysis, and community impact assessments, etc.
 - Many others
- As an organizing tool, we offer the following matrix:

Data Needs Working Group: Data Management

- Data management for EAF-EAM will require a more comprehensive approach
- The system must be flexible enough to accommodate data from a variety of sources including long-term monitoring, short-term experiments, inventories of existing data, etc., all with extensive formal metadata documentation and quality assurance and quality control protocols. However, there is again no need to reinvent the wheel, as programs such as LMER/LTER (NSF) have established methods to do this
 - GIS should be a portal into the database management system (DMS) because of the role of, and need, for visualization
 - The system should contain multiple portals of access depending upon the intended use of data, but confidentiality rules will necessarily need to be appropriately imbedded in the system
 - The DMS should be developed with a common vocabulary and metadata documentation designed to enhance multidisciplinary use
 - The DMS should include models and model outcomes
 - The DMS should allow multiple products and outputs that are accessible at different levels of resolution

Data Needs Working Group: Hot Research Topics

- By-catch/by-product/fishery interactions and tradeoffs
 - Trophic interactions, total ration and diet changes
 - Habitat-fish and habitat-fishery interactions
 - Taxonomy and stock ID
 - Consequences of physical variability
 - Low-frequency
 - High-frequency
 - episodic
 - Life history/ontogeny
 - Consequences of climate change, regime shifts
 - Eutrophication/habitat alterations/inherent ecosystems productivity
 - Social/economic dimensions
 - Carrying capacity/lower trophic level and forage base interactions
 - Spatial contrasts that reveal processes under differing use impacts
 - Spatially explicit processes
-
- The diagram consists of two vertical double-headed arrows on the right side of the list. The left arrow is labeled 'EAF' and spans from the top item 'By-catch/by-product/fishery interactions and tradeoffs' to the item 'Life history/ontogeny'. The right arrow is labeled 'EAM' and spans from the top item 'By-catch/by-product/fishery interactions and tradeoffs' to the bottom item 'Spatially explicit processes'.

Synthesis of Science Needs for Supporting Ecosystem Approaches

Scope	EAF	«boundaries are fuzzy»	EAM
example	technical interactions species, fleets	→	spatially explicit ecosystem interactions
Data-Information Needs	complicated	→	complex
Dynamics	simple, linear	→	complex, non-linear
Indicators	stock catches, status of stocks	→	maintenance of ecosystem services and processes
Social Science Role	tradeoffs, consumer producer surplus	→	multiple 'currencies', non-market valuation
Bio-organization	Stocks	→ guilds →	aggregate processes
Governance	Multiple Fisheries stakeholders	→	Multi-Sectoral Regional

The following slides contain supporting information

Social Sciences Discussion: Major points for the Working Group

- Human dimensions indicators need to be better integrated into ecosystem approaches. Economic agents a critical element of ecosystem structure. High priority value indicators, to what extent are the important attributes captured by them? MSE models critically dependent on econ/social metrics. Behavioral adaptations, preferences of human sub-groups important as emergent issues. Functional feeding relationships have similar properties between fish and people. Predicting behavioral responses is key element in MSE evaluation.
- Policy objectives much broader than EAF, EAM debate is critical. Communication between social and natural sciences critical, but does not necessarily imply we need complex models incorporating both. Optimization of yields in USA system where tradeoffs in EAF are balanced.
- Priority of economics in policy setting, not an afterthought. Modeling the management system may be helpful to know the scope of governance decision.
- How should people-oriented indicators be selected? Performance indicators - Ecosystem structure/function vs. "wellness" of a particular issue. Observe what people do. Policy analyses articulate tradeoffs. Consider in advance.. Transitional costs of achieving ecosystem objectives. Scale problems in selecting indicators. Some indicators may be required under various statutes.
- Valuation systems, intergenerational, discounting, green accounting.
- Importance of outreach, communication, education in governance system.
- Ecosystem-based projections with behavioral adaptations more realistic than F-s based ss projections. Larger-scale societal issues influence regional ecosystem drivers (e.g., demand for fish). Aquaculture vs. wild fisheries.

Modeling Discussion: Major points for the Working Group

- Modeling of ecosystem effects has been incremental and adaptive, many model types are derivative of single species population dynamics with elaborations for ecosystem issues of increasing complexity. Need to explore sets of models - can use multiple models looking at differing mechanisms & scenarios. Structured systems to evaluate multiple hypotheses explaining outcomes requires different models, in a formal adaptive management approach
- Management strategy analyses imbed population and ecosystem dynamics within the management system. What are appropriate inference procedures for the selection of likely model structures? Information criteria for "goodness of fit". Bayesian model weights, evidence ratios. Qualitative error checking on structure of model. Within models such as Ecosim have uncertainty measures.
- Benefits of MSE are in the modeling process (collaboration), assess tradeoffs, decision Makers have to be transparent regarding "rules". MSE provides results that can be quantitative, directional, semi-quantitative or qualitative. Selection of indicators should be in the context of what people are interested in. Objectives turned into quantitative performance indicators. Argues that the modeling process should be with stakeholders and iterative/adaptive. Uncertainty increases up the quantitative scale (direction, levels, absolutes). Understanding behavioral responses of people to management is an important aspect of MSE (implementation error). Who is allowed to be a "stakeholder" in the MSE process? Who determines this? Specifying objectives & performance measures is major part of process. Random Utility models. Social science models.
- Model selection process-appropriateness table.
- Optimality vs. Satisficing, tactical vs. strategic levels. Interactions with existing laws - MSY vs. optimality. Minimum sustainable winge? Mgt. Strategies robust to different strategies for optimality. Transition costs from tactical approaches to strategic ecosystem approaches. At what point do management decision tradeoffs occur (before modeling qurg quantitative outcomes?) Feedback "open-loop" or "closed loop"?
- Consider habitat effects in model selection Modeling to increase knowledge with life history information as opposed to using minimum (engineering) approaches that describe history. Ecology key to informing Models, merging ecosystems modeling and EAF modeling. Relevant models from non-traditional disciplines? Ensemble analysis for combining multiple models. Role of optimization. Finance literature alternative ways of specifying uncertainties, Fuzzy logic, network analyses. Non-parametric models

Data Needs Discussion: Major points for the Working Group

- Data needs supporting ecosystem approaches are more than the sum of species, information, protected species and socio-economic. EAF issues of importance include trophic interactions, total ration and diet changes. Habitat, fishery interactions, life history. Climate change and nutrient loading. Social/econ dimensions. Expand data back in time to get better perspectives on ecosystem health, need long time series to develop contrasts. Expand capabilities in taxonomy and stock ID. Focus on interactions monitoring and research.
- EAF-EAM models should be used to guide data initiatives - objectives for management should be basis. What is necessary for MSE, and policy decisions? To good science to make better MSE? Collaborative setting of objectives, science develops models and indicators developed, tested, for sensitivity. Fundamental issue is emergent, conservative properties of ecosystems. (e.g., properties of the system differ from properties of the parts). Top-down data collection hypothesis driven, multiple models drive data collection. Focus on variability in space/time/ontogeny. Process-level feedbacks need to be considered in selection of data streams. Balance between formal hypothesis testing and time series monitoring. Science based adaptive approaches to help identify key unknown drivers. Known big data monitoring gaps. Data mgt. Plan for monitoring, interactions, inventory and historic. Ecosystems require DMS more so than ss. Complex systems analysis.
- Collaborative approaches to data scavenging and collection. Need an assessment of what is there - data qa/qc. Finite resources means need to revisit existing Monitoring programs, sometimes revisit monitoring using intense process studies. Data/information needs should be locally adapted. Priority setting for complex systems with multiple objectives. Business as usual won't necessarily provide what we need, spatial contrasts may reveal processes under differing use impacts.
- EIS process provides guidelines for data and analysis, community impact assessments. Prioritize information now, future interaction between science mgt. Need dialog False dichotomy to prioritize based on science or mgt. needs. Note EAF/EAM requirements are different. Boundary issues are important in data priorities.
- Data models (open, collaborative, sharing) must support governance system. Data matrix according to models

5.0 SYNTHESIS OF PUBLIC INPUT

The September and October 2005 scoping meeting comments are sorted by the nine topic areas for discussion and are presented here as the best way to synthesize the public input. The two or three key points under each of the nine topic areas are presented in the Executive Summary and in section 6.6. Please note that under each of the nine topics areas there are two questions in italics that were in the scoping document in order to solicit comments from the public and generate discussion at the meetings. At some of the scoping meetings, these questions were addressed by some of the participants, but at most meetings the questions simply initiated the discussion and were not even specifically addressed.

5.1 Adequacy of Current Approaches for addressing Ecosystem Considerations.

The Council believes that the process needs to be more evolutionary than revolutionary and will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

Are there overarching ecological or socioeconomic issues that have been missed by the Council through its approach to single species management?

Has enough Council attention in the past been paid to bycatch, predator-prey, gear impacts, other man-made impacts, and PETs (protected, endangered, and threatened resources)?

Kill Devil Hills, NC September 26, 2005

Mr. Robert Glennon - do we know enough how individual species interact with each other?

Mr. Glennon - there are many species interactions and does not know how that fits in.

Mr. Glennon - ecosystem management is difficult enough to do on animals that are on land. It seems it will be very difficult to look at the data required to put the model together for ocean species.

Mr. Glennon - do current FMPs do much on habitat?

Mr. Glennon - is there interaction with the states, as far as seasons, limits, etc., for example, in terms of setting seasons for striped bass? Some states are not as accommodating as others.

Mr. Munden - our fisheries director can issue a proclamation. A number of states have to go to the General Assembly. We do not have that authority for all species. FMPs, both Council plans

and the state plans in cooperation with ASMFC, most have some type of harvest quota associated with it. If a state goes over a quota in one year, they have to pay it back the next year. This is a sort of checks and balance system.

Mr. Glennon - if Ecosystem Plan ends up with important habitat issues that are critical, would that be a hopeful result that there would be some type of designation to keep them safe?

Mr. Munden - they are protected. We provide comments on the proposals that come in. The Council also can provide comments on projects that are proposed for state waters if they feel it will impact a species they manage.

Mr. Glennon - do PETs include sea turtles? We have heard of a lot of strandings from nets.

Mr. Munden - yes. There are a number of factors that relate to the strandings. Some are killed by commercial fishing gear. NMFS now requests that TEDs be included on nets. We have closures off NC that are specifically excluded from fishing to preserve sea turtles. The Take Reduction Teams review proposals and provides comments.

Morehead City, NC September 27, 2005

Mr. Freeman – are there any frameworks that can be shared regarding other species?

Virginia Beach, VA September 28, 2005

Mr. Jim Haydon - regarding the definition, it is going into comprehensive ecosystem, does that mean you are going to be defining the aspect of it and how they fit into the picture and how they can be managed?

Mr. Haydon - do you see it as a phase type process? Regarding striped bass, would it be defined in portions?

Mr. Pride - NMFS will look at models based on the science.

Mr. Chris Moore - seems as we move towards ecosystem management we would move away from socioeconomic issues.

Mr. Haydon - there is a tremendous impact from man on almost every species fishable. It is according to what many fishes for and forages for. That all has to be looked at as well as bycatch. Sounds like a very convoluted approach, but must look at everything and what interferes with it and what factors need to be considered.

Mr. Pride - dogfish sharks have made an impact on fish species. Under an ecosystem approach, may decide not to allow for increased spawning since there is a large biomass of juvenile males.

Southampton, NY October 4, 2005

Lisa Suatoni: There is a clear need. Ecosystems are currently at risk. Fishing pressures have caused decreased fish population. Both Commissions view ecosystems as their corner stone for making changes. They have a long way to go. Efforts are conceptual and other organisms should be considered. Disturbing trends are likely not being changed. They are eager to help the Council with this project.

Jim Fletcher: Science has been proven over and over incorrect. The Council still believes the best science is the only science. Solar cycles and estrogen have not been addressed. Shoreline development has not been addressed. We need to address what we have done wrong. Surfclams has been successful-but at what cost?

Emerson Hasbrouck: Enough Council attention, as the Council moves forward the process needs to look at other impacts other than fishing. Many of our species are dependent on estuaries. 75% of population is within 50 miles of the coast. There is a relationship of summer flounder and SAV beds, however most SAV in NY are gone.

Richard Wilson: Focus on ecological issues, especially estuaries, rebuild stock, hatching and restoring in estuaries. This is easier to monitor scientifically. The Council is paying attention and this should evolve.

Greg DiDomenico: The Council has missed the cumulative impacts of management and some type of consideration needs to be made by individual Council members in knowing regional practices, gears, user group, etc. Council's attention on ecological issues, there is some regulatory authority that is not under the Council's authority. Single species management has missed some socio-economies.

Karen Chytalo: To build on something Emerson said, better coordinate and integrate FMP with estuaries. Lots of information is already being collected.

Long Branch, NJ October 6, 2005

Mr. Ristori – single species management doesn't make much scientific sense. We can't have all species at their individual MSY levels. He urged ecosystem approach over 30 years ago when he was a Council member. Dogfish are going to bite us – they eat everything. EAF is long overdue and we need it NOW.

Mr. Art Hilliard – this spring there were a lot of dogfish and we couldn't fish. Do you consider economic impacts? He has seen more striped bass than he has ever seen in his lifetime. Want more studies on predator/prey.

Mr. Buban – this plan is a disaster. NMFS is for commercial fishermen. Need to help the recreational fishermen. How can we trust you?

Mr. Egarter – species by species management is wrong. Dogfish can wipe out an entire year class and now they are being caught all year. They eat scup, black sea bass and summer flounder.

Mr. Hagaman – put a limit on dogfish.

Mr. Hilliard – 20 year rebuilding plan for dogfish, but need to check it every year. Can't keep the same number for 20 years.

Mr. Occhipinti – should get information from meetings like this.

Mr. Santee – does this plan involve area closures? He is opposed to them. Ocean dumping has screwed up lots of spawning areas. They are now forced to fish areas that will be closed areas. Sediments that are being dumped will spread out.

Mr. Buban – you are not talking about habitat.

Mr. Haines – wherever there is beach replenishment, you don't catch summer flounder. Dredging has also cut off lots of flounder.

Mr. Bachert – Corp has no idea that fish like rocks and structure.

Mr. Haines – socioeconomic issues must be considered in FMPs. Management doesn't consider areas, for example porgies in Sheepshead Bay don't get large. Some places a 14" fluke is hard to catch since don't get large fish. Management is eliminating people fishing from piers and jetties. They are killing more fish because the sizes are too big.

Mr. Occhipinti – should use recreational captains for data.

Alexandria, VA October 11, 2005

Mr. Hinman provided a prepared statement (attached). Gave general observations and specific recommendations on the conservation of forage fish relating to question 1 being the issues being missed by the Council in its single species approach and the need for more attention to predator/prey interactions and question 6 relating to types of management measures needed to address these issues. Ecosystem based management is a natural outflow of our increasing knowledge of the ocean and our expanding circle of concern for all marine species and their environment. It is a natural progression in the evolution of fishery management. An ecosystem is not made up of separate species but of the relationships among those species. It takes these relationships into account. This is neither a criticism of single species management nor a performance of the Councils; rather it stems from the fact that species by species approach can not address certain critical issues and problems, real or perceived, it can not be ignored. The current process lacks direction. There is no consistent guidance on what information is needed

or how it should be used. An ecosystem based approach need not be complicated. We support the ecosystem panel's advice to take an incremental approach being with protecting key predator/prey relationships. We encourage the Council's to apply ecosystem principals, goals and policies. There are three actions that are important: 1) predator/prey interactions need to be considered, 2) bycatch, and 3) protecting habitat. Greatest missing piece of this puzzle right now is predator/prey. Conserving forage fish is paramount. We are anxious to assist the Council in developing a process for harmonizing the management objectives and synchronizing the management regulations in SMB and related predator species within the Council's FMP. There are four elements that are essential to expanding upon the forage fish FMP's: (we would like a change in the Council's management structure relating to better integrating the various committees that have jurisdiction over species that are the key connections within the aquatic system both scientific and management: 1) protecting and maintaining the species ecological role, including preservation of an adequate supply of forage for predators as the principle plan objective, 2) expanding the information base to fully describe and comprehend the links of associated species, 3) adding a definition of ecosystem overfishing as a compliment to traditional overfishing criteria including ecologically relevant reference points, 4) establishing a precautionary total allowable catch that explicitly provides a buffer against overfishing.

Ocean City, MD October 12, 2005

Mr. King - Council has its responsibilities and Congress has its priorities. Who is taking the lead to drive us towards ecosystem management?

Mr. King - is NMFS providing the funding to move in this direction?

Mr. Monty Hawkins - wouldn't doubt that there would be no funding. How often is the salt water registry mentioned in the Bill?

Mr. Hawkins - thinks the Council has missed a great many opportunities through ecosystem management to better our fisheries. He lived and fished in the time during greatest collapse of fisheries. In 1991, the summer flounder quota was so low that trawling ceased past 11 miles. Certain bottom trawl gear impacts are sole influence. Thinks the great decrease in habitat on the bottom had a far greater impact. Most fishing gear impacts are outside 3 miles.

Mr. King - if those areas are identified, would they be protected under HAPC?

Mr. Hawkins - thinks everyone would benefit and thinks trawl fleets would see better production.

Mr. Hawkins - the Council has not paid enough attention to bycatch. What is up with red hake in the scallop fishery? We are down to 3 to 5 fish a year. Doesn't see any support from MAC on any sort of artificial reefs.

Ms. Margaret McGinty - understands that habitat has been based on frequencies of occurrence. Survey data are all that exists?

Mr. Hawkins - everyday I have to report where I fish. You know where a lot of structured bottom is. VTR data (Vessel Trip Reports) could show you a lot of information that is not used.

Mr. Hawkins - regarding managing for maximum economic benefit through ecosystem production, thinks you could drive this.

Mr. Steve Doctor - elasmobranch - seems to be a reciprocal relationship between dogfish and groundfish. Now that dogfish quota has been decreased, Council could look at dogfish plan and see where the analysis should be done. Could have groundfish or dogfish or somewhere in the middle. Needs to be looked at. Thinks it would benefit multi-species relationships.

Ms. McGinty - does The Ocean Conservancy have a part in the data analysis?

Mr. Doctor - you are going to have to accept a reduction in summer flounder and black sea bass fishery if you continue to maintain the dogfish fishery.

Cape May, NJ October 17, 2005

Mr. Siciligno – ecosystem efforts should be very broad based and should extend into the headwaters.

Mr. Doebley – you must follow the process, like NEPA, so there aren't lots of lawsuits. The Councils need to continue to do outreach to all their stakeholders.

Mr. DiDominico – don't want to repeat the fiasco of EFH with this ecosystem effort.

Mr. Berg – what is the timeframe for implementing ecosystem work, is it 2008 or 2012?

Lewes, DE October 18, 2005

No comments.

Newark, DE October 19, 2005

Dr. Rowe – ecosystems can't be based on political boundaries. He supports an evolutionary approach to EAF. It is a logical, natural movement from single species. Anthropogenic impacts have to be better addressed.

Philadelphia, PA October 24, 2005

Mr. Taylor – in 1995 or 1996 there was a world fishing study by National Geographic documenting fishing gear impacts to the bottom. Why have we not stopped dragging and ruining habitat?

Mr. Nowalsky – many things are being missed. What is the ecological impact of harvesting the prey? When rebuild one stock, what are the impacts on other species? You can't build every single species back to historical highs. The environment can't support striped bass, weakfish, bluefish, summer flounder – all at their MSY level on only bunker which is fished heavily by man. The Council has not paid enough attention to bycatch. While we many not have coral in the mid-Atlantic, there are lots of other structure, like mussel beds, wrecks, etc. Commercial fishermen drag over the bottom and destroy structure. Trawls with cookie sweeps are fishing around rock piles. The trawls stir up the bottom and sediment the rock piles. The Council has not paid enough attention to these things.

Mr. Taylor – scientific studies are often not incorporated into management.

Mr. Doobley – the Council has not done enough on predator and prey.

Mr. Flanigan – it will be a decade until get to EAF from moving from single species. Don't want tonight's meeting to fall into an anti-commercial discussion. Commercial vessels are highly specialized for single species. This results in high discards and high grading which will be a problem for EAF.

Mr. Nowalsky – agrees the commercial clam fleet is highly specialized, but most commercial fishermen do become generalized and can fish for 4 or 5 species. Moving towards EAF really won't affect them. The large companies will be more affected.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.2 Nature of Ecosystem-Based Management and the Goals to be Achieved in Addressing Ecosystem Issues.

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability **and** productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

What is the desired state of our ecosystem i.e., should we be conserving and managing or preserving?

What should the short/long-term goals and objectives be to get us to the desired ecosystem state?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - we can manage a dynamic fishery out there without shutting it down. There are those HAPC areas that should be protected. Didn't appreciate offshore habitats and how unique

they were. Habitat wise, there seems to be room for protections. Does not know how you would enforce it.

Mr. Munden explained that when he attended the SAC meeting, they require VMS in the rock shrimp fishery. They talked about incorporating Marine Protected Areas within snapper-grouper plans to protect the MPA. There would be no scuba, gillnets, trawling.

Mr. Glennon - seems to be the niche where preservation would have a role to identify critical habitat areas.

Mr. Glennon - are the areas important to the species survival? Is it the structure of the habitat?

Ms. Mary Lou Glennon - the more sensitive and unique the habitat the more it should be managed for preservation purposes.

Mr. Glennon - concerned that we were using some SAV beds that were important to ducks. We could overlay the MPA and get waterfowl benefits as well.

Morehead City, NC September 27, 2005

Mr. Freeman - what determines which species are targeted?

Mr. Freeman - are the species based on economic value?

Mr. Munden - reason MAFMC is considering requesting management authority of smooth dogfish is that a fishery has developed because many fishermen have switched over to them because spiny dogfish are not as plentiful. Most of the smooth dogfish fishery occurs in the Mid-Atlantic.

Virginia Beach, VA September 28, 2005

Mr. Haydon - looking at too sterile of an environment. Man may not know what impact he has on environment. They must be told. They don't understand limits.

Mr. Pride - some conservation groups say don't take any fish out of the ocean.

Mr. Moore - should conserve and manage.

Southampton, NY October 4, 2005

Byron Young: Must consider the non-consumptive uses of ecosystems like windmills, pipelines, etc.

Greg DiDomenico: Broadly defined goals, don't tie us down by technical definition. That is not

the way to proceed; they need to be modified based upon each fishery and the needs of public.

Richard Wilson: Conserve and manage. Again go back to the estuaries, look where the fish come from.

Emerson Hasbrouck: I agree with the goals for the Magnuson Act of conservation and management, not simply preservation.

Jim Fletcher: Ecosystem is not what it should be. We have been practicing fisheries management in terms of science. We lead with genetically defective fish. We are saying nothing of conservation. What is the desired ecosystems state? We are not there. The last 25 years has been the exact reversal of what it should be.

Lisa Suatoni: The definition is clear and agreed upon. It broadens the focus to include the entire ecosystem. It is concerned with interactions, predator-prey, impact of land use, etc. Need to focus on long-term economics yield.

Long Branch, NJ October 6, 2005

Mr. Egerter -- NJ has a good reef program and it builds habitats.

Mr. Santee -- should close the Mud Dump and put rock on the dump site and then close the area for production. It would create good habitat.

Mr. Egerter -- habitat and structure have been leveled by commercial draggers. The reef sites should be set aside and protected.

Alexandria, VA October 11, 2005

Mr. Heinemann -- What is meant by "productive ecosystem" or "ecosystem production"? I'm not sure what that is.

Mr. Heinemann -- So the activities you are referring to are extraction activities....

Mr. Heinemann -- So, do you have in mind a goal for ecosystem based management from the Council's perspective?

Mr. Travelstead -- Very much so, I don't think anyone has a predetermined feeling for how this should go. That is why we are holding the scoping meetings is to hear from the public what your perceptions are, where we should be headed. Take it from there.

Mr. Heinemann -- In incorporating ecosystem based management goals and objectives do you think there's any latitude with Magnuson to go beyond the goal of maximum sustainable yield.

Ms. Leland -- I was confused by this question. Should it be conserving and managing or preserving. One is the means to the other. Ecosystems should be preserved. We should be conserving and managing the species or preserve the ecosystem, we should do both. There is a paper recently which states the purpose the ecosystem based management is to preserve ecosystems so that they will provide services. This gets at a fundamental difference in how you approach management whether or not the primary purpose of management is as it is under the Magnuson Act where the extraction of resources and where we are trying to conserve those resources for future generations as opposed to preserving those resources and then extracting what you can without harming the preservation. There is no latitude under Magnuson approach. Magnuson is tied into exploitation and trying to conserve for future generations. Does the Council feel it really needs to be able to do a lot more than it has been doing with a single species approach and limited ecosystem considerations?

Mr. Travelstead -- I don't think Dr. Hoff can answer that from a Council prospective. He can provide his own personal opinion. We are interested in do you think Magnuson needs to be changed or reauthorized in some way to allow the Council to do more in ecosystems or do you think we already have the authority to proceed with ecosystem management?

Ms. Leland -- I am not an expert on Magnuson so I don't know if you have the authority or the latitude to give, I suspect not from what I know about it. I don't see in the reauthorization that that's on the table. One thing that is apparent for me is that I think we have to do a lot better job managing the extraction of resources from the oceans because the way in with we have done it now, thus far, it has had significant ecosystem impacts on habitat, on other species, on the forage species, on other prey species, bycatch species. There is a whole slew scientific papers out there that have demonstrated ecosystem impacts of fishing. We clearly, if we are going to conserve, protect, perhaps preserve ecosystems we have to do a far better job. There is a lot of people who think that is not possible with the current single species approach hence the need for an ecosystem based approach. I am skeptical as to whether or not that could be reached in incremental fashions as suggested earlier in an evolutionary way as opposed to a revolutionary way. No one has a really clear idea as to how to put all the elements of an ecosystems based management together yet and I don't think we will know evolutionary versus revolutionary change or we can do it evolutionarily until somebody comes up with a model for how to put it all together.

Mr. Hinman -- It is a government issue that is why the report is called ecosystem based fishery management. Even though we are trying get out of the little box of single managed species the whole process is still in a box. I recognize that Councils under the Magnuson Act have jurisdiction over managing fisheries/fishing and not an authority over regulating a lot of other activities that affect the ecosystems that eventually need to be brought into this whole picture, whether evolutionary or revolutionary. We are limited right now with the authorities, the same limits the Councils face with essential fish habitat where the Councils only have jurisdiction over fishing activities that impact habitat and not many others. I just want the Council to understand, to recognize we are trying to get into managing or protecting and observing the ecosystem, we are trying to get into controlling a lot of other activities that we do not see that, okay that is

where we need to start or is that an overwhelming goal and we can't get started or whatever. We must begin now to do what we can do.

Ms. Leland -- What is the goal of ecosystem based management? There is a fundamental difference in having to do ecosystem systems based management for the concept of managing, which could be taken any number of ways. It could be maximizing yield for all species or for the goal of as stated here at the bottom of this box. The goal of ecosystem based management is to maintain ecosystem in a healthy, productive manner. There is some really good stuff in this report. But it doesn't get at the question as to why we are doing this. What is the purpose of doing this? Is it just to change the management? The reason I am moving this direction, is because we want to have a better position than we do currently. When the Council is reviewing what the ecosystem based management is or what the ecosystems approach to fisheries is, it is important to include in that the concept of what the goal is. The goal should be explicitly stated. This is good for the fisheries and ecosystems as a whole. I have provided the *Scientific Consensus Statement on Marine Ecosystem-Based Management* that was signed by over 200 scientists (attached).

Ms. Elias -- supports healthy fisheries and healthy ecosystems. She fully supports the scientific consensus statement.

Ocean City, MD October 12, 2005

No comments.

Cape May, NJ October 17, 2005

Mr. Payne - need to develop the historical basis in order to make determinations as to what the goals should be.

Mr. DiDominico – Council needs to develop their goals and objectives, but you must manage in the estuaries.

Ms. Bochenek – the Council has done a real good job in fishery conservation, but we now need to go to the headwaters and we need better enforcement. Lots of the critical habitat is in state waters.

Lewes, DE October 18, 2005

Mr. Mateyko – favors ecosystem management. Stresses that you have to consider mortality from ALL the sources, pollution, overfishing, contaminants, etc. Wants the Council to assemble large slices of information so you could track to the sources of pollution and then look at what sources we have some control over. Let me use the Council's knowledge to impact the political system. He wants a focus on public education and what the public has to do to restore the ecosystem. Therefore he is in favor of preserving the overall ecosystem.

Ms. Salvador – agrees 100% with Mr. Mateyko.

Newark, DE October 19, 2005

Dr. Rowe – understands the difficult charges to the Council to fully utilize the stocks. Maybe we shouldn't be fishing at MSY, but rather at a lower more conservative level. There is a growing controversy with MPAs and there will need to be a common ground developed. MPAs are critical for some species like groupers.

Philadelphia, PA October 24, 2005

Mr. Doobley – conservation and management is the desired state. There needs to be a balancing of the stocks health and the environment, so that people are not restricted. EAF is more than the sum of the parts. There is an ecosystem analogy to a car. EAF is the engine. Council is ok on habitat. We need to do a better job on predator/prey. It will be 3 to 5 years before we could begin to quantify. We don't even have the basic pieces in place. There is a need for lots of money from Congress. Work EAF in gradually and incrementally. We will grow into it. Need more data and more money. Go slow and set realistic goals.

Mr. Nowalsky – the desired state should be conservation and management. Managers must consider moving to multi-species. May not be responsible management to humans. Buy-in by humans has to benefit humans. MPAs with their current goals and objectives will simply shut some people out. Can't sustain the environment with MPAs.

Dr. Kray – MSA requires the Council to manage for MSY. The question becomes what to manage when you have rebuilt stocks. ASMFC and their science committee are working on a model for 4 species, but what are the other types of models available?

Mr. Taylor – lots of information like all the nutrient data out of the Mississippi River. Do we use that for EAF?

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.3 Nature of the Public Decision Making Processes within the Council for Addressing Management Tradeoffs, Consistent with Identified Goals.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders – fishermen, mineral extractors, energy producers, aquaculture, transportation, etc. The Council believes (as was identified by the Ecosystem Panel at the March 2005 Washington conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering Committee for ecosystem goals and objectives. The Council reinforces its commitment to a

collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among various Councils, NMFS, partner agencies, and stakeholders.

What is the best forum for the public involvement in the decision making process?

How should the Councils reconcile the often competing requirements and agendas among state and Federal agencies, often times even within the same agency, i.e., zero mortality for marine mammals as opposed to realizing the full potential of the Nation's fishery resources as part of Magnuson-Stevens Act?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - need more people to show up at meetings. Imagines each state has their own network to get the information out to the public and attracting people to meetings. Encourage to put together groups to make decisions. Share mailing lists, outreach techniques, etc. Possibly post signs in stores, bait shops, marinas. Thinks posters get more attention. Talk to the shop owners and make sure they pass the word.

Mr. Munden - NC Dept of Marine Fisheries partnered with the Council and we submitted the info to the newspapers.

Mr. Glennon - there are a lot of groups that have a stake in this. Silly to have to pay people to post posters in the window. Thought it was best to have shop owners understand issues and pass on the information about the meetings. Need to make sure it makes the newspapers.

Morehead City, NC September 27, 2005

No comment.

Virginia Beach, VA September 28, 2005

Mr. Haydon - regarding best form for public involvement, almost has to be on a regional basis because many of the species are only regional. Would have to define goals and objectives for various species.

Southampton, NY October 4, 2005

Jim Fletcher: NMFS scientist gave me the answer "the dog ate my homework" There is more than NMFS and it is not being brought into this discussion. They tell us it is the best science. NMFS science is not the only science.

Richard Wilson: Public involvement is best forum, go to the communities. Drawbacks are that people don't know this type of meeting is going on. If it might be possible, post these in the post office to inform the public. Good to set high goals regarding zero mortality but it may not be

maintainable.

Greg DiDomenico: The best thing to do to collaborate with the public; continue what the Council is doing with regards to meetings such as this. I would say all the different government structures need to collaborate more than they do now. Public does not know about limited entry, etc. Process needs to be slow, deliberative, collaborative and regional.

Byron Young: The people interested must also reach out for a holistic approach. That will be the hard part. We interact with fishermen easily. It will be the other types of stakeholders that will be hard.

Karen Chytalo: There needs to be a better variety of stakeholders. Make use of what are available, i.e. mailing lists, etc. Need regional and sub-regional groups.

Long Branch, NJ October 6, 2005

Mr. Egerter -- advocates the use of public forums like this one. Advisory Panels should be used even though the AP advice is often not considered. The information that an AP provides should be used more.

Mr. Hagaman -- the public should be more involved before decisions are made.

Mr. Haines -- the management should give regulations an opportunity to work before new ones are added in. There is never enough time to see what works.

Mr. Spinelli -- there is lots of culling for larger fish, especially summer flounder. There is lots of commercial bycatch and waste. He has seen lots of whiting and ling floating on the surface dead after a commercial trawl goes through. Need more observers on commercial boats. The recreational fishermen are providing logbooks and information and he wants that information to be used.

Alexandria, VA October 11, 2005

Mr. Hinman -- It seems premature at this point to include in this stakeholder process mineral extractors, energy producers, aquaculture, etc. It is obvious that those interests are going to enter the process at some point but that point is not in this process, the Council process in figuring how fisheries can be managed in an ecosystem context. I think that is down the road having those interests involved and talking about living marine resources and how what those resources should look like.

Ms. Leland -- In that whole mix of stakeholders, the environmental community that Tom mentions is not included in your document as stakeholders.

Ms. Elias -- You must continue to fully involve the public and keep them in the overall process.

Mr. Heinemann -- I am not comfortable with the premise of the first sentence in the introductory paragraph, the development of goals and objectives should be a regional bottom up process. There are many bodies that produce that statement, NOAA, Councils, FAO, the national framework, a couple of workshops going on right now, a lot of people are trying to figure out what ecosystem based management is or what an ecosystems approach would be and those groups have come to an agreement regarding a large number of elements that would be necessary or that are logical candidates for ecosystem based management and they have each taken their own staff, principals and objectives. If EAF is going to be successful in our country we would need a top down, bottom up process. A top down selection of principals, overarching goals and objectives and then a bottom up involving stakeholder's implementation of that. Without a top down provision of overarching goals, principals and objectives you could have widely divergent things happening in different regions. You could end up with one region that focused on the preservation and another that focused entirely on extraction. Just taking the single species approach to the entire ecosystem is not reasonable. If you were to use a terrestrial analog you could end up with one region that looks like the Rocky Mountains with a wide variety of areas managed for different purposes from extraction to complete protection. Without any top down control you could end up with another region that would look like the mid-west prairies that are entirely without production and there is no preservation at all. If the nation is going to have a coherent approach to fisheries management incorporating ecosystem principals in the larger context of ocean management and ocean governments there has to be top down element as well.

Mr. Hinman -- Councils should be the advocates in an ecosystem based approach. The Council should be advocates for the fish, NMFS should be the advocates fish and for PETs. The Council recognizing the limited ability to effect all those other federal decisions that affect habitat. The Council, the fishermen, the environmentalists and others who participate in that process, the advocates within the government for protecting the habitat has been identified as essential for supporting the fisheries. Unless we restructure the whole federal government that is really what we need. They can be the advocates that bring the public to support these ideas.

Ocean City, MD October 12, 2005

No comments.

Cape May, NJ October 17, 2005

Ms. Bochenek – there should not be national goals. There is not enough feedback.

Mr. DiDominico – they definitely do NOT support different Ecosystem Councils and another layer of government.

Dr. Kray – we will have to interact with ASMFC and the states. Everyone must be engaged.

Mr. Freeman – States rights will often be an issue. Can't look at political boundaries.

Dr. Kray – wants everyone to be aware that Oceans 21 legislation addresses the new proposed Ecosystem Councils.

Lewes, DE October 18, 2005

Mr. Mateyko – there is a real teaching opportunity here. Use the waters since they have a very high public awareness. The ocean is like a canary in the mine. You can teach long term sustainability. If an ecosystem collapses, it will have major economic impacts on communities like Lewes. It will impact everyone who lives in the community.

Newark, DE October 19, 2005

Dr. Rowe – the key is to educate people and then those people become part of the process in appropriate bottom up management. Federal agencies need to evolve and work together and not compete with one another. There needs to be practical decisions made between MPAs and the MSA. Federal flood insurance is a disaster when people keep rebuilding with taxpayer money. Perhaps there should be something like "One and Done".

Philadelphia, PA October 24, 2005

Mr. Flanigan – agrees that we need a national overlook but also need regional perspective. Simply can't eliminate the FMCs. Need local involvement. Need to balance the needs of the participants in the Council forum.

Mr. Doobley – the Council process is the best forum. Councils can't always reconcile competing uses. The can't NOR should it always try to. Need to engage the stakeholders.

Mr. Nowalsky – this is a good forum and is the right process. Stakeholders should be asking how they get involved. For example there are only 7 people in this room. The only time stakeholders come out if they are negatively impacted. It would be much better to give a positive impact for them to be involved. Many stakeholders need to be validated. Need to talk about data collection for the importance of science.

Mr. Taylor – make use of volunteers.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.4 Mechanisms for Considering Activities outside the Council's Purview but Influencing Ecosystem Productivity.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity.

Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

Councils are mandated to manage fishing mortality and fishing gear impacts, while other man-made impacts can contribute greatly to resource declines (i.e., coastal development, pollution, cable routing, energy production, and climate change) as well as loss of biodiversity. How should other non-fishery agencies be engaged formally or informally?

What issues/agencies are necessary to address the requirements of EAF that are beyond the Council/NMFS control to effect i.e., North Atlantic oscillation, head-water development, Federal flood insurance?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - thinks CHPPs (Coastal Habitat Protection Plan) did a good job on identifying jurisdictions. Recognizing Council doesn't control all these things, it needs to be recognized that these things need to be controlled. The fact that they are factors; they should be identified and included. Pollution is going to be floating down to the streams and into the shell bottoms. It is going to affect the fish before it gets to the shell bottom. State by state, there are a lot of players.

Mr. Munden - we are mandated by NC General Assembly. They required the Division to do CHPPs. Also required Div of Marine Fisheries, Coastal Management and Environmental Management to work together to do the CHPPs. It is similar to FMPs, where it can be amended.

Morehead City, NC September 27, 2005

No comment.

Virginia Beach, VA September 28, 2005

Mr. Pride - in VA, local governments are responsible for interpreting problems, they can come up with own recommendations. Put together a type of best practices manual for home owners. Need to make it a part of local government practices. Negotiations come together when you create guidelines.

Mr. Haydon - things need to be similar and not extremely different in order for them to work. Need to show why it is necessary to do each thing. It would take a lot of time and political savvy.

Mr. Moore - a caution would be that there are competing agendas within agencies and by

bringing in another set of agencies that might create a problem. They may be opposed to each other.

Southampton, NY October 4, 2005

Karen Chytalo: Again, it's making use of a regional group, water shed efforts, estuaries; it is an integration of values and needs to develop a holistic approach. Important to integrate everyone's data.

Richard Wilson: The Council needs to realize they are part of a larger picture. Identify the agencies to be coordinated through a central communication and meet on an established regular basis.

Emerson Hasbrouck: Work with the National Estuary programs.

Jim Fletcher: University students think it's all science, but it is not. They get a mind set from their professors. Congress passed a law on federal flood insurance, do away with it! Part of the problem is government and the EPA. Chlorine used in treatment plants-deadliest chemical known to man.

Lisa Suatoni: Council should work closely with NGO.

Gordon Colvin: The Council should think about what processes the Council uses to engage others.

Long Branch, NJ October 6, 2005

Mr. Bachert -- beach replenishment is a seriously problem. Also ferry boats pump 10,000 gallons of water through per minute and lots of fish get sucked in and chewed up.

Alexandria, VA October 11, 2005

Mr. Krenz -- Thanks for this forum of public input. I want to clarify that Oceans 21 is not part of Magnuson-Stevens Act. However, what is in Oceans 21 is linked to Magnuson-Stevens. In Oceans 21 we use the scientific consensus statement for all our ecosystems based management and that is what we are using and it comes directly from that definition and we have scientists from around the world. One section in Oceans 21 is a section on regional governments, includes the regional Councils, we see this as something that is built upon current work to look at mechanism or activities outside the Councils purview. It was based upon many different uses that are going on and how to coordinate those uses. There is so much talk about the frustrations in Councils that as our ecosystem declines from things such as pollution, habitat degradation, etc., it really stuck me that this is a great place to start... to address those issues and empower the Councils to address those issues. These regional ocean partnerships are not set in stone and it not mean to change how Magnuson-Stevens work and the Fishery Management Council work.

There is a spot for an Executive Director of each Fishery Council on each regional ocean partnership. We feel that this is a great opportunity to have the Councils come and say "hey, you are really messing up things for us.

Ms. Leland -- The issue raised in #4 actually I was pleasantly surprised to see that this was even included in the document. My impression thus far is that the Fishery Councils are resistant to the idea that they need to engage on a larger level with other jurisdictional issues, agencies, or otherwise. It brings up the larger question of how do we deal with all these different activities that are going on and who has jurisdiction. Oceans 21 is not really, is definitely a stretch beyond where we are now but it is not that big of a stretch. The Bush Administration has the ocean action plan some what endorses partnerships i.e., Great Lakes partnership. It is a strategic plan that they are working through right now. I am pleased the Councils are considering these issues that are outside your purview. The model for regional entity is great.

Mr. Hinman – look at the Chesapeake 2000 agreement. They set the goals and are dealing with widespread issues like farming and transportation.

Mr. Heinemann – if you have comprehensive management, agencies at all levels MUST work together. No one has all the solutions, but Councils can make great strides all by themselves. Fishing effects on the ecosystem are the largest impacts to the ecosystem.

Ocean City, MD October 12, 2005

No comments.

Cape May, NJ October 17, 2005

Mr. DiDominico – the Council has done a real good job with fishing mortality and fishing gear impacts. Now they need to move on to other items.

Mr. Goldman – Council and Commission only manage fishermen. We now need to go to other agencies and formally engage them.

Ms. Bochenek – agree with both of the previous speakers. The Council needs to think internationally also i.e., mackerel.

Mr. Siciligno – the international arena is very important i.e., the US has done a lot of conservation on tuna but NO ONE else is doing much. The definition of ecosystem needs to be done formally.

Mr. Foxworthy – the situation is getting critical. There are lots of things going on and we need to talk with other entities. There needs to be an increase in everyone's level of awareness.

Lewes, DE October 18, 2005

Mr. Mateyko -- the Council needs to explicitly address Sussex County Plan due in 2007. Now is the time to be informed. The Governor has an office of "Livable Delaware". The Council needs to communicate our concerns to the state government.

Newark, DE October 19, 2005

Dr. Rowe -- the current rules need to be changed for coastal development. Ecosystems will need programs like the Integrated Ocean Systems.

Philadelphia, PA October 24, 2005

Mr. Taylor -- expand the FMCs to include all the stakeholders.

Mr. Doobley -- there are reasons for Agency specialization. There should not be formal organizations for expanded government. He doesn't like the term "biodiversity".

Mr. Flanigan -- viewing this topic as outside the scope of this scoping process. government always working on procedures for operations with other agencies. Will have to work on this mechanism as we evolve. This should NOT impact our primary goal of resource extraction.

Mr. Nowalsky -- no new government level. Engage other agencies to move forward.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.5 Boundaries of Sub-Regional Ecosystems within the Areas of the Various FMCs.

The "Northeast U.S. Large Marine Ecosystem (LME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

The MAFMC ecosystem efforts will overlap with both the New England and South Atlantic jurisdictions. Should a formal or informal partnership be used with our sister FMCs?

How far inshore of the Exclusive Economic Zone (EEZ) should the range of issues extend for purposes of EAF?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - SAV beds are too critical and important not to be included. Need to consider SAV impacts. Need to figure out how to capture it.

Mr. Glennon - thinks there would be enough info from areas to share overlapping data.

Morehead City, NC September 27, 2005

Mr. Spitsbergen - the NEC Habitat Committee approved a motion to set up a joint committee with NEC and MAC members to take a look at smaller ecosystems within the bigger ecosystem. The full Council did not support the motion.

Virginia Beach, VA September 28, 2005

Mr. Haydon - the main consideration is the purpose of the ecosystem management is primarily marine life and things that affect it. There should not be boundaries. Species interact everywhere.

Mr. Moore - should form an informal partnership with other Councils.

Southampton, NY October 4, 2005

Jim Fletcher: Drawing lines in the water does not make sense. We don't understand what we are dealing with. For us to believe science is totally frustrating. Manage from where the water shed starts and go out to the 200-mile zone. If you do away with Federal flood insurance-do away with 2/3 of problems.

Emerson Hasbrouck: I suggest that if we take a watershed approach; extend as far inshore as far as the watersheds go.

Richard Wilson: The other FMC should relate on an informal basis. Go as far as the scientists deems necessary, not what the politicians say.

Greg DiDomenico: Follow what is happening now.

Byron Young: Be aware of climate change.

Bob Pride: Chesapeake Bay needs guidelines and uses the best practices. Ecosystems approach should include the best practices approach.

Long Branch, NJ October 6, 2005

Mr. Bachert – Council authority needs to go into the bays at the least.

Mr. Egarter – Council authority should go into where the life stage starts. How do you reclaim the damage that has already been done?

Alexandria, VA October 11, 2005

Mr. Hinman – need to have a joint Council process.

Mr. Heinemann – something that is missing is the need to include human use. Need the social, political and economic systems. We manage "uses" not the ecosystem. You can not just use ecological boundaries – need to take into account the human activities i.e., scallop openings of closed areas. The problems are very complex.

Ocean City, MD October 12, 2005

Mr. Hawkins - the smaller you cut the pie, the easier it would be to understand - Cape Hatteras to Canadian border is too large an area. Could boil an ecosystem down pretty small when looking at individual species.

Cape May, NJ October 17, 2005

Ms. Bochenek – ecosystems have to go inshore and all the way up through the headwaters.

Mr. Goldman – need to be concerned with the NE Council since Amendment 13 doesn't care one bit about NJ fishermen. Arrangements need to be formal.

Mr. Payne – there needs to be formal relationships. As water temperatures change, you need to be able to speak with other guys in the room.

Lewes, DE October 18, 2005

Mr. Mateyko – the boundaries of the ecosystems should be left to science. The watersheds should be the boundaries.

Newark, DE October 19, 2005

Dr. Rowe – there should be formal relationships between LMEs. That will generate more actions. As far as going inshore, it should be as far as possible with the States fully cooperating whenever possible.

Philadelphia, PA October 24, 2005

Mr. Flanigan – inshore of 3 miles the Council should NOT be involved with. The Council should develop a formal process with the other FMCs.

Dr. Kray – how do we get state involvement with their waters, i.e., estuaries are very important for summer flounder. How do we engage those States?

Mr. Flanigan – keep Council authority at 3 to 200 miles and do NOT reach into state levels.

Mr. Doobley – agree on keeping Council jurisdiction 3 to 200 miles. It is important to keep states rights. There needs refinement of LME's which need to be the boundaries of the fish. There should be no major overhaul in boundaries.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.6 Types of Management Measures that would be Incorporated into Ecosystem Approaches for Fishery Management, Consistent with the Identified Goals.

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

What types of management measures would be incorporated into EAF, consistent with the identified goals?

How should the NEFMC and MAFMC coordinate fishery management efforts within this one LME that we share, given that NE is generally effort-based while MAFMC has quota-based management regimes?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - asked if there were larger fleets in NE area?

Mr. Glennon - the biggest question seems to be, what is the recreational fishery taking? You can get a pretty good handle on commercial fishermen. Seems firming up the recreational numbers would be best way to handle although it is difficult to do.

Mr. Glennon - seems like the fishing is uneven. Some days there are many people fishing off the piers and other days there are not. Even if tried to do a prediction model on recreational samples, it would be difficult. Would make sure whatever habitat that was designated important, that that becomes the new thing we pay attention to and make sure it is preserved.

Morehead City, NC September 27, 2005

Mr. Freeman - seems like the different migration between the two regions should almost be mandated.

Mr. Spitsbergen - we manage summer flounder all the way through New England area. Scallop fishery is down through the Delmarva area. There are fishermen who fish from Mid-Atlantic area in New England area, but have to abide by which area rules they are fishing in.

Virginia Beach, VA September 28, 2005

Mr. Haydon - thinks it behooves the two Councils to work out their differences. Successes would have to be pointed out and would need to work toward same objectives. Try it for a few years and see how it works.

Southampton, NY October 4, 2005

Byron Young: Maybe we are not using the right approach. Look very carefully going through this process and it may hurt but may end up better. All needs to think outside the box.

Richard Wilson: I don't know what management measures need to be incorporated. But you should also measure the results to see whether they are doing what you want them to do. Results need to be measured and compared within the Council.

Emerson Hasbrouck: 2 issues, 1 is the quandary between MSY and OY. There needs to be flexibility, if there are a couple of species that interact with each other. How do you manage both of them for MSY? The 2nd issue is there needs to be something for the definition of overfishing. The 2nd question is that's a good question, good luck.

Jim Fletcher: Management actions are not given time to take effect. We will never know where we are because we always go with what the scientist says, needs to be changed. The fisherman got along fine with regards to the north and south. The Councils put a division between the fishermen. If you continue you will run the fisherman out of business.

Lisa Suatoni: The actual management measure may not be quantitatively different from the single species but may change qualitatively. Science of multi-species is growing quickly. The Mid Atlantic Council can take action here. The approach will require bycatch monitoring. Documentation for habitat changes will be required. TAC's may need to be lowered to be risk averse or reduce for importance as prey.

Greg DiDomenico: It is important to point out; Mid-Atlantic is doing things that are ecosystem based.

Long Branch, NJ October 6, 2005

Mr. Ristori – the needs to be better coordination between Mid-Atlantic and New England. There have always been problems where the Council's don't have authority for example winter flounder. The Mud Dump fishery has collapsed, i.e., the whiting out there have gone the way of

the dodo bird. The giant BFT fishery won't come back because there is no food now. Whiting and ling should not be in the NEFMC because they have been extremely mismanaged by New England. This is a disgrace, but a result of the 2 Councils having extremely different agendas.

Mr. Egarter – MAFMC management often benefits the New England area because so many of our fish move north as they grow. Size limits only really benefits states to the north of New Jersey.

Alexandria, VA October 11, 2005

Mr. Hinman – please remember my earlier comments. The New England FMC approach is less successful in ecosystem approaches for fisheries management.

Ms. Fordham – certainly would like to second Mr. Hinman's comments about the NEFMC approach being very unsuccessful.

Ocean City, MD October 12, 2005

Mr. Hawkins - need to have more flexibility for the Council to design a plan to allow for best ecosystem yield, for example: dogfish - raising the catch limits.

Cape May, NJ October 17, 2005

Mr. Freeman – NEFMC and MAFMC have very different strategies for fisheries management. How do we deal with those differences?

Ms. Bochenek – keep working with the way the Mid-Atlantic works. New England has very serious problems with inadequate management. There has to be common ways to discuss things, but you do NOT need to merge the two.

Mr. Doebley – management measures should NOT have no fishing MPAs.

Lewes, DE October 18, 2005

Mr. Mateyko -- the communication needs to deliver a consistent message between the two Councils.

Newark, DE October 19, 2005

Dr. Rowe – discards of undersized fish is a big problem. Recreational fishermen mistrust MRFSS. Is there some way that Sea Grant can get involved? It would be nice if everyone had the same management measures, but we also need to retain flexibility. There should be good interactions among the Councils.

Philadelphia, PA October 24, 2005

Mr. Nowalsky – hard quotas and reduction in overcapitalization works for commercial fishermen, but is not appropriate for recreational fishermen. Seasonal restrictions are like limited access. Management measures must be looked at by user group. Coordination among the Councils is important.

Mr. Flanigan – this is a real big question. Neither Council approach is incompatible with EAF. Mid-Atlantic is better for the resource, but New England management may be better for fishing families. The big problem is how to enable access to small user groups i.e., part time scallopers?

Mr. Doobley – in the short-term you need to focus on predator/prey and habitat. Doesn't see no fishing MPAs as an appropriate tool. "Much of science is advocacy work". MPAs redistribute effort. Ask the question if you can achieve the same goal without closed areas? Thinks there are ways to reconcile the NE and MA efforts.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.7 Specific Regional Issues that need to be addressed in a Fishery Ecosystem Plan (FEP).

The EPAP (1999) recommended the development of FEPs and the research to support them. The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

Should the Council create an umbrella-like FEP that provides all the background information on our ecosystem?

How would an FEP be different from the current National Environmental Policy Act (NEPA) requirements to address "cumulative effects" which focus attention on five areas: 1) targeted fishery and resources, 2) non-target fisheries or bycatch, 3) habitat, 4) PET species, and 5) communities– socioeconomics?

Kill Devil Hills, NC September 26

Mr. Glennon - thinks they should do an umbrella FEP. It should contain the 5 items listed as best as possible.

Mr. Glennon - the challenge is tying all 5 of them together. Would have to show the give and take. If push one down, which one would be pushed up, etc. Commercial guys would claim they want to fish over those shell bottoms. BETTER YOU THAN ME!

Morehead City, NC September 27, 2005

No comments.

Virginia Beach, VA September 28, 2005

Mr. Haydon - would have to have an umbrella like FEP. Would need all of the background information. Would need an umbrella to cover all of the aspects that might come up under any aspect.

Mr. Moore - does it appear that an FEP could be a living document as look at each species?

Mr. Haydon - are there a set of guidelines people can utilize and see what they need to add to it?

Mr. Moore - have you looked into a way to make the FEP more user friendly?

Mr. Pride - are we talking about a background document as opposed to an FMP?

Mr. Pride - first go around may just be an informational document.

Southampton, NY October 4, 2005

Jim Fletcher: One question, not based on current science, it is not science, at its best is generated by like-minded people. Part 2, the environmental policy; we are not concerned about the number of discards we have. We have not addressed bycatch in recreational fisheries. He believes NOAA has a policy to decrease commercial fishing nationwide and give fish to recreational fishermen.

Richard Wilson: You should have an umbrella type plan. Become an advocate to the fish. If the fish survive the rest of this will survive. There are bigger threats to fish that are outside Council control.

Greg DiDomenico: Each Council should implement the FEP; it should not be a mandatory requirement but should be part of the FMP.

Karen Chytalo: Take incremental steps, not every model needs to compute out perfectly. Don't need all data. Use adaptive approach.

Greg DiDomenico: Know that forage base discussion is coming. FEP needs to provide guidance for FMP.

Long Branch, NJ October 6, 2005

No comments.

Alexandria, VA October 11, 2005

Mr. Hinman -- fully supports the development of an FEP. Wants the FEP to be adaptive. Compiling all the background information on ecosystem is a daunting task so begin with the food web.

Ms. Elias -- goes ahead and does an FEP. Use historical data and a precautionary approach. The FEP should lay out the strategic approach.

Mr. Hinman -- EAF is just a different way of looking at what we have and therefore why EAF is different than NEPA is because it is NOT single species approach.

Ocean City, MD October 12, 2005

Mr. Doctor - should create an umbrella-like FEP. Should be charged with looking at cumulative effects. Might need to create a separate document from FMPs and use it as an overview. Maybe could partner with Universities and farm it out.

Mr. Hawkins - agrees that an umbrella-like FEP should be developed, but sees it as a huge document.

Ms. McGinty - instead of starting new documents, why not use framework of the FEP from the Chesapeake Plan to beef up management plans.

Cape May, NJ October 17, 2005

No comments.

Lewes, DE October 18, 2005

No comments.

Newark, DE October 19, 2005

Dr. Rowe -- an FEP would be very helpful to move towards an ecosystem approach.

Philadelphia, PA October 24, 2005

Mr. Nowalsky – the idea of an FEP should be supported, but can't take away from current efforts. It is a reasonable goal if not negatively impact what are currently doing. Where you draw the line in defining ecosystems is the most difficult problem.

Mr. Doobley – don't need an FEP and all the work associated with it. Need more of an articulated policy or banner. Need to catalog what you are currently doing. Then as money becomes available, put it under the overall banner. Put the pieces of the puzzle together under the banner.

Mr. Flanigan – need transitional period, with education. Should evolve under the umbrella during the next decade. He sees litigation as a serious problem. (He is a lawyer!)

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.8 Techniques for Determining Success of Ecosystem-Based Management.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of NMFS into usable products for management.

What new tools are required for risk assessment, monitoring, and evaluation in an EAF?

What techniques are available for determining success of ecosystem-based management?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - good models and lots of money. The models are only as good as the data collected.

Ms. Glennon - need to look at what time frame are you thinking about in terms of success.

Mr. Glennon - is there enough of a knowledge base to know relationship between fleet size and actual fishery?

Morehead City, NC September 27, 2005

No comments.

Virginia Beach, VA September 28, 2005

No comments.

Southampton, NY October 4, 2005

Byron Young: The young people can contribute to future successes, challenge the university systems etc. It is an interactive process.

Greg DiDomenico: The tool that needs to be implemented would be a much more accurate assessment.

Richard Wilson: Identify problems to identify tools after you identify the management system. If we have these tools, more people will have to understand how it works.

Jim Fletcher: Need to look at historical patterns for ecosystem management.

Long Branch, NJ October 6, 2005

No comments.

Alexandria, VA October 11, 2005

Mr. Krenz -- ask the scientists and use the attached consensus statement.

Mr. Hinman -- models currently exist i.e., ecosym, ecopath, multispecies VPAs.

Mr. Heinemann -- even if you have in place the tools and an FEP, you will need to have standards and mechanism for incorporating the information into management. You need to use the information to set OY for single species and then suites of species. I don't see the mechanisms or guidelines being available now.

Ms. Leland -- the techniques and success rests on the goals of EAF -- the basic, fundamental goals.

Mr. Hinman -- ecosystem "health and integrity" are monitored by various tools and indicators, but you all need to know the starting point.

Ocean City, MD October 12, 2005

Mr. Hawkins - suggested to use VTRs. There are mounds of data. Could modify VTR to faster gather information on HAPCs. Somebody needs to talk to the old time fishermen! They have a

wealth of information to share. An FMP that rebuilds can dig deeper. Strongly thinks flourishing fisheries have greater biomass explained by present practice.

Cape May, NJ October 17, 2005

Ms. Bochenek – need to address global warming and its effects on fish stocks. Need to build that into the monitoring programs.

Mr. Siciligno – the total stock assessments need improvements. Both commercial and recreational fishermen do not believe the numbers. In order to judge success, you have to go back to the basics.

Mr. Goldman – need to look at forage species. Have to consider horseshoe crab eggs for the sustainability of birds. Need to consider how many menhaden are needed in Chesapeake Bay for striped bass and weakfish.

Lewes, DE October 18, 2005

No comments.

Newark, DE October 19, 2005

Dr. Rowe – larvae and juveniles need good connectivity with recruitment. What is the bottleneck for the adult population? Do the fishermen understand the science? Sea Grant could get into this issue and could help get the two groups to talk together better. Research-Set-Aside program and the associated partnerships are real important.

Philadelphia, PA October 24, 2005

Mr. Nowalsky – "better efforts . . ." is an understatement of epic proportions. Managers need a large toolbox with as many management measures as possible. Need good information and better data. Number one need is better stock assessments. National saltwater fishing license provides means of monitoring. Everything should be done to quantify fishing effort, but NOT a saltwater fishing license. Use the trip reports from party and charter boats for effort. Query the user groups. Stakeholders are generally happy to help and scientists indicate sustainability for their successes.

Mr. Flanigan – decisions can always be second guessed. Strength is the procedures that allow for input. How strengthen – procedurally. EAF requires information. There needs to be more real-time feedback.

Mr. Taylor – how often do you use college studies?

Dr. Kray – we use the Research-Set-Aside program and believe we get bigger bang for the buck that way.

Mr. Doobley – you need more tools. When the data are robust enough use new models. Use more fishery dependent data. Spawning success, wide range of age classes, increase in dock side value, selling more boats – lots of ways to determine success. The NGOs are using a philosophy of preservation and trying to come up with intrinsic values of savings. What ever happened to "sharing" the resources?

Mr. Flanigan – the Council should look at the cost of diseconomies or inefficiencies of single species management versus EAF.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

5.9 Other Issues Considered Important for Our Region.

The initial Congressional funds run through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA (question 7) as a surrogate for ecosystem-approaches to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the non-targeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

How would you propose strengthening the Councils approach to ecosystem management?

The Council treats EFH as an unfunded mandate and relies nearly totally on NMFS, thus if no new monies come to the Council, should we treat EAF as we do EFH?

Kill Devil Hills, NC September 26, 2005

Mr. Glennon - where is the mandate for ecosystem coming from?

Mr. Glennon - you can only take on so many unfunded mandates. EFH has been a part of your workload for a long time. If had to choose, would stick with what you have been working on and not take on new projects. Money is hard to come by. Cannot do everything. EFH has a longer history and you have to set priorities.

Morehead City, NC September 27, 2005

Mr. Freeman - what kind of coordination is there on NMFS with habitat?

Dr. Hoff - it is limited. I have never worked with the state of NC. VA, north, there are joint processing meetings within the individual states where they look at what comes in once a month.

NMFS would coordinate our comments. Agencies have to respond to us, but they don't have to listen to us. Most of the people, who were in the field, have gone by the way side. The agency comments from Washington, DC or Gloucester, MA.

Mr. Munden - in NC Division of Marine Fisheries, we have specific individuals that review projects. One of the latest documents, Coastal Habitat Protection Plan, when items come forward pertaining to NEC, MAC or SAC, I would review the documents and provide comments.

Mr. Freeman - any inclusion of water quality in those documents? Understands that once the water gets out to some of the habitat, he knows it won't affect it.

Mr. Freeman - so where there is excessive toxic substance of fish, are there any mechanisms for suppressing that?

Mr. Munden - not within NC DMF. We have worked with EPA to look at the impact of coastal development on marine life. We would mainly deal with coastal beds or submerged aquatic vegetation.

Mr. Freeman - who would be assessing toxic substances in fish?

Mr. Munden - Food and Drug Administration.

Dr. Hoff - it has been EPA and FDA since the 1960s. Certain states also do it, like NY, who issues their own warnings.

Mr. Craig - you mentioned data gaps, what are the research priorities going to be and where do biggest uncertainties lay?

Dr. Hoff - those are the types of answers we are looking for. We have to mine what is out there and build a framework and bridge the gaps. You have got to create a structure, identify the key components that you don't know and the ones you do. One critical piece is the association between habitat and fishery productivity

Virginia Beach, VA September 28, 2005

Mr. Haydon - looks at it based on individuals and jobs and what they have facing them, education and knowledge concerning these types of issues. Most people don't understand. Monies are not readily available and who is going to educate the Senate.

Mr. Moore - if developed a species plan that took a more direct ecosystem approach, is there a chance for a judicial challenge of that plan because there is no wording to take it into effect?

Mr. Haydon - it is going to be hard for fishermen and stakeholders to accept new guidelines.

Southampton, NY October 4, 2005

Jim Fletcher: Sarcastically proposes to use RSA to fund Federal scientists. If we go into ecosystem management, MMPA, ESA, birds-all will collide. Will we as a Nation, allow the top predators (and thus competition of man) to be harvested?

Richard Wilson: Rebuilding is the best approach. Focus on the food chain. Individual species approach is a good approach. What Council is doing is the best way now. Collaborate whenever you can.

Karen Chytalo: There are other resources out there if you just look around.

Gordon Colvin: Any summary comments?

Richard Wilson: The last item, even if you are not fully funded there are communities that would participate financially.

John Rod DiGiacomo: Read two statements, which are attached.

Long Branch, NJ October 6, 2005

Mr. Ristori – the first thing that you need to do, is to get management of the forage species. There has been nothing done on management of sand lance, anchovies, and herring. During the 1970s and 1980s there were huge populations of sand lance, but we just don't know what happened to that species. There has been nothing done on ecosystems in the past 25 years.

Mr. Santee – if there is no money, is it likely that this would require a salt water license or user fees? He is opposed to that.

Mr. Hagaman – to go to ecosystem management it will be very hard, since don't know many of the interactions among the species.

Mr. Haines – first need to address pollution and ocean dumping, and then have to address where all have the sand lance gone. You have to bring back ALL species and then things like whiting can take some of the pressure off of black sea bass and summer flounder.

Alexandria, VA October 11, 2005

Ms. Leland – why aren't you doing EFH now?

Ms Fordham – I am not an expert on ecosystem-based management, but I am familiar with the work of the Mid-Atlantic Council. I agree with many of the comments made tonight by my colleagues, particularly the idea that the Council can take many steps toward ecosystem-based management now, without new Congressional mandates or money.

Based on other comments heard tonight, I take this opportunity to point out that species-specific management has been less than successful in many cases for a variety of reasons, including lack of an ecosystem approach as well as habitat degradation and simple failure to accept or act quickly enough on scientific advice for catch limits. As you know, species-specific management has been most successful when scientific advice, particularly with respect to reducing fishing mortality, has been heeded (regional examples include summer flounder and blacktip sharks). We therefore hope that the Council will view species-specific management as a component of ecosystem-based management and not see the trend toward this approach as a signal to move away from or discount the importance of setting science-based limits on catch and establishing protection for essential fish habitat. The nation as a whole has a long way to go toward achieving these basic, relatively straight forward objectives; we hope progress in that regard will continue while we move toward operating within this larger, ecosystem context. It is important to keep in mind that an ecosystem approach is likely to dictate that such decisions (on catch and area protection) be made in a more precautionary manner.

We offer a specific recommendation for strengthening the Council's approach to ecosystem-based management. We urge, as we have in the past, better coordination between the Councils and the National Marine Fisheries Service (NMFS) Protected Resources Division, particularly with respect to fish on the "Species of Concern" list. We fear that the Council and state fishery managers are being sheltered from a lot of bad news on a number of the region's fish species including Atlantic halibut, Atlantic sturgeon, cusk, wolfish and several elasmobranchs. These species are not yet "P.E.T" (protected, endangered or threatened) species, but are serious risk of becoming so, primarily due to bycatch problems that are not being addressed by the Councils or the NMFS representatives that work on/with the Councils. We hope that improved integration of these bodies will benefit not only the fish species at risk but also marine mammals and sea turtles.

Lastly, as you might imagine, we hope that the Council will not go along with the popular notion that ecosystem-based management should include culling, driving down or eliminating certain charismatically challenged species based simply on economic value and/or real or perceived dietary preferences. We urge the Council to instead look to scientific advice and consider the complexity of the relationships among myriad species in the marine ecosystem.

Mr. Heinemann – Current processes are missing 3 things: 1) adaptive management, 2) precautionary approach, and 3) geographic or place management. As we deal with ecosystems, the decisions become more complex. There are not always analogs available and therefore we need adaptive approach. We can't really do EAF management right now because we don't have the complex models we would like to have. As you move towards EAF, the uncertainty will become greater. The greater the complexity, the more a precautionary approach is NEEDED. Finally, area management is an essential part because humans act on area. We have to protect areas from trawling on an area basis rather than reducing overall trawling.

Ms. Elias – you must continue to rely on strong science.

Mr. Hinman – plug for science and the fact that science and allocation must be separate, in order to maintain the integrity of science.

Mr. Heinemann – seconded Mr. Hinman's last statement.

Ocean City, MD October 12, 2005

No comments.

Cape May, NJ October 17, 2005

Mr. Siciligno – perhaps the Council level is not the right level. Perhaps it needs to be at a much higher level because the Councils do not have the necessary clout. Has to be national and then the Councils can deal with things.

Ms. Bochenek -need a strong scientific basis for management in order to know what is going on in the environment. NEED lots of money pumped into the system to get the information to manage properly.

Dr. Kray – with the grant that we were give, we were charged to get the public involved. We were never told what the goal should be or what it is. Congress wanted the public engaged with the four Councils and then they will report back to NMFS. NMFS should provide a template. The Council will manage their regions and coordinate with other agencies. Let the Council work within the guidelines.

Mr. DiDominico – the absolute best way to strengthen EAF is to keep it within the Councils. Don't want a new layer of government.

Mr. Berg – is anyone else doing this ecosystem work or is the US at the forefront?

Mr. DiDominico – in summary, the regional Councils need flexibility based on national guidelines. There should be no new Ecosystem Council. The public has to buy in to make it work. FEPs should guide the science. Goals and Objectives need to be very broadly defined. There should NOT be any EFH type guidelines. There should not be new MSA amendments that require strict new guidelines.

Mr. Muffley – the general public does not trust our single species management and ecosystem management will be much more complex. The date requirements will be overwhelming. There is work on multispecies models, like the Chesapeake Bay one for striped bass, bluefish, weakfish and menhaden. But we are a long way away from tackling EAF.

Mr. Payne – many groups have been collecting data on EAF. You have to reach out to them all.

Dr. Kray – asked NMFS Chief Science officer, Dr. Steve Murawski, when will we know when we are doing ecosystem approach to fisheries. Dr. Murawski said it will not happen over night and that it will be evolutionary. We will NEVER have all the data, but we can move towards EAF.

Mr. McCloy – you can not flip a light on and get to ecosystem tomorrow. It simply will NOT happen. It is an evolution to get there. The public needs to keep that in mind.

Lewes, DE October 18, 2005

Mr. Mateyko – you can't responsibly avoid ecosystem management because we have the expertise and there needs to be changes to manage fisheries. The state of our environment and knowledge is changing. It would not be responsible to manage otherwise. There is tremendous potential to reach public awareness through fish contaminants and personal health. The health of the environment, in general, is a large public concern for Americans. There is a public mandate to meet the audience wherever they are at.

Newark, DE October 19, 2005

Dr. Rowe -- this topic will provide more thought. I hope Congress will continue this program and provide more money.

Philadelphia, PA October 24, 2005

Mr. Flanigan – if you don't have the money -- then it has to go on the back burner.

Mr. Taylor -- when an NGO sues, they should pay for the necessary research.

Mr. Nowalsky – talk to stakeholders and get them involved. Let them define if you are successful. OY should only be reached if the ecosystem supports it. If you are managing species and they are doing well, then you are doing EAF.

There were no public comments at either the Jamaica, NY (October 3) or Annapolis, MD (October 13) scoping meetings.

6.0 MAFMC CONCLUSIONS

6.1 Council Efforts on Ecosystem Approaches to Fisheries in the Past

The Council began single-species fisheries management nearly 30 years ago with their very successful efforts for surfclams and it has 11 others species under their lead authority: ocean quahogs, Atlantic mackerel, butterfish, *Loligo* and *Illex* squid, summer flounder, scup, black sea bass, bluefish, dogfish, and most recently, tilefish. All of these species are being successfully rebuilt or are at their maximum sustainable yield level. This Council is generally perceived as being responsible managers and as Roger Rufe (Executive Director of The Ocean Conservancy) pointed out in his scorecard at *Managing Our Nations Fisheries II* (Washington Conference March 2005) the MAFMC scored the highest of the east coast Councils.

At the March 2005 Washington conference, the Ecosystem Advisory Panel acknowledged that ending overfishing and getting fleet overcapacity under control would be effective first steps towards ecosystem management (section 2.4). Of the Council's 12 species, only summer flounder are experiencing overfishing, with the status of scup being "unknown" as of the NMFS 2004 Report to Congress (NOAA 2005). Only scup and butterfish are currently overfished, with the status of *Illex* squid and dogfish being "undefined" or "unknown" relative to being overfished. Thus the species that the Council manages are all at or near their target levels. The Council also has an ITQ program for surfclams and ocean quahogs and limited access for nearly all the other fisheries, thus preventing or limiting overcapacity.

6.2 Current Council Efforts on Ecosystem Approaches to Fisheries

During the evolution of the various FMPs the Council has amended its: Surfclam and Ocean Quahog FMP 13 times; Summer Flounder, Scup and Black Sea Bass FMP 13 times; Atlantic Mackerel, Squid and Butterfish FMP 9 times and the Bluefish FMP once. The Dogfish and Tilefish FMPs were recently implemented and are already undergoing management changes.

As the FMPs were amended they generally evolved from single-species to multi-species, and now many of the management issues facing the Council currently deal with ecosystem-type ideas. For example, the surfclam and ocean quahog FMP currently is dealing with the loss of the southern and inshore portion of the surfclam biomass which is most likely a function of global warming. For the Atlantic mackerel, *Loligo*, *Illex*, and butterfish FMP the Council is addressing bycatch issues in the *Loligo* and butterfish fisheries for scup, as well as, the fact that all four species are prey for marine mammals, highly migratory species, most fishes, and themselves. In the summer flounder, scup, and black sea bass FMP there are ecological issues of summer flounder juveniles strongly associated with submerged aquatic vegetation which is very vulnerable to man-made disturbances in the estuaries. Bluefish and striped bass are competitors with an inverse relationship between the two. Finally, tilefish are structure-oriented and while an

HAPC (habitat area of particular concern) has been identified, there are no gear restrictions.

Council management of our fisheries resources has been based on the goals and objectives set through public participation under MSA and often times compromises have resulted in not the maximization of a certain parameter or output but rather the overall "optimizing" for society. Many of the current 10 National Standards that FMPs are required to meet under the MSA (i.e., 1– overfishing, 2 – best science, 3 – managed as unit throughout its range, 5 – efficiency, 8 – communities, 9 – bycatch) and the essential fish habitat provisions require a more holistic approach that has evolved the fisheries management efforts towards EAF.

The evolution of the FMPs themselves has gone towards EAF as can readily be seen in the new Table of Contents for Amendment 9 to the Atlantic Mackerel, Squid and Butterfish FMP (Appendix J). The entire FMP is set up to meet the requirements of the National Environmental Policy Act (NEPA) where the major sections deal with the impacts of the alternatives to the targeted species, impacts to non-targeted (bycatch) species, impacts to habitat, impacts to protected resources, and social and economic impacts. Reviewing section 8 of the FMP, the "Cumulative Effects Assessment", one can see that the geographic and temporal boundaries are addressed in sections 8.2 and 8.3. "Ecosystems" are mentioned in the titles for sections 8.4, 8.5, 8.6, 8.7, and 8.8. As recently as 2003 when the Council's latest approved FMP (Surfclam and Ocean Quahog Amendment 13) was submitted, the word "ecosystem" did not appear in the Table of Contents.

6.3 Ecosystem Approaches to Fisheries that the Council Can Not Do Presently

The lack of money will restrict further dedicated ecosystem efforts of the Mid-Atlantic Council. The small cooperative agreement with NMFS for this pilot project was restricted to the time frame of July 2004 through December 2005 with an additional 90 day duration for final report preparation. With the completion of the cooperative agreement, the Council staffer, Dr. Hoff, will likely return to his normal fishery management responsibilities. Only with future dedicated funds from Congress or the Agency will dedicated ecosystem efforts continue.

To better address ecosystem interactions that influence FMP species, the NMFS Ecosystems Principles Advisory Panel (1999) provided a number of recommended goals, policies and operational steps that would allow ecosystem considerations to be melded into the approaches currently used by the Council. Chief among the recommended steps from the EPAP was the development of umbrella FEPs for each region. This pilot project provided a timely way to gather public input regarding the goals and objectives to be accomplished through FEPs. The intent of the FEPs (as given by the EPAP) is to provide a framework for organizing information about the structure and function of ecosystems, and for developing ways to enhance decision making when goals of single-species or fishery-by-fishery management approaches conflict. Development of the FEPs requires at least eight operational steps:

- (1) delineate the geographic extent of ecosystems,

- (2) develop a conceptual model of the food web,
- (3) describe habitat needs of different life history stages for all plants and animals,
- (4) calculate total removals, and show how they relate to biomass, production and trophic structure,
- (5) assess how uncertainty is characterized and what kind of buffers are to be included in management,
- (6) develop indices of ecosystem health as targets for management,
- (7) describe available long-term monitoring data, and
- (8) assess ecological, human and institutional elements, which affect fisheries and are outside Council/DOC authority.

It was recognized in the cooperative agreement that "not all these actions can be accomplished with available funding." The vast majority of the public who participated in the public scoping meetings, the Ecosystem Committee, and the Council staff strongly support the concept of an FEP development as a framework for organizing information about the structure and function of ecosystems, and for developing ways to enhance decision making when goals of single-species or fishery-by-fishery management approaches conflict. However, it is obvious from the above eight operational steps identified by the EPAP, that a significant amount of research money will be needed in the development of an FEP. If Congress and the Agency desire to continue to move forward with an ecosystem approach to fisheries, it is logical that an FEP development would be one of the next steps.

6.4 Council Support for Advisory Panel Report on Developing an EAF

The Mid-Atlantic Council strongly supports the conclusions of the Ecosystem Advisory Panel as presented in *Managing Our Nation's Fisheries II* (section 2.4). The main conference panel, which was comprised of all eight Regional Councils, the three Interstate Fisheries Commissions, NMFS officials, US Coast Guard, NOAA General Counsel, State Department, and US Fish and Wildlife Service also concurred with the Ecosystem Advisory Panel.

The Ecosystem Advisory Panel came to consensus on some overarching issues regarding an EAF. They endorsed the finding of many other science and management boards that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. In that regard, they endorsed a preference for the use of currently available tools and the resources and funding necessary to better engage those tools. Rather than endorsing wholly new mandates, the Panel favored an incremental approach that would allow managers to learn lessons from the pilot programs, and incorporate ecosystem considerations consonant with the activities of each region.

To that end, the Ecosystem Advisory Panel was insistent that Fishery Management Councils and regions need to retain the flexibility to be able to manage their regional fisheries. The concept of "standardization" is incompatible with the need for ecosystem approaches to reflect regional differences. Regional management has been the cornerstone of the Federal fishery management system since the inception of the Magnuson Act in 1976.

Finally, the Advisory Panel reinforced its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among Fishery Management Councils, NMFS, partner agencies and stakeholders.

6.5 Council View on Necessity of Ecosystem Guidelines

The Mid-Atlantic Council again supports the position of the Ecosystem Advisory Panel as presented in *Managing Our Nation's Fisheries II* (section 2.4) as to the need for national guidance and whether to codify EAF in the Magnuson-Stevens Act. The Council would like to continue the involvement of Dr. Hoff as one of four Council individuals selected to work with NMFS on the development of ecosystem guidelines (section 2.6).

The Ecosystem Advisory Panel recommended that general guidance be developed and provided, and that it not be in the form of formal national technical guidelines or regulations that might limit the flexibility for regions to develop different strategies appropriate to their circumstances. Critics point to the essential fish habitat guidelines as an example of binding national guidelines that have changed the fishery management focus from habitat protection to the avoidance of legal challenge. Implementation of an EAF will be a long-term venture. As more funding is devoted to ecosystem research, and our knowledge base increases, fishery management will evolve. Additionally, ecosystems and the combination of activities that occur in them vary greatly from region to region.

Guidance should help Fishery Management Councils and regions to use all the tools available under the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, and Executive Order 12866 provide tools to address issues of diverse stakeholder's views and multiple opinions about ecosystems and cumulative impacts. There is, however, a need for all regions to improve their consideration of ecosystem components in fishery management. The two recent ocean reports have criticized some Regional fishery Management councils for purportedly prioritizing short-term economic concerns over the sustainability of target species and their ecosystems. Raising the standards with national guidance would address uneven progress among Councils and regions and could help to ameliorate this perception.

The Advisory Panel is cautious about amending the Magnuson-Stevens Act at this time. They are wary of strict regulations and required guidelines that will mandate Regional Fishery Management Councils to produce new FMP amendments across the board (similar to the 1996 essential fish habitat requirements which allowed only a two-year timeline). Acknowledging all the items NMFS and the Fishery Management Councils must address currently, they were reluctant to burden the system with more products or requirements to produce new FMPs. Rather, the panel favors building an ecosystem approach into existing management practices. An EAF could explicitly promote conservation and management measures for the protection and maintenance of a healthy ecosystem, as well as the productivity of managed species, using existing tools.

The panel also reinforced that the Magnuson-Stevens Act allows for ecosystem-based management. Although the Magnuson Act in 1976 was originally written as a vehicle for single species fishery management, revisions to the Act, in 1996, incorporated a wide variety of ecologically friendly requirements. These included bycatch, habitat, and multi-species considerations, and increased focus on the human component of ecosystems through the explicit mitigation of fishing community impacts. With the ten national standards and essential fish habitat, the Magnuson-Stevens Act provides most of the tools necessary for EAF, given the current understanding of ecosystem structure and function. The current system does not necessarily prescribe the degree of proactive management action required for non-targeted species, noncommercial species, bycatch and waste, biodiversity or managing trade-offs among competing uses for the resources; nonetheless, many Fishery Management Councils and regions have made efforts in this regard. The Advisory Panel did, however, recognize the need for all Councils and regions to move towards ecosystem management, and that national guidance may assist in this process.

6.6 Council Summary of Nine Topics Covered at Scoping Meetings

During September and October 2005 the Council held 13 public scoping meeting (section 2.7). The Council's scoping document is Appendix E and the three other east coast Council's scoping documents are included in Appendix F. Appendix G provides all the names and addresses of participants that attended the 13 Mid-Atlantic public scoping meetings. Nine topic areas served as the outline of the scoping document which was introduced by a statement, described in a brief narrative with questions asked which were intended to solicit responses from the public. These nine topic areas are listed below along with a summary of the responses and major issues elicited from the public.

6.6.1. Adequacy of current approaches for addressing ecosystem considerations.

In the course of the public meetings there was considerable discussion that the Council needs to attend more carefully to the issues of estuaries where many species spawn and develop. The habitat connection and gear impacts were mentioned often also. The predator/prey relationships and how they interact were also discussed at numerous meetings. Among both the recreational and commercial sectors, the reduction of bycatch was a topic suggested for more attention. A theme in the discussions was the shortage of data and how much is unknown at this time.

6.6.2. Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The clear message was that in order for the ecosystem to be preserved for the future, we must both conserve and manage. There were strong indications that the Council has done a good job in fisheries management, but that the range of management must reach to the headwaters for all the anthropogenic impacts. Marine Protected Areas (MPAs) were a major concern of the recreational fishermen commenting on this topic.

6.6.3. Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

There was strong consensus that the public should be involved in a scoping type process similar to these public meetings. Also, the Council process needs to be regional, deliberative and collaborative and that both conservation and management is the desired state. There was agreement that Regional Councils and NMFS should be advocates for the fish as well as advocates for protected, endangered and threatened species (PETS). Except for representatives of the environmental community, it was generally agreed that there was not a need for new Ecosystem Councils.

6.6.4. Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

There was general agreement from the participants that the Council will need to work with other agencies that are not now within their purview if this EAF is to succeed. Most participants felt that the Council was doing a good job in the management of fishing mortality and could engage these other agencies if empowered to do so. The environmental participants felt that Regional Ecosystem Councils would be necessary; however, the majority of the participants did not want a new layer of government on top of the fishery management process. All agreed that we must increase the public's level of awareness about these issues.

6.6.5. Boundaries of sub-regional ecosystems with the areas of the various Fishery Management Councils.

It is interesting to note that at ten of the locations of the scoping hearings, there was agreement from the participants that management should extend from the headwaters out to two hundred miles, except for the Philadelphia public meeting where participants wanted the Council to stay within their current jurisdiction, the EEZ, i.e., three to two hundred miles.

6.6.6. Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

It was stated on several occasions that there needs to be better monitoring of bycatch, both recreational and commercial if this ecosystem approach is to be successful. There also needs to be better documentation of habitat changes throughout the ecosystem. The Total Allowable Catch may need to be lowered in order to be "risk averse" in recognition of the importance of prey. The science of multispecies assessments is growing rapidly and models must be explored. Several participants indicated that the NEFMC approach has not been successful for single species management and that it may not work in an ecosystem-based approach either. Again there was consensus that the MAFMC model of management (i.e. hard quotas) seems to work.

6.6.7. Specific regional issues that need to be addressed in a fishery ecosystem plan [FEP]

There was overwhelming support for an umbrella-type Fishery Ecosystem Plan, but not at the expense of the current efforts of the Council. The public in general supported the 1999 EPAP Report to Congress (Appendix H) for the desirability of an FEP. That being said, there was serious concern about being able to move in this direction because of the paucity of data, skilled staff, and financial resources.

6.6.8. Techniques for determining success of ecosystem-based management.

There was support for the concept that success rests on the goals of EAF. Also if this approach is to work, there will be a need for improving the current stock assessment process. There will also be a need to develop new and better tools to assist the managers in their decision making process.

6.6.9. Other issues considered for our region.

Many participants suggested that what the Council is currently doing is best for now, but that they could start to take incremental steps towards EAF. There currently are inadequate data, and inadequate funds to begin to acquire these data, in order to make a quantum leap into EAF, but the continuing introduction of ecosystem considerations in the fishery management process will accrue and the ecosystem will be better for it. There was a loud call for keeping science at the forefront in this process.

6.7 Overall Council Conclusions on Ecosystem Approaches to Fisheries

The Council believes that the process needs to be more evolutionary than revolutionary and that it will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability **and** productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders. The Council believes (as was identified by the Ecosystem Panel at the March 2005 conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering Committee for ecosystem goals and objectives. The Council reinforces its commitment to a collaborative and participatory process.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity.

Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

The "Northeast U.S. Large Marine Ecosystem (LME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

The EPAP (1999) recommended the development of FEPs and the research to support them. The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of the NEFSC into usable products for management.

The initial Congressional funds run through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA as a surrogate for an ecosystem approach to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the non-targeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

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8.0 ACRONMYS

ASMFC -- Atlantic States Marine Fisheries Commission
DOC -- Department of Commerce
EAF -- Ecosystem Approach to Fisheries
EAP -- Ecosystem Advisory Panel
ED -- Executive Director
EEZ -- Exclusive Economic Zone
EFH -- Essential Fish Habitat
EPAP -- Ecosystem Principles Advisory Panel
ESA -- Endangered Species Act
FEP -- Fishery Ecosystem Plan
FMC -- Fishery Management Council
FMP -- Fishery Management Plan
GIS -- Geographic Information System
GMFMC -- Gulf of Mexico Fishery Management Council
HAPC -- Habitat Area of Particular Concern
I&E -- Information and Education
ITQ -- Individual Transferable Quota
LME -- Large Marine Ecosystem
LNG -- Liquefied Natural Gas
MAFMC -- Mid-Atlantic Fishery Management Council
MMPA -- Marine Mammal Protective Act
MRFSS -- Marine Recreational Fisheries Statistical Survey
MPA -- Marine Protected Area
MSA -- Magnuson-Stevens Act
MSY -- Maximum Sustainable Yield
NEFMC -- New England Fishery Management Council
NEFSC -- Northeast Fisheries Science Center
NEPA -- National Environmental Policy Act
NGO -- Non Governmental Organization
NMFS -- National Marine Fisheries Service
NOAA -- National Oceanic and Atmospheric Administration
NPFMC -- North Pacific Fishery Management Council
NS -- National Standards
OY -- Optimum Yield
PETS -- Protected, Endangered, and Threatened Species
RSA -- Research Set Aside
SAFMC -- South Atlantic Fishery Management Council
SARC -- Stock Assessment Review Committee
SAV -- Submerged Aquatic Vegetation
SFA -- Sustainable Fisheries Act

SSC -- Scientific and Statistical Committee
SOW -- Statement of Work
TED -- Turtle Excluder Device
VTR -- Vessel Trip Report
WPFMC -- Western Pacific Fishery Management Council

APPENDICES:

A. COOPERATIVE AGREEMENT APPLICATION NA04NMF4410368

B. ECOSYSTEM COMMITTEE MEETING MEMOS AND MINUTES

C. GIS WORKSHOP --Table of Contents, Executive Summary, Staff Presentation

D. ECOSYSTEM TOOLS WORKSHOP -- Agenda, Working Groups, Staff Presentation

E. MAFMC SCOPING DOCUMENT

F. SCOPING DOCUMENTS FOR OTHER EAST COAST COUNCILS

G. NAMES AND ADDRESSES OF PARTICIPANTS AT SCOPING MEETINGS

H. ECOSYSTEM-BASED FISHERY MANAGEMENT REPORT TO CONGRESS

I. ECOLOGY OF THE NORTHEAST CONTINENTAL SHELF

J. AMENDMENT 9 SQUID/MACKEREL/BUTTERFISH -- TOC and Cumulative

APPENDIX A.

COOPERATIVE AGREEMENT APPLICATION
NA04NMF4410368

Investigation of Ecosystem-Based Approaches to Fisheries Management**I. Background**

Magnuson-Stevens Act National Standards mandate that conservation and management measures promote resource and fishery sustainability and optimize societal benefits. Increasingly, fisheries managers are being called upon to incorporate more aspects of marine conservation into the development of fishery management measures (NRC 1999; Ecosystem Principles Advisory Panel 1999; Busch et al. 2000). The Mid-Atlantic Fishery Management Council (among others) was specified by Congress in the FY-2004 appropriations to incorporate ecosystem considerations into fishery management.

The NMFS has drafted a statement of work (SOW) for public participation in ecosystem approaches to fisheries management through the four east coast FMCs. NMFS' will facilitate Council involvement in the development of ecosystem approaches. Greater public involvement in ecosystem-based goal setting as well as the development of management plans, technical information, and management decision support tools (such as more sophisticated models and GIS systems for depicting and analyzing ecosystem interactions) is needed. The MAFMC wants to address what defines an overall fisheries ecosystem plan (FEP)- type umbrella for fisheries management, and how decisions would be accomplished, as well as what would be the process and format for the FEP. The MAFMC wants to examine what the practical aspects of ecosystem based management are.

To better address ecosystem interactions that influence FMP species, the NMFS Ecosystems Principles Advisory Panel (1999) provided a number of recommended goals, policies and operational steps that would allow ecosystem considerations to be melded into the approaches currently used by the Councils. Chief among the recommended steps was the development of umbrella FEPs for each region. NMFS currently is developing a policy that would require regional FEPs. This pilot project would provide a timely way to gather public input regarding the goals and objectives to be accomplished through FEPs. The intent of the FEPs (as given in the Ecosystem Principles Advisory Report) is to provide a framework for organizing information about the structure and function of ecosystems, and for developing ways to enhance decision making when goals of single-species or fishery-by-fishery management approaches conflict. Development of the FEPs requires at least eight operational steps:

- (1) delineate the geographic extent of ecosystems,
- (2) develop a conceptual model of the food web,
- (3) describe habitat needs of different life history stages for all plants and animals,
- (4) calculate total removals, and show how they relate to biomass, production and trophic structure,
- (5) assess how uncertainty is characterized and what kind of buffers are to be included in management,
- (6) develop indices of ecosystem health as targets for management,
- (7) describe available long-term monitoring data, and

- (8) assess ecological, human and institutional elements, which affect fisheries and are outside Council/DOC authority.

This statement of work is intended to describe the activities that will facilitate the development of regional FEPs. Not all these actions can be accomplished with available funding. The pilot project will lay the groundwork for developing ecosystem-based goals and objectives, and for implementing the FEP approach, with emphasis on public involvement in goal setting and needs assessment.

II. Statement of Work

Four tasks will be undertaken to fulfill the requirements of this grant. To accomplish these tasks the MAFMC plans to hire a project leader who will be responsible for all phases of the project. The project leader will have at least several years of professional experience and a track record of accomplishment in working on fisheries management issues and directly working with scientific and fisheries data in the mid-Atlantic region. Additionally, the project leader will have a high level of skill in writing, and communicating with diverse groups, and manipulating and understanding scientific data. The Council also plans to contract with an outside ecosystem expert (s) and a geographical information systems (GIS) specialist (s) to assist the project leader to: 1) present geographical based information needed as background for public meetings; 2) to help identify technical needs and inventory existing information; and, 3) to assist in the preparation of the final report.

About three years ago, the MAFMC combined its former Ecosystems Committee, Habitat Committee and Comprehensive Management Committee into one Committee and currently it is called the Fishery Issues Focus Committee. It is envisioned that this Committee will be renamed the Ecosystem Committee and its efforts will be refocused for this project. It is likely that this Committee will meet at nearly every Council meeting over the course of the project. The Council intends to rely heavily on its Scientific and Statistical (S&S) Committee to initiate the identification of technical needs and existing information. Our S&S Committee is comprised of experts in population dynamics, ecology, economics, social anthropology, and data collection -- all of which will be needed for an ecosystem approach to fisheries management. This effort will be coordinated closely with work at the NEFSC. Currently, the Council also anticipates coordinating a small contract with an entity (perhaps a mid-Atlantic Sea Grant institute) to approach how to solicit the participation of the public in the envisioned attitudes/values survey. The Council also will spend time reviewing the Committee's recommendations on the development of the report and review the final report.

A. Public Meetings with Affected/Interested Parties

The Council, with assistance from appropriate NMFS staffs (NEFSC, NERO, and HQ), will undertake approximately 14 public meetings (two for each of our 7 states) seeking input regarding ecosystem goals and objectives for fisheries management. The purpose of these meetings will be to facilitate wide-ranging discussions with affected/interested parties, and the general public in nine topic areas: (1) views regarding the adequacy of current approaches for

addressing ecosystem considerations, (2) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues, (3) the nature of the public decision making processes within the FMCs for addressing management tradeoffs, consistent with identified goals, (4) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity, (5) the boundaries of sub-regional ecosystems within the areas of the various FMCs, (6) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals, (7) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP), (8) techniques for determining success of ecosystem-based management, and (9) other issues considered important in any particular region.

The public meetings will address the nine topic areas listed above, and will be conducted after a "strawman" document is produced to put the large-scale issues of ecosystem management into some sort of framework that can be rejected, modified, or accepted. Minutes of the meetings will be kept, consistent with applicable operating procedures of the MAFMC. These meetings could involve meetings that are targeted to specific groups (e.g., fishing industry groups, local communities, NGOs, recreational fishing groups). Advice from NMFS, the Council's S&S Committee, the entity that works with the Council on the attitudes and values survey, the ecosystem contractor, Council staff, and the Ecosystem Committee will all contribute to the generation of the "strawman" for public review. A summary of public comments received at the various meetings will be provided and will feed into the FEP.

The Council tentatively envisions that our Atlantic mackerel, squid, and butterfish FMP may be an ideal FMP to examine in terms of an FEP because of the importance of prey/predator relationships with several other FMPS. If this FMP becomes the prototype, then this is where technical and policy questions can be addressed in order to choose policies that result in the greatest benefit to society, consistent with applicable law.

B. Attitudes/Values Survey

In addition to the public meetings developed as part of (A) above, an additional mechanism to gather public input will be a questionnaire or survey. The survey will be widely distributed within the mid-Atlantic area to provide additional opportunities for input (particularly for people not available to participate in public meetings). The survey instrument (to be developed in consultation with NMFS) will allow cross-comparisons among Council areas, public, affected parties, and other categories of interest. The survey will set a baseline from which attitudes and understanding about ecosystem principles can be measured once FEPs are developed and implemented. The Council envisions contracting an outside entity to assist it in the development of such a survey as this type of expertise does not reside within the MAFMC. This entity could possibly be a Sea Grant institution, but all efforts will be made to coordinate this project with NMFS since the cross-comparisons among Council areas are so important.

The project leader will participate on a technical working group to be convened by the NMFS Office of Science and Technology. He will participate in an initial workshop to develop candidate questions applicable to regional and national perspectives relative to the nine issues noted in part A above, and to assure that the survey is administered consistently among the

pilots. Following completion of the regional surveys, an additional workshop will be convened to analyze and develop a final report on survey results.

The MAFMC will assure the survey instrument is widely distributed, advertised and completed by developing lists of interested people, affected parties and others to whom the questionnaire will be sent. The Council may develop an online questionnaire and inform the public and affected parties of the web address if deemed appropriate by the workshop. Upon completion of the survey, the Council will develop a report of the extent of participation, by interest group, and summarize the findings of the survey. Additionally, the Council will make available an electronic database from questionnaire responses to allow comparisons to be made across the four Councils participating in the pilot projects.

It is possible that the questionnaire survey may need to be vetted through OMB/PRA processes for approval. Accordingly, completion of this task will be contingent upon such approval of the survey instrument, should it be required.

The project leader will be responsible for developing and overseeing the distribution of the questionnaire. The contracting entity, the GIS specialist, and the ecosystem contractor will track the geographical distribution of survey respondents and assist the project leader in the preparation of a report on survey participation.

C. Identification of Technical Needs and of Existing Information

The purpose of this task is to identify, compile, and prioritize technical information needs and to consider the types of analyses necessary to support fishery ecosystem plan development and evaluation. This needs assessment will define the likely important ecosystem linkages appropriate for each ecosystems

The identification of needs will specify technical information necessary to evaluate ecosystem interaction effects as given in the background material above and for implementing the eight operational steps for FEPs identified by NMFS in the generic draft statement of work for the pilot projects.

The list of needs will include information necessary to identify bycatch and fishery interactions, predator-prey relationships and competition between and among species, essential fish habitat, HAPC, and the potential impacts of various fishing on the functional values of the identified habitat types.

Additionally, the technical needs assessment will specify the types of ecological and social science data and assessments needed to inform public policy choices consistent with the types of goals identified in parts (A) and (B) above. This needs statement will be designed so it can be used by the Councils, NMFS and various cooperating research entities to develop proposals for research in support of ecosystem approaches and for coordinating research activities. If ongoing studies in various identified priority areas are being conducted, the source of such research and their intended completion dates will be noted.

The project leader will be responsible for working collaboratively with NMFS, the S&S Committee, other governmental organizations, and research and academic institutions to complete this task. The GIS specialist and ecosystem contractor will assist the project leader in working with geographic data and understanding geographically-based data needs including ecological and social science data.

D. Synthesis of Public Input on Ecosystem Goals and Objectives

This task is intended to synthesize the public input identifying ecosystem-based goals and objectives, and the technical needs assessments into a strategy for FEP development. The Council will develop a prioritized list of ecosystem considerations identified through public processes as they relate to ecosystem interactions effects (e.g., predator-prey issues, essential fish habitats and effects of fishing gear, etc.). To address each issue identified, the relevant management authorities (Council and non-council), as well as a corresponding set of technical analyses will be identified. Table 1 of the NMFS draft for these pilot projects (hereby incorporated by reference to this SOW) provides the cross walk among hypothetical ecosystem issues identified, the respective Council and non-council management authorities, the technical requirements necessary to inform the decision making process, and some alternative management outcomes based on the results of technical analyses. The examples provided are for illustration purposes only and do not constitute judgments of the issues likely to be identified in particular regions, the technical requirements or actual management responses in relation to the issues identified. This synthesis will help define the scope of FEPs and the areas of particular emphasis in each region, as well as technical requirements supporting ecosystem-level decision making.

The project leader will work with the Council's Ecosystems Committee to develop the prioritized list of ecosystem considerations identified through public processes and the alternative management responses for Council consideration.

The GIS specialist and ecosystem contractor will assist the project leader in geographic based information needed for the identification of ecosystems goals and objectives.

E. Final Report

The project leader will draft a report that will provide a plan on how the Council might develop FEPs. Contents of the report will include: summaries of the public meetings; results of questionnaire surveys; reports of technical and institutional needs supporting ecosystem approaches; and, the potential for a draft FEP for incorporating the above into Council processes. The GIS specialist and ecosystem contractor will assist the project leader by providing all geographic based information, charts or maps needed for the report. The Ecosystems Committee and the Council will review the final report prior to submission to NMFS.

APPENDIX B.

ECOSYSTEM COMMITTEE MEETING
MEMOS AND MINUTES

APPENDIX B

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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MEMORANDUM

DATE: July 29, 2004

TO: Ecosystem Committee (Witek, Peabody, Kray, Augustine, Simms, Hoopes, and Brown)

FROM: Tom Hoff

SUBJECT: Materials for Ecosystem meeting on August 12

Please find the following 6 items:

- 1) Our Cooperative Agreement Application to NMFS for Ecosystem-based approaches to fishery management (9 pages),
- 2) Slides from Dr. Steve Murawski on the Ecosystem Pilot Projects (9 pages),
- 3) Email from Dr. Murawski on a GIS Workshop of September 8 - 10 (4 pages),
- 4) Announcement of a workshop on social sciences issues for ecosystem projects, September 13 and 14 (1 page),
- 5) Email from Dr. Murawski on ecosystem-based decision tools for fisheries management workshop, September 13 - 17 (9 pages), and
- 6) EFH Regional Steering Committee minutes of June 30 (2 pages).

Look forward to seeing you on August 12.

Ecosystems Committee Meeting Minutes
August 12, 2004
Wyndham Baltimore Inner Harbor

Attendees: Charlie Witek, Michelle Peabody, George Darcy (NERO), Dennis Spitsbergen, Red Munden, Lt. Cmdr. Jeff Randall, Ron Smith, Wilson Laney (USFWS), Jed Brown (USFWS), Gene Kray, Rick Hoopes, Pat Augustine, Larry Simns, Ron Smith, Bruce Freeman. Others: Fran Puskas, Rick Cole, Ricks Savage, Dave Wallace, Jim Ruhle, Scott Doyle (NMFS LE). Staff: Tom Hoff, Dan Furlong Deb Donnangelo, Kathy Collins.

Four tasks to fulfill requirements: Hiring an outside ecosystems expert with GIS capabilities; Hold public meetings, probably 14 (SSC will need to be heavily involved); Attitudes/Values survey; and Identification of technical and existing information with synthesis of public input on goals and objectives.

Hoopes- Survey seems more voluntary than structured.

Hoff- Instrument will be developed by NMFS.

Kray- There has to be some balance between commercial/recreational since the general public won't produce very much.

Furlong- The public is the buffer. They are looking to the Councils to identify the public. Blending together of scientists, fishermen, etc...it's beyond that. Our jurisdiction, EEZ 3-200 miles, different ballgame of fishery management here.

Kray- We have to be careful that we're not biased. Environmental organizations will be impacted and we need their input. Need to make sure their input doesn't overtake all of our goals.

Augustine- One source to look at would be the estuary programs up and down the coast. I agree with Gene. Very heavily oriented towards the environmental groups.

Smith- Not sure that they're contemplating a general canvas. Focus groups might work well in this context.

Hoff- Unquestionably, survey methodology is very sophisticated. We knew we didn't have expertise in staff to do this, which is why we would go to someone like the Sea Grant institute. Secondly, slides from Dr. Steve Murawski on detail from heading up NMFS stock assessment at Woods Hole, beneficial for us to see what he's looking at and projecting.

Reviewed slides from NMFS-- see briefing book, Tab 8. GIS workshops in the fall, Charleston, Panama City, etc...

Kray- What role do you see for us in the public debate sense at these 14 meetings?

Witek- We would be moderators.

Hoff- Ecosystems would meet at all of the Council meetings, no separate meetings. Council members would go out and be the hearing officer at these public meetings.

Freeman- What are we going to add to this?

Hoff- They wanted the public meetings right up front. Maybe once PC, FL workshop comes along, it'll make sense about NMFS, to us didn't make sense unless public had something to comment on. Need to define goals of species management plans. Need to know how to balance some ecosystems issues with our single species management. I can't imagine how this will affect clam fishery. We've made certain that the fishing gear impacts are temporary at minimal....so what else are we affecting here? We don't have bycatch or anything.....how do we manage these specifically in the overall FMP?

Freeman- Most of the public won't have any idea what we're talking about. Public won't make any remarks because they won't know what we're talking about. Seems too expensive for people who don't have a concept of ecosystems management ideas. Wouldn't make considerable sense to people. My opinion of going out to the public is that it will be a big waste of time.

Furlong- A better way to get their input and to provide information, educate the public on the ecosystems issues. Get the people with the technical expertise to look at the whole list, see how they would start out with a plan to educate the public.

Augustine- We had issue about marine protected areas. Had a steering committee deciding what the goals were, then reached out and pulled in 60 or so people, a focus group. Coming out of that, the focus group had an interest in what was going on. Had sub groups and sub committees, each concentrating on a particular fishery. It would seem to me that this would be a good way to go, sub committees or focus groups. We have to start somewhere. The concept is too big and nebulous right now. Need to break it down into focus groups and come up with a threat that makes sense. Where do you start? Seems we have the cart before the horse. I think the message that we put out should be clear. We've identified these areas, will continue to see what the impact is here, etc...

Smith- Talked to Steve about this initiative. Gave presentation to NRCC last meeting. I see this as evolutionary rather than revolutionary. It's a gift horse that the agency has identified this as a high priority project and gave some money to the councils. What is EFH all about? Discussions about specs for SFSBSB and interaction with the various fisheries? We should look at this as the next step beyond single species management. An opportunity to do something different, recognize what we are doing and move ahead, rather than consider as some foreign thing we have to deal with. The public outreach process will be a little simpler. Here's what we're doing, what do we need to do to make things better? I think that'll help them to focus their comments on specific targets rather than general multi-species management initiatives.

Brown- FRP that went out for FY04-will there be another one for FY05?

Hoff- Steve's last slide.....it say's "if" the information is available?

Brown- If it's available, would you inform the council members?

Hoff- Yes. Next, announcements for three workshops: GIS in Charleston, SC on 9/8-9/10; Social Sciences workshop in Panama City, FL on 9/13-9/14; and Ecosystems Workshop in Key Largo, FL, date unavailable in briefing book. Wants to know from committee what you want to see. What types of maps, what is it that will help you and therefore the public, to perceive and communicate to them what we're looking for. You can give me comments now, email me in the next month so I can communicate these at these workshops.

Augustine- A lot of the information is already available to the public. If you think the New England Council and South Atlantic Council already have the tools in place, and its what we need, there has to be things that they've done that we can ask for.

Hoopes- Can we add to the list rather than everyone starting from zero. The other thing is in PA, a challenge is having a base map that everyone can agree on, that's accepted and stable. Challenges that should be avoided at the beginning. If GIS efforts had already occurred on the east coast, perhaps they've occurred on the base map. If not, this should be addressed first.

Wilson Laney- Regarding the speaker from the nature conserve-they got funding from the EPA for regional assessments. The group for South Atlantic is from Duke University. That information is beneficial to the Council and I will provide you the contact information to reach someone about that information. Also, definitely the Estuary service. They usually have GIS people in their offices, and they're good at putting together information and are good at assembling that information. Have a national database that will be useful to us. Tremendous amount of information already out there.

With regard to base maps, I know there's been an effort to coordinate all of the GIS programs and make sure everyone is talking the same language and using the same programs. Fish and Wildlife maps are now housed within the US government. Wanted you to be aware that this is available. I'll be happy to help you get the information that's out there.

Kray- Another aspect to consider is artificial reefs. Off of New Jersey and Delaware. These are things that have to be included in any marine habitat consideration. These are usually under federal law. There are deep-water reefs that go farther out.

Freeman- Seems that there's some basic information that can be well communicated. Probably should use a larger scale presentation and break it down, use as much detail as possible. Can always make it smaller if need be. Just as a start, this is absolutely necessary.

Smith- Lot of good points raised, but need to stay focused on a few certain goals and achieve that first. Need to stay focused or we'll just be treading water and not making appreciable strides. Seems like every organization has a finger in this pie, and coordination seems to be the key. Not necessarily for primary or secondary research--everybody's collecting information but no one's putting it together.

Furlong- Need to identify the players first, then can get the information needed.

Hoff- Workshop in Panama City, we will be sending Jose Montanez and Shannon Lyons, a Duke graduate. If there's one survey instrument for the whole coast, this is it. We can have input, but don't want it to be like MRFSS. This workshop should be involved inlaying these issues out.

Furlong- I got email first, called Murawski and let him know that Tom Hoff should be attending this meeting. Sometimes you don't have the total picture. Of the three workshops coming up, I think the one in Charleston would be the best for committee members. The others are more staff oriented.

Hoff- (reviewed handout)

Smith- There might be controversy-- in species, its not overfished or overfishing not occurring. In ecosystems, its only considered not overfished. This might cause conflict with Councils.

Freeman- In Pew Commission report, it talks about ocean environment, fisheries being one of many mentioned. Right now, the policy is to dredge sand from offshore because it is stable. We're talking about thousands of acres of sand bottom, and they're talking about taking a foot and putting it on the beach. It's not an issue, yet I would submit that it's probably extremely important in controlling fisheries. It's of tremendous consequence.

Brown- Regarding Pew press release. They tended to spin the forum as bigger than it really was, but the article was very good.

Laney- Sand is not sand. Its breeding ground. Fish go where they're used to a certain microhabitat. If you move the sand, the fish won't go somewhere else, they'll go back to what it is that they know.

Furlong- The complexity of moving from single species to ecosystems based management is a daunting task. Regarding this Pew report, what you see is what they want you to see...they own the media. Single species approach is simpler, but this is more interesting.

Hoff- Final piece to discuss is the northeast region steering committee meeting minutes. Needed to design a workshop to redefine our EFH designations in 1996. Forced to create EFH, used trawl survey information. Of all of our resources that were overfished, we identified that as essential fish habitat. Wanted a workshop on the non-fishing related threats to habitat. We will deal with beach replenishment and power plant generation, etc... Even though we can't control it, we can try to make an impact.

Adjourned at 9:25.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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MEMORANDUM

DATE: September 22, 2004

TO: Ecosystem Committee

FROM: Tom Hoff

SUBJECT: Materials for Ecosystem meeting on October 4.

Please find the following 4 sets of materials:

- 1) Agenda for Workshop on GIS Tools Supporting Ecosystem Approaches to Management,
- 2) Presentation Abstracts for the GIS workshop,
- 3) My presentation for the workshop on the management needs of the MAFMC, and
- 4) Consensus Statement on Integrating Marine Reserve Science and Fisheries Management

Please note that the two other ecosystem workshops that were to be held in Florida the week of September 12 were cancelled due to Hurricane Ivan.

We will be fortunate to have Dr. Steve Murawski (NEFSC, but who is on detail to the Office of Science and Technology) attend our Committee meeting. Steve is spearheading NMFS' ecosystem efforts. Steve was one of the two principal organizers of the GIS workshop and was the main organizer of the postponed Key Largo meeting on the ecosystem-based decision tools for fisheries management. He was also a significant contributor to the California conference on marine reserves (item 4). The majority of the meeting will be interacting with Steve on where he envisions NMFS' ecosystem efforts heading in the next fiscal year and beyond if monies are available. Please give some thought to the types of questions we raised in our first meeting last month and be prepared to "ask the expert". See you on Monday October 4.

Ecosystem Committee
October 4, 2004

In Attendance: Tom Hoff, Steve Murawski, Shannon Lyons, Charles Witek, Dave Wallace, Jose Montanez, Michelle Peabody, Gene Kray, Larry Simms, Ricks Savage, Bob Pride, Phil Ruhle, Dan Furlong, Deb Donnangelo.

Meeting

Charles Witek: We will begin the meeting, welcome everyone to the second meeting of the committee. Tom Hoff will make some introductory remarks, workshop postponed as result of hurricane in Florida, Greg.

Tom Hoff: As Charles mentioned when you look at the agenda for this meeting you see three workshops were to occur in September, only one occurred in Charleston on GIS. The other two were cancelled, the social science workshop has been moved to Nov30-Dec 1 in Miami. We will be creating a survey instrument on ecosystem mgmt. The second meeting will be held in January or February. There are four sets of material in the briefing books, the first deals with the agenda from the GIS workshop, the second is the abstracts from the GIS workshop. We are lucky to have Steve Murawski with us from the NMFS center, he is spearheading GIS efforts towards ecosystem mgmt. Let me back up, Steve was one of 7 people who took expert testimony and created report on marine reserves. Kray mentioned that consensus was available, something this committee should be thinking about. We are not endorsing necessarily but this is a tool that we should have. We can discuss questions for attachments, but if you may also bring up questions during Steve's presentation. We will turn the meeting over to Steve.

Steve Murawski: I would like this to be as informal as possible, let's have a conversation, ask questions. I would like to present background information and give you an update on where ecosystems are going and how this pilot program fits into the larger context, where the agency is on ecosystems. Ecosystems generating interest from White House and other groups as we reconsider the Magnuson Act. These issues are high on people's agendas. Many things in fishery management are already ecosystem based but have not been pitched that way. FMP development is on the right path and Magnuson redefinitions are bringing the disparities together. The ten national standards dictate what we are going to do, but many already ecosystem based: EFH. Draw these things in to natural ecosystem context.

I am in charge of stock assessment group in Woods Hole, but I have been pulling the ecosystem program together in the last few months.

Presentation (copy on file with MAFMC)

Definitions, narrow range of things we are discussing, subset of "E" ecosystems issue

Update of pilot project

Schedule of meetings and workshops

New Issues: guidelines for ecosystem plans, integrated ecosystem assessment, ecosystem issue in NOAA.

We want to start a dialogue with the Councils and take the discussion out of NOAA.

Integrated ecosystems assessments: What is needed in an ecosystem assessment? Area of active research and consideration worldwide. Defining aspects of an integrated ecosystem assessment.

NOAA changing administrative vision. Ecosystems issues in NOAA are 1.2 billion dollars per year.

NOAA policy-definition of an ecosystem approach to management: Adaptive, regionally directed, takes account of ecosystem knowledge, takes account of uncertainty, considers multiple external influences, strives to balance diverse societal objectives. NOAA had a workshop on regional definitions in Charleston one month ago. The two most important aspects are that it looks at multiple external influences. Fish stock measures vary from natural causes, not just from fishing. Scup example: try to balance diverse societal objectives. Instead of FMPs enclaves onto themselves, look at the larger societal context.

Jose Montanez: I have a question, obviously this will be incorporated into the guidelines. In many cases guidelines restrict our ability to complete the job. For example, social impact analyses, if you do not talk about every impacted community you are subject to criticism. The guidelines are well intended, but the people writing the guidelines need to understand it, they are tying our hands.

Steve Murawski: Tackling ecosystems is another level of complexity, we are trying to develop more info, but we do not have all the info, so we need to choose between punting and making some progress. We cannot wait around forever for data that may or may not appear.

Pat Augustine: We may end up with paralysis by analysis. I know how dedicated you are, Steve, and intuitive. But it seems like there is so much in this document that it scares me. How do we scope all of this national emphasis without losing sight of what we are trying to accomplish. You said we are doing a lot of this right now but we are criticized for not doing it. Maybe what we are putting out needs to be revisited and highlighted for what Councils have already done from an ecosystems point of view.

Steve Murawski: We do not want to further complicate the situation.

Gene Kray: I am a practical person. When we get down to an ecosystem approach to management, how do we fold in what we are doing now on a fish by fish basis? Do we take the best parts of what we have already done and fold them in? The definitions are not specific enough. We need to compartmentalize.

Steve Murawski: This slide is a process slide, not necessarily what we are doing now. We need to start looking at tradeoffs. It will probably lay out with a cornerstone of are we harvesting stocks at proper levels given life histories? Based on growth and mortality. More subtle things will be what are population sizes given predator/prey relationships. Not transparent now that those tradeoffs are being made.

Gene Kray: Some of the methodology of setting annual specs may be one of the tradeoffs. May have to go by the wayside.

Steve Murawski: Basic methods for counting fish will stay the same. Harvest rates will stay mostly the same. Population size goals will change, bycatch management will change in terms of one fishery versus another fishery. What is in the best interest of the society in terms of stock stability, economic yield, etc. In terms of natural variation in ecosystem, and long term changes (climate), how are these playing through in policy? Surfclams for example, southern range is moving northward and this has practical implications for the policy that you are setting. There are many people who want to manage all parts of ecosystem, but probably cannot.

Jose Montanez: In some cases I see ecosystem-based management and others ecosystem management. These mean different things. Incorporating temperature, pH, etc are ecosystem management.

Steve Murawski: I think it is the other way around, incorporating those factors creates better informed policy. People are talking about ecosystem approaches to fishery management. Abbreviation EAF: Ecosystem approaches to fisheries.

Basic element of an ecosystem is defining a marine ecosystem and determining how they will be delineated (definitions in presentation). Eight Councils have rough ecosystem jurisdictions...there are no water boundaries between these Councils, just state boundaries. Setting boundaries between NE/MA would be disastrous, the trick is delineating these areas in terms of units that make sense. Some of the definitions that NOAA is using now (in presentation). Environment comprises physical, chemical, biological and social elements. Relationship between Mid-Atlantic and New-England is classic in terms of how we define ecosystems. Cape Cod is a natural area where cold and warm stocks separate. Meeting in Charleston said ecosystems should be based on biogeographic systems. Depending on the problem we can have either a wide or narrow geographic scale. Some problems have a very small scale and should be managed as such. In a sense, closed areas are mini-ecosystems. The environmental community sees benefits of these areas for the environment and this may or may not be true. It is a matter of scale.

NOAA views the approach for implementation as a gradual process, start by reducing elements and have a long-term approach.

Dave Wallace: Is there an idea of the timeframe?

Steve Murawski: Will depend on how rewriting the Magnuson Act develops. Taking a look at draft ecosystem plan guidelines will happen faster than other parts.

Dave Wallace: Both Ricks and I attended the hearing where you testified regarding ecosystem management. Gilchrest asked a question about how much money needs to be spent. You and Dr. Hogarth skated around the question and did not answer. Congressman Frank was asked about restoring 400 million that the House has cut out of NMFS budget and what the chances of it being restored were and he said zero. I am sure Senator Stevens has a different idea. My next question to you, Steve, is can we really start thinking about this big term without contracting out or hiring additional people to gather data so that we have a better understanding of how it all fits? We take a risk if we try to push it beyond the knowledge we already have. I know environmentalists think we have enough information but how can you have it both ways?

Steve Murawski: On the budget question, I have been sitting on a new long-term budgeting commission for ecosystem management and we have a team looking at the cost. It is a big bill for a number of reasons. We would like to get a bottom type map, side scan sonar of the EEZ is a huge cost. If we want to manage a lot of the questions we already have, bottom trawl impacts on EFH, we need the data to answer these questions quickly. In terms of the number, it has been estimated that it would cost 2 billion dollars to do that in the EEZ. We are not going to get that. We projected 30 million dollars over ten years to do the high priority. Will we get it? We are not sure, but those are the numbers we are dealing with to do the job right. If we adopt this ecosystem philosophy we will start where we are and add on issues considered high priority. We do not have a blank check so we have to work in steps.

Dave Wallace: The Councils could be put in a position with unfunded mandates.

Steve Murawski: Debate over reworking ecosystems if you rewrite Magnuson. Practical to address ecosystem that supports fisheries and fix those issues first. Hopefully this is how the process will work.

Gene Kray: We are going to fold these things in incrementally. When will we know when we have an ecosystem based management program?

Steve Murawski: There is not magic level where all of a sudden you are at an ecosystem plan. We are managing fisheries this way in many situations. We have done comprehensive looks at fisheries and there are other things we can look at and improve the ones we have. Predator-prey issues are an example. The MSY goal of Magnuson changed management, prior we were just trying to prevent over-fishing.

Pat Augustine: When we address MSY and had to address some many issues before now we have ecosystems and it is a monster and it is not going away.

Tom: Will you discuss the existing governance institutions and their relationships with the Councils?

Steve Murawski: Maybe I will wait until I get to the slide.

Dave Wallace: The new strategic plan has been released for NOAA and its first objective is to understand ecosystem management. Even if Congress does not do anything about it NOAA will push it. You are the front person for the Administration on this issue, so will it be pushed as hard as it can? How hard will you work at implementing this strategic plan and in what timeframe?

Steve Murawski: Unless there is a regime change this is how the policy will be implemented. Many agencies are collecting the same data for different purposes, so part of this is good housekeeping. As corporate policy this is how it will be. In terms of fisheries management, it is a law. Part of it does imply ecosystems but trading fisheries requires changing the law. There are many things in flux right now. It is very active in terms of sorting through all the bills.

Jose Montanez: Have you seen any other initiative such as this in any other parts of the world?

Steve Murawski: Yes. ISES, what is an integrated ecosystem assessment. We are farther along in the legislation than other countries. We are talking about minor changes to the blueprint. In most cases we are dealing with just one nation, but dealing with the common fisheries policy in Europe leads to big allocation issues that we do not have.

(Back to slideshow)

Bycatch in fishery interactions, indirect effects of harvesting, and interactions between biological and physical components of ecosystems are the main ecosystems issues relevant to fisheries management.

Fishery Management Councils do not have the authority to deal with a lot of habitat related issues of coastal development, nutrients, toxic waste. The Magnuson Act is not going to give authority over coastal development. These ecosystem pilot projects will address non-fishery concerns in fishery issues and management, propose that we consider these issues in a coordinated way. Army Corps projects in Mid-Atlantic are important in this aspect.

Spatial management is usually considered a cornerstone of EAF.

We are doing a lot of spatial management: seasonal and year-round closures, 22,000km².

Probably the most extreme example world-wide. Spatial data collected from groundfish VMS trawling vessels. The VMS unit records every hour but can infer direction and speed from VMS points. Find that 96% of time vessels traveling less than 3 knots. When managing impacts on habitat type, we can underlie this data and see how areas would be affected.

Pat Augustine: The general public screaming for marine protected areas need to see this slide and see that we are the leaders in closures and protected areas.

Steve Murawski: We found that the 4 km around the closed areas, the average dollars per hour fished is twice as high. The fishers are targeting species coming out of the closed areas. These data allow us to look at spatial effects of fisheries. We can answer specific questions with this information. We now have better data on where fishermen are than data on the habitats we are working on. Habitat type information is very sparse relative to fisher location data. We need a better habitat map and an ecosystem approach will highlight these data gaps.

Simms: It may be that areas closed were near there best places and it may be misleading to the public because fishermen just trying to stay close to best places.

Steve Murawski: This is true.

Dave Wallace: That is exactly what the environmental community is using for justifying massive MPAs.

Steve Murawski: We have a movie of this (shows movie). This is the monthly VMS data that incorporates rolling closures. Can start to see where the fisheries develop in response to the closures. The Nantucket lightship area is not a particularly good conservation tool. The groundfish effort is around the edges.

But, this is a tangent, I will return to the point that much of the data we have in place in informative for spatial management and we can see what data are missing and what spatial work needs to be done. It is not necessarily more burden on fishermen to produce the data.

?: As of this year your VMS has tripled, we need a question for your report about bottom topography.

Steve Murawski: Issue of resolution with bottom type.

The other big issue in ecosystems that I would like to address is predator-prey relationships. Can you get them all moving in one direction? Need to be adaptive, see what harvest rates are and what the stocks will do. Harvest biomass goal for haddock: even if this year class is moderate we will be 50% over baseline by 2006. Will tell us how productive the stock will be. We have some experiments and ability to be adaptive. Better than models with insufficient data. Herring, mackerel, zooplankton all going up in productivity, seems counter-intuitive. But, could be another factor in productivity. These are heavily schooling fish and it may be that local changes in growth rates are resulting from zooplankton in the system.

Pat Augustine: Will we have a coastal FMP on zooplankton?

Steve Murawski: Well, why not move it down the system to phytoplankton? Not the issue of can we have another FMP but rather here is this issue and how many FMPs does it already cut across?

Pat Augustine: Who will be in charge of the balancing act and rebuilding stocks on a timeframe? This will be an interesting challenge to see who ends up at the top of the food chain.

Phil Ruhle: We will find out that phytoplankton being suppressed by pollution.

Steve Murawski: Consideration of Ocean Councils that can address these issues in a larger sense. (return to slideshow). This is not just a Northeast/Mid-Atlantic issues. A classic issue is the Bering Sea and Aleutian groundfish fishery. The total biomass is 20 million metric tons, segregated by species. In terms of TAC setting, 2 million metric ton cap has been overlaid on top. Leave a big margin for error because we do not understand how fisheries are inter-related. The result is 55% of uncut quota which is an ecosystem issue for them, and the North-Pacific Council sees this as an ecosystem hedge. This could be a way over conservative measure, not a lot of science involved in this TAC. Using this precautionary measure in terms of uncertainty is how northeast will have to address management as well.

Fisheries Ecosystem Pilot Projects: Congress allocated \$2 million to NOAA for four regional ecosystem management pilot projects (NE, M-A, SA, Gulf). Pilots cover contiguous bodies of water to measure influences between them.

Spending plan for first year was to spend half the funds directly to the Councils. Look at how ecosystem considerations may enhance regional governance structures. Then conduct technical workshops, and develop quantitative decision support tools (GIS, models).

We need a broader discussion with user groups in terms of what they want, what they see, and what NOAA can do. Attitudes and opinions survey important but also need to address larger society. Larger segments of society involved in Ocean Commissions Report demonstrate this need.

Jose Montanez: One issue I have in terms of the survey: I am concerned about how the survey will be developed. Initially there will be a small group of individuals with names generated from NOAA's database. Perhaps you can talk to Kristy Wallamo. This is a very select group of people and I think this is backwards.

Steve Murawski: I agree we should agree on the approach.

Pat Augustine: You may want to consider a group on your advisory panel.

Steve Murawski: We need to agree on a common strategy. We need to touch on two aspects: we have Councils from North to South so we can ask a series of common questions and determine if there are regional differences and we can also ask questions targeting to specific regions. We can determine what is unique and what is common geographically. Societal interest high but public education is low. At some point you can look at outreach and retest questions and determine the impact. That is unique. Usually we run these programs after the fact. A unique opportunity for social scientists to get in on the ground floor here.

Gene Kray: Going back to Jose's comment, you can use an informed group as far as what the right answers should be versus the public response.

Pat Augustine: What is the timeline on the survey?

Steve Murawski: We have a workshop schedule for Nov 30-Dec2, 2004 in Miami to design the social survey instrument. It may be worth having the Councils involve their social scientists. The South-Atlantic Council has impressed the value in having the committees and Councils involved working together. If we get FY05 money we need to know how we are going to spend it. Money came in May and had to be spent by September. If this is longer term we need to function as a larger group, some coordination among Council staffs could be useful. We have enough money to cover us through December 2005 so we do not need to make any decisions at this moment, but what would be

do with another quarter million dollars? How would we augment what we have? Maybe this is an issue we can bring up at Hogarth's meeting in Baltimore.

We will have the Decision Support Tool Workshop meeting in January or February, it is primarily a science needs assessment to support EAF. What constitutes an Integrated Ecosystem Assessment? Australians have done a great job of this and they are invited to the workshop. Incorporating tropic balance, temperature records...indices of performance can be used in an integrated ecosystem assessment. Canadians doing a good job of overlaying physical elements and North Pacific Council beginning this in quota setting. This committee could probably discuss this as an agenda item at a later date. What would Council like to see in terms of ecosystem performance over and above the stock assessment information. We had a GIS workshop as well, this is a good template for putting out the information that we have.

Gene Kray: Wouldn't we have to produce a product to show progress with FY05 money?

Steve Murawski: In some ways these projects that we have on board already show this, survey workshop, decision support workshop, public meetings...there are many options. If we start delivering these reports this will show the progress.

Dan Furlong: I came in late but I want to thank Steve for being here. He is going to be the new head in Silver Spring. You have unique insights for our Committee about how this ecosystems based management has evolved.

Steve Murawski: This has been the best round table dialogue that we have had. We have some big picture issues here to deal with. Much is happening right now in terms of working with Gilchrest and his staff and it is very uncertain about what will happen in that process. We do not want to be saddled with mandates that cancel one another.

Dave Wallace: Or a whole bunch of mandates without funding which is what I am afraid of.

Tom Hoff: You and I have talked about our S and S committee, but we do have a very diverse S and S committee, that survey when we originally wrote the grant we envisioned using that S and S committee to help us develop that survey. Would it be beneficial to use that committee as a pretest? Or would it be appropriate to take it to that committee for review?

Steve Murawski: There are two levels here, what is best for the Mid-Atlantic Council and what is best for the Council may not be best for the survey.

Jose Montanez: The purpose of that survey, the objectives, is to create guidelines. If you are developing a survey for a specific group of people interested in addressing fishery issues, and then use the same survey about what they know nationwide, it seems that you should not use the same survey. This does not sound logical. That is why I want to bring up the issues.

Steve Murawski: The workshops will be targeted towards stakeholder groups, perhaps use your S and S committee to generate that information. I recommend we use the social science expertise in the region to work on the

Charles Witek: There are still a few other issues we may want to go over, Tom will you cover GIS?

Tom Hoff: Steve talked a bit about it, I did a presentation that was two parts where I tried to communicate with the GIS experts at the table about our fishery management, limited access quotas, allocation issues...but then I tried to address ecological issues with FMPs. The focus of an ecosystem plan is an umbrella supporting different issues. We see a fishery ecosystem plan similar to our NEPA requirements to evaluate cumulative impacts. First, there are targeted species, we are the poster child for single species FMPs. But we are also dealing with bycatch, habitat, protected resources, and socioeconomics. The SA Council said that we need to include humans in management. Humans will be involved in any type of ecosystem management we create. The second set of big issues was that single species management does work, we have effective management, but we are not taking credit for it in terms of an ecosystem. We probably have to continue ecosystems management but throw in enough information that it is moving towards ecosystems. Evolutionary versus revolutionary approach is likely. The last part is that we are concerned with paralysis, another layer of information similar to EFH that involves a strict timeframe. Ecosystem management cannot be implemented in a 2-3 year period. This is what I communicated at the meeting. There is a website that is being developed and tentatively Keith Bickers at NMFS HQ Habitat Assessment Group is compiling data to be stored in a GIS format. NMFS is already doing this and it is a matter of figuring out who is doing what. There needs to be a GIS map of who is doing GIS work. It was a good meeting in terms of people communicating well, the Mid-Atlantic Council is really in the stone-age with GIS. However, our needs and requests are echoed by other parties, for example the South-Atlantic Council and the New-England Council although information varies by Council. The only other thing in the briefing packet is a consensus statement on Marine Reserves. Steve had never been able to publish or serve on a panel on Marine Reserves. The seven people that provided these objective statements were from U. Maryland, Oregon, Miami, and Cornell. It was a good consensus statement and the introduction is impressive in terms of how they came to the consensus.

Steve Murawski: In California there is a push to establish Marine Reserves, they wanted people to look objectively at how it can be done and that is the context and background behind this.

Tom Hoff: The conclusions: it can be useful as a tool and it is a management unit by unit decision. Additionally, the goals and objectives of ecosystems may be slightly different as a result of ecosystem management.

Pat Augustine: But will it be consistent with all of the Councils? I assume this is a statement that pushes us into a mold? It sounds like a billion dollars.

Tom Hoff: Remember what Steve said, NOAA has been reorganized into 4 groups and the Ecosystems group has 1.2 billion dollars annually.

Steve Murawski: We are trying to think it through and be involved in a public process so that it is not done poorly.

Dan Furlong: I think you have to look at the authorities in our jurisdiction. We have one square mile of marine sanctuary off the coast of North Carolina. That comes from the MS program. The reauthorized Magnuson Act created EFH, the Councils are required to describe EFH and address impacts as a result of fishing so we can close areas. We have the executive order on Marine Protected Areas...Clinton established and Bush ratified it. In California you have marine reserves and coral legislation that protect different areas. Bottom line is that EFH, MPAs, reserves, areas of the bottom are closed off from activities. For instance in the Florida Keys sanctuary the bottom is closed but you can still trawl. These are management tools that allow us to address what we are charged to do. Single species management has been working, we are rebuilding, we are up 80%,

stocks are not overfished. This whole ecosystems area is a great opportunity to come into areas with good funding and fit our programs into this area and go forward hand in hand with this new thrust. I do not know anything about GIS and there is a lot of information, what we need to do is coordinate. Council members should get involved in these meetings to find out what is available. Someone has conducted a fish abundance survey from Canada to Florida and you can get this for over ten years. If you overlay effort on top of that abundance GIS then you get an idea of where the fishing is going on, can determine habitat and determine what measure need to be done to protect the habitat.

Tom Hoff: I will expand on Dan's point. No matter what you call these parcels, MPAs, reserves, etc, they are management measures and zoning issues. There are pros and cons.

Bob Pride: There is one large and powerful contingent with stated goals and what they are looking for is a mechanism to force closed areas. That is what is going on politically.

Dave Wallace: They are the first ones to say we already know enough to do it.

Bob Pride: They just want to make it the National Park system in the water.

Tom Hoff: I was impressed by the California system because they looked at it from a situation specific perspective.

Bob Pride: I think the indulgent approach from time closures has been what makes sense from a management perspective.

Terrestrial parks have a non-consumptive value to society because people can go and look at them. No one is going to pay the price to look at closed areas on Georges Bank so people are relying on spillover effects, relying on benefits from closing fishery areas. We see big benefits from closed area 1 in the channel because we have revived a spawning area, but the net benefits to Southern New England yellowtail are very low. It has not been very successful.

Charles Witek: Anybody else? Any other issues? Thank you. (Meeting closed, 5:17pm)

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MEMORANDUM

DATE: November 24, 2004

TO: Ecosystem Committee (Witek, Kray, Peabody, Augustine, Simms, Hoopes, Freeman, Bogan, Randall, O'Shea, Brown) Chiarella, Bickers, and Buja

FROM: Tom Hoff

SUBJECT: Committee meeting agenda for December 7, 2004

The Ecosystem Committee will meet at the Council meeting in Claymont, DE from 3 to 5 PM on December 7. There are two main items for this meeting. The first item will be a joint presentation by Keith Bickers of NMFS Headquarters and Ken Buja from NOS also in Silver Spring, addressing the status of GIS capabilities and its applications for fisheries management. Keith and Ken both participated in the September GIS Ecosystem Workshop in Charleston, that Dan and I attended, and this is a follow-up from that meeting where these experts will address the usefulness of the GIS tools, describe the various data layers/sets that already exist, and demonstrate how geographic type information could benefit our Committee as it moves towards ecosystem based management.

The second major item for the meeting will be a discussion of the social science issues and ecosystem management workshop that Jose Montanez, Shannon Lyons, and I will be attending next week. I am optimistic that a draft socioeconomic survey will be available after that meeting and I would like to solicit the Committee's input on this questionnaire.

Keith and Ken did not have their presentation completed in time for this mail-out, but they will provide me with their slides prior to the meeting, and thus you will have hard copies at the meeting. Attached is the social science issues and ecosystem management workshop agenda. I have also attached an ASMFC news release on the Menhaden's Board charging its Technical Committee to address the feasibility of incorporating and ecosystem-based management approaches into the menhaden plan (FYI). I will be in the office on Friday December 3 and Monday December 6 should you have any questions. Hope everyone had a good Thanksgiving.

Ecosystems Committee
Holiday Inn Select, Wilmington, DE
December 7, 2004

Meeting convened at 3:20 p.m.

Mr. Witek-- Introductions of Presentation "**Ecosystems Management & The Role of GIS.**" Presentation by Keith Bickers and Ken Buja of NOAA. (Power Point) See handout.

Mr. Smith-- Will there be someone on Council staff to work with Keith and Ken so that staff can do the inquiries without having to bother NOAA all the time?

Dr. Hoff-- With Shannon and Jessica, both have GIS knowledge, also Jim Armstrong, and Jim's been working with Rich on squid issues. We have expertise on staff that three months ago we didn't have. Would like to get entire staff basic knowledge of GIS. There are training courses to be taken on the subject. I think that staff should have a basic knowledge of GIS, maybe Shannon and Jessica and Jim should now have intermediate knowledge. We haven't worked out any of the details yet.

Mr. Spitsbergen-- Question on gulf shrimp. Just based on relationships rather than specific field data?

Mr. Bickers/NOAA- Yes, that information was gathered from experts with knowledge on the species itself. We didn't get information on sediment for that part of the country. Not how it responds to any other input.

Mr. Buja/NOAA-- Can't make a map based on only one piece of information, but it gives you an idea or a potential.

Mr. Ruhle-- GIS questions.

Mr. Buja-- We have a high level of confidence in this data set.

Ms. Puskas-- If we request specific information, how quickly can you respond? In looking at a portion of an estuary, if we ask for general overall information, how quickly could you respond?

Mr. Bickers-- Depends on what information you're looking for. Lots of ground work to get the information into our offices, then able to make maps.

Mr. Freeman-- Regarding Summer Flounder model in DE...seems you'd need to put a number of species on this model to get a good indication of where these areas could be dredged.

Mr. Buja-- Can compile data on different species and overlay them to see if any hotspots jump out at you. Didn't take into account pollution, etc... Can use this model for habitat restoration. Recently completed biogeographic analyses around the SF Bay area also. My visit here is also tied to an upcoming project called Eco-GIS, which creates tools that allow different groups to do some of their own analysis.

Mr. Bickers-- This is just an overview, so keep that in mind, just touching on certain areas. Would like to present again regarding Ecosystems-Based Management.

Mr. Ruhle-- Can we get names/address/emails for these gentlemen?

Mr. Witek-- Second presentation, "**NOAA Fisheries Social Science and Ecosystem Management Workshop**," Kristy Wallmo/NOAA. (Power Point) See handout.

Mr. Freeman-- Everyone has their own definition of Ecosystems....apparent here this is an issue dealt with at this workshop...so what definition was used at this workshop?

Ms. Wallmo-- Difficult to answer, because as you said, many different definitions. NOAA is currently developing guidelines that should be out shortly.

Mr. Hoopes-- In the sampling frame, you mentioned a few problematic groups of interest. How is that going to be accomplished for non-government organizations, recreational fishermen, scientific organizations, etc...

Ms. Wallmo-- NOAA maintains a list of stakeholders...they have been classified as commercial and recreational fishermen, among another group of stakeholders. Haven't figured out yet how we will get information from these non-government agencies. Post as well as pre-stratify based on their characteristics.

Mr. Hoopes-- What's the time frame for implementation.

Ms. Wallmo-- We hope to get this to OMB in January, early January. At that point, if lucky, could get a survey instrument in as little as about six weeks, but I'm hopeful for 2-3 months. Please take a few minutes to review the survey.

Mr. Smith-- A survey about a survey...when should we hand it in...

Mr. Witek-- Give to Tom by tomorrow at lunch.

Mr. Smith-- We don't have many species that are overfished...or its not occurring. I'm not in statistical design, so I'd have to defer to an expert to quantify the results.

Ms. Wallmo-- These will go in front of focus groups before the final instrument is sent out, i.e. wording, etc... I need to know if you think this will be useful as to what people already know about the status of fish stocks...

Mr. Smith-- I think we already have a good feeling of what the people know. We all have a different view...maybe we need one from the general public also.

Ms. Wallmo-- Right, and this is a good measure to get that quantified...maybe that's true. Statistically we know that, but we're not sure we do.

Mr. Augustine-- Somewhere in this package, maybe there should be a check block for "what am I?" For the variety of people who will fill this out, maybe want one for the species specific for the MAFMC. Would bring into a more finite group.

Ms. Wallmo-- There will be a more standard demographic section that's just not included in this draft.

Dr. Hoff-- There is a portion that should be generic for all Councils....

Dr. Kray-- When we look at the data, we have to be able to break that out into groups, comm'l, recreational, etc...

Ms. Wallmo-- We'll certainly be able to do that. Getting specific to regions is a great idea. I appreciate all of the suggestions.

Mr. Smith-- Some information is too broad...need to be more specific in order to get useful information.

Ms. Wallmo-- That's good feedback, thanks. Please write down any suggestions and give them to me.

Mr. Simms-- I think the GP will have a problem answering page 2 regarding EFH. Most comm'l fishermen will think you're just trying to manage their gear.

Ms. Wallmo-- This wouldn't be a GP survey, informed stakeholders only. Second, this is something we'd take to research focus groups and find out how we can translate into language that uninformed stakeholders can relate to.

Mr. Simms-- Does this EFH include pollutants or lack of pollutants?

Ms. Wallmo-- I think you need to talk about management of fish habitat and what's going to be managed-fishing gear, pollutants, etc... Needs to be more clear, because that will change the way you answer the question.

Mr. O'Shea-- Calibration where the respondent is informationally and where they're coming from philosophically....i.e. management, commercial, etc... Perceptions have changed because we're educating better or because we've changed the measures of the management system? Will need to qualify the knowledge level of the stakeholders.

Ms. Wallmo-- Please include what you feel you'd need to.

Mr. O'Shea-- But how would we judge their understanding of the concepts?

Ms. Wallmo-- Scales of their understanding have already been developed.

Dr. Hoff- Three issues, I'll be back tomorrow at lunch to collect the surveys. These are for individuals, should not be discussed and submitted with group answers. Second, I have one more handout about large marine systems, tech memorandum, good document. Copies don't have figures and tables, but I'll be requesting the actual docs from Woods Hole. Third, hospitality is in Room 525. Please join us.

Meeting adjourned 5:05.

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MEMORANDUM

DATE: January 6, 2005

TO: Ecosystem Committee (Witek, Kray, Peabody, Augustine, Simms, Hoopes, Freeman, Bogan, Randall, O'Shea, Brown) Chiarella, Fogarty, Locandro

FROM: Tom Hoff

SUBJECT: Committee meeting agenda for January 20, 2005

The Ecosystem Committee will meet at the Council meeting in Hampton, VA from 8 to 10 AM on January 20. There are two main items for this meeting. The first item will be a presentation by Dr. Michael Fogarty of the Northeast Fisheries Science Center. Mike has worked at Woods Hole, with a brief hiatus into the mid-Atlantic with the University of Maryland, for the vast majority of the past 25 years. In the 1980s he worked on several of the stock assessments for our managed species (i.e. summer flounder) and is now the Project Director for Ecosystem Based Fisheries Management. Behind this memo is the *Ecosystem-Based Fishery Management* report to Congress that Mike believes will be helpful in laying out several of the basic principles. He would like to give us a sense of the information that the NEFSC can provide in order to aid in the decision-making process and in shaping the evolution of ecosystem-based approaches from a broad concept to specific objectives and strategies for management.

Our second speaker will be Dr. Roger Locandro, formerly of Rutgers University. Roger, as many of you will remember, is a three time appointed MAFMC member. He has served on just about every Committee but I always fondly remember his efforts as Chairman of the former Habitat Committee. The Council Chairman asked Roger to review our Council's previous efforts involving ecosystem management.

A third topic, that I will address briefly, will be the MAFAC meeting that will occur next week where Vice Admiral Lautenbacher and Dr. Hogarth will be discussing with all the Councils NOAA's efforts on ecosystem-approach to management. The Council Chairman, Executive Director, and I will be attending those meetings.

I look forward to seeing you all in two weeks. I will be in the office on January 18th should you have any questions.

MAFMC January 2005 Council Meeting
January 20, 2005
Radisson Hampton Inn, Hampton, VA
Meeting Minutes

Ecosystems Committee Meeting:

Tom Hoff, Charlie Witek, Dr. Roger Locandro, Dr. Mike Fogarty, George Darcy, Laurie Nolan, Dennis Spitsbergen, Jim Ruhle, Michelle Peabody, Ron Smith, Lt Cmdr Randall, John Boreman, Jim Weinberg, Pat Augustine, Dr. Gene Kray, Vince O'Shea, Fran Puskas, Larry Simns, Bruce Freeman, Rick Cole, Shannon Lyons

-Presentation by Dr. Mike Fogarty, NEFSC, regarding ecosystems based management.

-Presentation by Dr. Roger Locandro, Rutgers University, about what Council has done (or not done) regarding Ecosystems management in the past.

Meeting adjourned 10:25.

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MEMORANDUM

DATE: March 2, 2005

TO: Ecosystem Committee

FROM: Tom Hoff

SUBJECT: Background information for Committee meeting on Ides of March

We will be meeting from 1 to 3 PM on Tuesday at the Council meeting. The first half of the meeting will consist of a presentation by Derek Orner of NOAA's Chesapeake Bay Office. Please find attached 14 pages of slides that he has developed as a general overview of that program. It is highly likely that some of those slides may change for this presentation, but we felt it worthwhile to distribute the general presentation so that everyone would have an overview of the program before the meeting.

During the second half of the meeting, I would like to discuss the workshop on *Ecosystem-Based Decision Support Tools for Fisheries Management* that occurred in mid-February. Please find attached the detailed background and agenda, as well as, slides from my presentation at that meeting. The four east coast FMCs were to focus on our data needs and as you can see from the background document, I was assigned to the working group on data needs. We have a draft data needs document that is being revised this week that I hope to be able to share with you at the Council meeting.

Also in the second half of the meeting, we will hopefully have some time for two additional items that I have attached for your information. The first is the *ASMFC Implementation Plan Linking Multispecies Assessments to Single Species Management, September 2004*, that Dr. Kray thought many of you would find very interesting. The second document is a set of slides that our Executive Director presented to an MPA workshop in mid-February.

Finally, please find a draft document entitled *Developing an Ecosystem Approach to Fisheries* that will be the strawman for the ecosystem workshop at the upcoming conference on Managing Our Nations Fisheries II that will occur the week after the Council meeting in Washington.

ECOSYSTEMS COMMITTEE

March 15, 2005

Kill Devil Hills, NC

Convened 1:20 p.m. Members present: Charlie Witek, Dr. Gene Kray, Michelle Peabody, Pat Augustine, Larry Simms, Lt. Cmdr. Jeff Randall. Staff: Dr. Tom Hoff, Deb Donnangelo

Agenda items: Receive update on tools available for implementation of ecosystem based fishery management and receive presentation on Chesapeake Bay Program Office's ecosystem approach to Chesapeake Bay restoration.

Mr. Witek-- Article in *NJ Angler* on Ecosystems by Gene Kray. More copies available outside and in Gene's room. Last of educational meetings. First, presentation by Derek Orner of NOAA Chesapeake Bay Office. (ppt presentation loaded on second laptop)

(Discussion)

Dr. Hoff-- Thanked Mr. Orner for excellent presentation. My understanding is that it's not the science holding this back, but the political pull.

Dr. Kray-- Comment on presentation. Definitely political problems. Wastewater treatment plants need to be updated. They are also a cause of pollutants getting into the Susquehanna.

Dr. Hoff-- Behind Tab 2, we have four issues to discuss. Want to layout an agenda that we can move forward on regarding the committee. Can take questions on the committee to the Managing our Nation's Fisheries conference at the end of the month.

Dr. Kray-- I read this, extremely well done. We can use this. Any specifics on going out to the public?

Dr. Hoff-- Questions that Diana addresses are very fair. Her bottom line is that we don't need any more bureaucracy. All four Councils received grant at the end of July. Reviewed scope of work at the last Council meeting. Each of four councils will set up a pilot project. NMFS views these projects as a timely way to collect public information and input on the goals and objectives of ecosystems. We had four tasks: public meetings, survey, id of technical needs and data and synthesis of public input.

Mr. Witek-- I'd like the committee's thoughts on this as well.

Dr. Kray-- I think we should get into the guts of it right away.

Mr. Augustine-- My concern is that in the scoping document, when we identify what the specific goals are, should we use the north pacific as a guideline to get us going?

Dr. Hoff-- Yes. Last document behind Tab 2 is what we can use as a template.

Meeting adjourned 2:50

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Deputy Director

MEMORANDUM

DATE: April 20, 2005

TO: Ecosystem Committee

FROM: Tom Hoff

SUBJECT: Background information for Committee meeting May 4

We will be meeting from 8 to 10 AM on Wednesday at the Council meeting. This is a critical meeting since we have completed the I&E presentations and now the Committee will need to wrestle with ways to solicit information from the affected/interested parties as to what they perceive the goals and objectives of ecosystem approaches to fisheries management should be. I have attached the scope of work (SOW) that we developed for this cooperative agreement with NMFS. Remember that under this agreement, we are to produce a report that will provide a plan on how the Council might develop a Fisheries Ecosystem Plan. Our contract, which expires when we produce that report (March 31, 2006 at the latest) may be the last dedicated ecosystem monies we receive. While I believe that NMFS and Congress will likely provide more money in the future, at the current time there is no continuation of monies for Council ecosystem activities in FY 2006.

At the bottom of page 5 of the SOW is the description of our interactions at the public meetings with the affected/interested parties (section A). Section B is the Attitudes/Values survey that we heard Kristy Wallmo of NMFS discuss at the December Council meeting. That survey has been submitted to OMB for review and it is anticipated that it will be available sometime this fall. I am attempting to coordinate our public meetings with the availability of that survey. Does everyone agree? There are a whole series of questions that we need to discuss as to how best to solicit public input. I was envisioning us producing a strawman document the public could comment on and that the meetings would be similar to our public

hearings for an amendment. Is this the best format or should we try and go to state/local fishermen gatherings? This may be different from what we typically do and thus input is welcomed.

I have attached two additional documents. The first one is a paper entitled: *Developing an Ecosystem Approach to Fisheries* that I am the senior author of. This summary paper is a product of the national conference last month in DC on Managing our Nations Fisheries II. I encourage everyone to read it as it provides the latest thinking on where NMFS, the Councils, and a wide range of stakeholders believe we should be heading on ecosystem approaches to fisheries. The second document (same title but with just Diana Evans as the author) is the background paper for that conference. I have included Diana's paper to stimulate our discussion as to whether that might be an approach we would want to use to interact with the public, i.e., a series of questions around each of the 9 topics (and others) identified in the SOW. For anyone who was unable to attend last month's conference, I have the three excellent background papers (Steve Murawski, Gregg Waugh and Roger Rufe) that I can readily share with you upon request.

Two additional attached items are a draft of a workshop (funded by Sea Grant and NEFSC) that will be held next spring on GIS and Ocean Mapping in Support of Fisheries Research and Management. I am on the steering committee for the workshop and would welcome any input. The second item is an email from Tim Haverland encouraging people to view the EcoGIS website. This is a product of the fall workshop that Dan and I attended in Charleston. Again comments are solicited.

Finally, two other ecosystem-related meetings will occur next week. The first is the Council/NMFS Ecosystem Guidelines review committee meeting on Monday. I will attend that and provide an update at the Committee meeting. The second is the Council Chairs and Executive Directors meeting where Murawski, Dunnigan and Waugh will present, and an afternoon discussion will occur, on ecosystem management approaches. We can be briefed on these activities by Dan.

One final issue is the geographic boundary for our ecosystem area. NMFS is consistently using the 10 Large Marine Ecosystem (LME) designations that has one large ecosystem for all US waters north of Cape Hatteras. Assuming we adopt this designation, how/whether we should coordinate with NEFSC?

Please give some thought as to how we can best engage the public in this process before the Committee meeting. My plan is to thoroughly resolve the approach at this meeting and lay out the basic information the Committee would like in the strawman paper. I will draft the strawman for the June Committee meeting with it finalized in August. Meetings are planned for September/October. I am also exploring the use of our Scientific and Statistical Committee for the review of the strawman between drafting and finalization. We have an excellent SSC with national expertise in ecology, economics, and sociology. Their involvement obviously would be very valuable. Thank you. See you on May 4.

Ecosystems Committee Meeting
May 4, 2005
Ocean City, MD

Convened: 8:15 a.m. Committee members present: Charles Witek, Bruce Freeman, Pat Augustine, Larry Simms, Dr. Gene Kray, Vince O'Shea, Tony Bogan, Lt. Cmdr. Jeff Randall. Others: Dr. Jim Weinberg, George Darcy, Dennis Spitsbergen, Howard King, Gordon Colvin, Fran Puskas. Staff: Dr. Tom Hoff, Dan Furlong, Kathy Collins.

The purpose of the Committee is to discuss ways to solicit information as to what they perceive the goals and objectives of ecosystem approaches to fisheries management should be.

Dr. Hoff reviewed information behind tab in briefing book.

Dr. Kray - Diane Evans work was logical and laid out well. The document needs to be pulled in a little, but would peek the interest of the public. Regarding following the FMP process or going to fishing clubs, feels we could use both approaches. Could have a general meeting in Philly for the FMP process, and then go out to fishing clubs where there would be large groups.

Mr. Witek - this would fit very well into our scoping process. Have it in a general scoping manner.

Mr. Freeman - apprehensive about success of whole approach. Most of the public has no knowledge of ecosystems. Tends to be an issue with subcommittees, in Congress, Councils and NMFS. We have spent a lot of time going to the public. Believes we will not get a lot of info from public because they don't understand. If going to go anywhere with ecosystems, we need to go over and above what we have done. Suggested that if we go out to public, we put some info as to what we are talking about as far as info we need and cost figures. Doesn't want to go out and ask the public what the goal will be and then not provide any information back.

Mr. Smith - recommend our Scientific and Statistical Committee become involved when appropriate. They could review the process and make recommendations.

Mr. Augustine - start at beginning and approach our goal. In order to move the process forward, need to give the public something specific and simple. We are challenged with this task and we have to do it. Have to keep this tight, in terms of questions on the survey. Do we have a clear and defined goal?

Dr. Hoff - in our scope of work, we responded to a document NMFS sent out. Public meetings are to facilitate wide range of discussions. NMFS would like us to go out and get the information and this may prove that the public does not know what ecosystems is about.

Mr. Augustine - use public information document. Leave it wide open to get public input. Need to approach it so that it is not a lot of weighted effort. Important information to include is what our limitations are, just a couple of paragraphs explaining. Public may come back with what they think ecosystems is. We need to make sure they know what are confines are and what we can make

recommendations on. The public may come back and say, "these are problems, what are you going to do about them?"

Dr. Weinberg - develop some hypothetical case studies where you could choose some species and create a scenario where there are different species with conflicting groups and see how that may play out. One of the difficulties in taking that approach is getting people to think that is what is going to happen if it is not hypothetical. Ecosystems based management is a loose concept. Even Table 1 in the report is vague. Create a case study so people would know what outcomes would be.

Dr. Kray likes Jim's approach. Use a fictitious fish, build a model around it. Have to inform public this is something that is not going to happen tomorrow. Need to take away some fears. A lot of people don't know what it is, so we need to calm the fears. Tony indicated that there are things beyond our control. They need to understand that it is not just the Army Corps and people who control development on shore, etc.

Mr. Furlong - look at the Chesapeake Bay program. Need to look at terms of dollars and time that have gone into these programs. Thinks whole concept is sub-critical mass. Until you get sub-critical info, we are misleading the public that there is a program. This is a tough problem. We need to deal with the information we have and move our programs as best we can on single species management. To go beyond into some ecosystems approach, we don't have the resources to address it.

Mr. Simms - we are in favor of this. What this is going to boil down to is a feel good exercise. It is going to boil down to more restrictions on fishermen. The only people they really do anything with is the people and they don't do anything about the environment. When he sees politicians getting involved about the environment, fishermen get hurt. He is skeptical about the whole process. We need to get the message out. If we were going to do something, we should call for a subcommittee made up of Corps of Engineers, people at treatment plants, all the people who manage what is going on on land, then we need to discuss what the problems are of what is coming into the water. Until we can manage what is going into the water, we are just playing with the people's minds.

Dr. Hoff - agreed that EFH, the way it has evolved, was never what the Council intended. In 1980's - 90's we pushed to get what we were doing through. When it turned around and became that you could only regulate fishing gear, most feel that EFH is what we don't need ecosystems to turn into. Need to identify where our limitations are. Dr. Roger Locandro had done papers to indicate that half of the summer flounder decline was attributed to wetland loss, water run off, not fishing. Need to discuss approaches in handout.

Dr. Kray - agreed with looking at approaches. Look at perspective of a more global approach, that is what they can understand.

Mr. Augustine - if use background of success of single species management, use an example. The basic information needs to be discussed first. Agreed with Larry, need to talk with major players.

Mr. Bogan - should approach it by looking at questions. We want to make sure people recognize what we

can and cannot do. We want them to know our limitations, and we want them to know what we should be able to do and what we can do. Then ask people for ideas and put them into the box of "can", "should be able to", and "cannot do".

Mr. Fletcher - at one time or another, we have used the water as a sewer. The only thing a license for a wastewater treatment plant handles is biological waste, it does not touch chemical waste. We need to go back and look at mistakes and correct them. Instead of saying we cannot do it, we need to say, here is something we haven't looked at but will. We need to realize that we have killed the resource. This ecosystems could be the greatest thing we have done. All that information is available - have a few people on the computer to put in information. Most problems we have come out of wastewater treatment plants. We still have the chemical problem.

Dr. Hoff - we will be talking about successes. Our single species FMPs have been very successful. We have been evolving that towards ecosystems for 25 years. We are doing ecosystems now to comply with NEPA. Envisions scoping document being no more than 8-10 pages. Agreed that a hypothetical scenario might be a good idea. May do a document in June, 6-8 pages, 2-3- preambles, 8 issues. The hearings will be a forum to get information.

Mr. Augustine - until we see a rough draft of the document, we need to keep it as simple as we can.

Mr. Freeman - it is a difficult task. Frustrated by issues raised in the paper by Diane Evans, page 7, there is an example given of EFH and the statement made regarding conservation, but not addressed. We have been dealing with EFH. It sounds good and reads well, but what is the impact on fisheries? We have told people to donate certain species of fish. Some states have taken responsible action. The impact of ecosystems, we are going to tell people don't consume a particular species of fish. We are going to identify problems, but we won't be able to take action. The result will be -- don't fish. Now we are going to identify ecosystems. We need to incorporate that to make meaningful management. Concerned where this is all going to end up.

Dr. Kray - looks at this as a political rally. We have been mandated to do this. Within resources we have, we have to do the best we can.

Mr. Simms - thinks we do have a choice. Their recommendation is to form a committee of all people responsible, fight to get that, that is the only way to get it done. We need to have the backbone to tell them that we need these certain people and they need to meet and discuss the issues. If they are going to tell us to do something we cannot do, we need to tell them this is what they need to do.

Mr. Augustine - Two directions: 1) need to address issues in front of us, and, 2) contact other Council chairs and have all Councils recommend creation of the committee mentioned, then bring the super committee together to address issues.

Dr. Weinberg - dealing with ecosystems is a large topic. need to focus on a situation that is likely to happen. Two examples would be: 1) have 2 species, a and b, they are commercial species, different groups of fishermen fish for a and b. One of a and b is a predator on the other. Should have a column of plus and minus for single species approach and multi-species approach. Need to point out positives and

negatives. 2) climate changes that effect one or two species, the climate change may shift species north, and fishermen may have to move their fishing area.

Mr. Freeman - we insist that implications of ecosystems be looked at, we can identify some of the impediments of our coast fisheries. We also identify impacts on the fishery. In ecosystems, you will find many of these interactions occur. Our message to Congress is that all the issues need to be dealt with, not just the fishing issues. Thinks if we can demonstrate after all of this is done, interrelationships are very complicated. They are interwoven in a high complex degree. We need to look at the entire system, not just part of it.

Mr. Bogan - my whole point is what we can and cannot do. The scoping meetings are to get the input back from us and the public. We can get the info back to the Service and tell them here is what we cannot do, and do not have control over, so what can the Service do? Need to address all the issues we possibly can. We need to tell the Service that if they do not give us the authority to do things, then they need to take care of it.

Dr. Hoff - we are charged under this grant. We will have the public involved. We will have illustrations, questions.

Mr. Furlong - regarding Chairs meeting comments, only 4 Councils participated in the ecosystems, and received the money. Don't sell this as a fisheries ecosystems plan. The message we gave Dr. Steve Murawski is to go to a ecosystems based fisheries management, not a plan. If a plan, there will be significant regulatory issues to deal with. The west coast: North Pacific, Pacific, and Western Pacific Councils would like to be involved, but did not get the funding.

Dr. Hoff - we have had several interactions with the 4 Councils involved. SAFMC is far ahead of this. They took EFH plan and incorporated this into what they are doing. Dr. Murawski suggested using the SAFMC's model. We need to see how this committee wants to think about interacting with the NEFMC. The MAFMC and NEFMC is in one large ecosystem area. Would the committee want to interact with NEFMC?

Mr. Spitsbergen - NEFMC has an ecosystems committee, they made a motion to set up looking at smaller ecosystems. They thought maybe the bigger ecosystem area was too cumbersome.

Dr. Hoff - NOAA produced a document on water mass units several years ago, so there is scientific info of going to smaller ecosystem areas.

Mr. Spitsbergen - Would keep in communication with NEFMC. See where they are coming from on this.

Mr. Freeman - if look at differences in water masses, Georges Bank is a transition, cape cod south of Cape Hatteras is very similar. Doesn't make sense to break areas. Politically the boundaries are different, but biologically, they are the same. May be useful to assign committee membership, offer NEFMC membership on our committee, and MAFMC membership on theirs. Thought it would be useful to have someone on the committees from other Councils.

Mr. Spitsbergen - NEFMC was going to be staff to staff. So would recommend a staff member from MAFMC keep in touch with NEFMC.

Mr. Freeman - Dan should contact Paul Howard, Executive Director of NEFMC on this issue that we need committee coordination.

Mr. Furlong - we do have staff to staff. Should invite someone from NEFMC to sit in on this committee.

Mr. Freeman - regarding email memo - GIS workshop - Use the 4 functional areas as priorities for tool development: 1) mapping of commercial fishing catch and effort; 2) commercial effort displacement; 3) quantifying fishery/habitat interactions, and, 4) identifying bycatch hot spots. Suggested to do the same with recreational. Most will be close to shore, but thinks it is important.

Mr. Fletcher - our problems come from building in and around watersheds. You need something simple, something that can be done, and something that doesn't only effect recreational fishermen.

Adjourned 9:40 a.m .

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MEMORANDUM

DATE: June 2, 2005

TO: Ecosystem Committee (Witek, Kray, Peabody, Augustine, Simms, Hoopes, Freeman, Bogan, Randall, O'Shea, Brown) and Chiarella

FROM: Tom Hoff

SUBJECT: Committee meeting agenda for June 15, 2005

The Ecosystem Committee will meet at the Council meeting from 3:15 until 5 PM on June 15. There is only one agenda item – review the first draft of the scoping background paper. Remember we will be holding 14 (2 per Council state) public meetings with affected/interested parties this fall in conjunction with the availability of the NMFS attitudes/values survey.

This is the first draft and all comments are welcome. It is 7 pages which is a little longer than we talked about last month and thus, I am certainly willing to remove things in order to have it more likely read by the public. There are two attachments. The first attachment (12 page document distributed to the Committee last month) is a summary of the ecosystem discussions from the conference in March on *Managing Our Nation's Fisheries*. I was the rapporteur for that main session of the conference and believe the day-long deliberations synthesized the best current national thinking on ecosystems. The second attachment is a presentation that I gave in February on our needs and I have attached the slides from that presentation because they identify ecological issues that the Council has dealt with in every one of our FMPs. This attachment is included partly to address Dr. Jim Weinberg's suggestion last month that an appendix with examples may be beneficial to some in the public.

Both of the appendices could be dropped fairly easily if the Committee desires. Many of the important points from the national conference are included within the 6 page scoping document. It would be easy to include a paragraph or two summarizing each of our FMPs and the ecological issues the Council has considered in section 3 of the scoping paper.

The plan is for the Committee to review the draft, I will incorporate the changes, meet with our S&S Committee in July and have a final draft for the Committee and then Council at the August meeting. We will then schedule the public meetings based upon completed approval from OMB of the NMFS attitude survey.

I look forward to seeing you all in two weeks. I will be in the office next week should you have any questions.

ECOSYSTEMS COMMITTEE MEETING
JUNE 15, 2005
WILMINGTON, DE

Convened: 3:50 p.m. Committee: Charles Witek, Gene Kray, Michelle Peabody, Pat Augustine, Larry Simns, Rick Hoopes, Bruce Freeman, Tony Bogan, Lt. Cmdr. Jeff Randall. Others: Jim Weinberg, Dennis Spitsbergen, Laurie Nolan, George Darcy, Ron Smith, Joel MacDonald, Fran Puskas. Staff: Dan Furlong, Jan Saunders, Kathy Collins.

Mr. Witek referred to the document behind Tab 8 in June briefing book.

Mr. Kray - In Tom's cover letter - whether or not to use appendices - feels that if this document is going out to public and there are going to be meetings, many may not get this document, appendices would not be necessary. Just go with the basic document.

Ms. Puskas - page 4 and 5 - Tilefish- overfished and overfishing occurring . . . thinks this should not be in the document because we are addressing Tilefish now and they are no longer overfished. Doesn't think it should be included.

Mr. Witek - Do you think going out to public to people who are not familiar with ecosystems management, is this document simple enough for them?

Mr. Freeman - You will not attract a lot of people and the ones you do will not know what is being talked about. To put this out to general public and ask them to comment, we will be greatly disappointed.

Mr. Spitsbergen - Suggest someone from staff communicate with SAFMC to see what their problems and results were. They had problems with their presentation of their document. If going to have 14 meetings and spend a lot of money, need to figure out what we are going to put out for public to understand.

Mr. Smith - Supports Bruce and Dennis' comments. The document needs to be geared towards the level of the public's understanding. If public doesn't think they are losing something, they are not going to come to the meetings.

Mr. Darcy - Make sure document and presentation will address what SAFMC had problems with as Dennis indicated.

Mr. Freeman - you assume the public understands the comments in the document. We deal with these terms often and the general public doesn't. We are not being fair by explaining what we want. If we go through these hearings and no one shows up, what are we going to get out of this. The public doesn't care or are not intelligent enough in this area to know what we are talking about.

Dr. Weinberg - Goals and Objectives Section - it kept repeating. It never really got to the goals and objectives. Doesn't know what purpose of the document is because there are no clear goals and objectives. Doesn't think the discussion will go far. Need to give more guidance in the writing and then fine-tune it with a question.

Mr. Witek - this was designed as a scoping document. Normally scoping documents are geared toward those who understand the discussion. This would not be the case here.

Mr. Kray - Trying to take a very complex subject with a lot of uncertainties and make it simple is not easy to do.

Mr. Augustine - If you are taking this out to people who don't know, it is a waste of time. Turn this around and make it an educational project. Maybe it is a Dr. Steve Murawski turnaround that we need to apply. Could pose a question "Are you interested in what happens to 'indicator species' of fish?" What is the problem, what is the issue, what are we trying to make them aware of? Need to inform them of what we are doing, and how we are going to implement them. Keep it simple. Could use tools such as a color brochure, a packet, and a PP presentation.

Mr. Hoopes - the take home message he got was that we have done a great job on FMPs and now we are putting ecosystems on top of it. We don't know what it means and we are asking the public. Thinks it needs to be simplified. Probably needs to be put in the context of what on the ground needs to be changed. Overall concept is that it is understood, isn't going to change. Until you get to the point of where you are going to say what you are going to do, don't do anything.

Mr. Smith - If funding was available, could make some type of "animated" presentation and then give them a questionnaire.

Mr. Jim Fletcher - if talk about ecosystem management, why doesn't Council have federal Government do away with a federal flood insurance to protect the ecosystems. Do away with waste in rivers and streams. By doing this, you will get more people involved.

Mr. Furlong - keeps hearing "simplify" and "use more of an educational process". This is a scoping document; we want to go out to public. Doesn't know if we have any authorities that would allow a FMC to say this how you have to modify your developments. Might have to seek out future legislation to say from a Council perspective, you do not have the right to do what you are doing.

Mr. Augustine - understanding of ecosystem management was the relationship of all of the activity of the scope of that body of water. What we actually control is the species of fish that interact and the habitat on the bottom. We are dealing with floatable debris, waste treatment plants, run-off. We are concerned about water quality. We should be looking at our impact on fishing issues that we deal with, what we do with the species that we deal with. Need to ask, what can we do as a Council to develop a scheme to make it clear what we deal with, what effect do we have on that? Thought our responsibility was to focus on gear on habitat interaction as it relates to predator prey from bottom of the ocean to the top. The complexity of the questions are mind-boggling. Need to show what we expect to do to the best of our ability.

Mr. Freeman - thinks we are doing this backwards. He would present the big picture issues first. What are factors that effect water quality, oceanographic features, then present small picture of this is what the responsibility of the Council is and this is all we can affect - then ask the Council what they think. Then can go back to Congress after public hearings and explain to them this is what came out of the hearings and this is all that we can do.

Mr. Furlong - what would you consider a different way?

Mr. Freeman - Here is what we know, here are all the factors that effect water quality, those within our control, reduction of our estuaries. Need to explain that if they want to reach a certain goal - this is what it takes.

Mr. Witek - Think problem is that we have kind of two necessary things that are not compatible. We need to have something that is many pages that states these are the options, this is what we can do, this is the big picture, the small picture, this is what the Council can do. We need to serve our mandate.

Mr. Kray - when talking about some of these issues, they must be within what we can do. When getting into areas like run-off, you get into politically sensitive issues. They will fight you tooth and nail. Also issues such as PA approved the Bond issue to improve wastewater treatment plants along Susquehanna. Governor said he wants to take that money and put it into economic development. So they have ways to fight. Needs to be an educational process and try to get response from these people and use terms they can understand. Could try multiple-choice questions.

Mr. Simms - if ecosystems management means we have to regulate the fishermen more than we are, then he doesn't know what else to do. We cannot do anything about stuff on land. If we point out the problems that come from the land, people would get more involved. We have to pay attention to what is going on on the land and then get people to lead us into what they want done. Need to show what each species depends on and what comes off the land that is harming them. We need to get the info back to the public what the real problem is in order to get them involved.

Mr. Witek - where do we go from here?

Mr. Freeman - when the council first got involved, how was this presented? Was there a footprint? It really told us what we should be doing.

Mr. Furlong - We have a mandate and that is what we are trying to do. Appropriation of \$240,000 was given to us to go out to public and solicit them of what ecosystem management is. Now we are at the point that we have to do soliciting ourselves.

Mr. Hoopes - if go to public with these questions and brainstorm the questions, a way to move forward is to have a set of alternative answers to questions as basis to answer them. Discuss the alternatives.

Mr. Smith - have questions like - if you want healthier fish populations, are you willing to give up what you are doing once a day or twice a week? Set up questions so people understand this is give and take. Maybe get some questions that would evaluate what the public thinks is important.

Ms. Puskas - if want to simplify it, instead of talking about run-off -- have a cartoon to illustrate maybe a fish swimming happy and then a cloud of pollution floating in.

Mr. Augustine - wonders if a subcommittee might be appropriate to look at Tom's questions and respond to them in context of providing an educational document. Multiple-choice questions would be a good start.

Mr. Witek - we are committed to go to public hearings. Doesn't know if want to take time to go to subcommittee process - go directly back to Tom.

Mr. Furlong - The agency has developed a survey. We have been asked to provide our mailing list to NMFS to distribute that document.

Mr. Witek - we need to provide comments to Tom to incorporate in the document.

Mr. Freeman - it indicates that Councils have been engaged to look at goal setting. One of the basic things to do is put forth a definition of what ecosystems is. There are a lot of definitions, suggests there are reasonable definitions and pick one and go with it.

Mr. Furlong - the definition is stated up front.

Mr. Freeman - there is no clear definition. Need to form one and stick with it.

Dr. Weinberg - there are a lot of definitions of ecosystems. Chad Demarest said there were three or four. He found that John Boreman stated that there is a definition and it must be used. Need to stick with Boreman's definition.

Mr. Freeman - the definition on front page of DRAFT, it is not clearly defined. The one that Boreman suggests is okay.

Mr. Augustine - suggested to use John Boreman's definition of ecosystems.

Mr. Hoopes - Geographically specified - It should be up to what the MAFMC wants to deal with. Must take simple systems and try to understand what constitutes an ecosystem in that context.

Mr. Smith - using that term - Geographically specified- public wouldn't have a clue.

Mr. Kray - reviewed PR regarding Oceans -21 dated June 9, 2005. He also reviewed high points of the Legislation Bill.

Adjourned: 5:10 p.m.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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Daniel T. Furlong
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MEMORANDUM

DATE: July 27, 2005

TO: Ecosystem Committee (Witek, Kray, Peabody, Augustine, Simms, Hoopes, Freeman, Bogan, Randall, O'Shea, Brown) Chiarella, Gilford, Demarest, Waugh, Pugliese, and Atran

FROM: Tom Hoff

SUBJECT: Third Draft of Scoping Hearing Background document

Please find 2 separate items in this briefing book tab. First is the third draft of the ecosystem scoping document. This draft scoping document is still 7 pages long – a little longer than the Committee identified as optimal, but much shorter than the SA or Gulf documents that I forwarded to you two weeks ago. I appreciate the comments that I received on the second draft and believe this one is much tighter. Again, please remember that I have not tried to make it too much of an educational document because I have been focused on having the wide-ranging discussions on the nine topic areas required in the grant.

As I stated in my July 14 memo that transmitted the second draft, I envision our scoping document being one of four items that we sent to all 1400 entities on our mailing list when we announce these scoping hearings. First will be a press release announcing the 14 scoping hearings with the locations and times. This scoping document will be second and will be what is used at the meetings to generate the discussions. (During the scoping meetings I envision walking through the nine questions.) The third document will be an introductory ecosystem brochure that the NEFSC is producing right now that should be ready by the beginning of September. Item 4 is also supposed to be available by the beginning of September and that is the NMFS Attitudes/Values Survey that is called for in section B (page 6) of our cooperative agreement with NMFS. I hope that these 4 documents provide education and clarification for everyone before we start the actual scoping hearings.

We will discuss this third draft at the Committee meeting on August 10 and hopefully will have a final version ready for the scoping hearings which are tentatively scheduled to start in mid-September depending upon clearance of OMB of the Attitudes/Value survey.

The second item in this tab is correspondence on the "Oceans 21" proposed legislation that Dr. Kray has been closely following. He will be leading the review of this topic with his major question being where does the Committee/Council want to go with this legislation.

Thank you and look forward to seeing everyone on Wednesday August 10.

Ecosystems Committee Meeting
August 10, 2005
Sheraton Society Hill, Philadelphia

Convened: 8:15 a.m. Members: Charles Witek, Dr. Gene Kray, Pat Augustine, Larry Simns, Bruce Freeman, Lt. Cmdr. Jeff Randall. Others: Dr. Jim Weinberg, Fran Puskas, Gordon Colvin, Ron Smith, Mike Pentony (NERO), Laurie Nolan, Dennis Spitsbergen, Jim Ruhle, Dr. John Boreman, Howard King, Brooks Mountcastle, Dave Ellenton, Pete Jensen, Dave Wallace. Staff: Dr. Tom Hoff, Dan Furlong, Jan Saunders, Kathy Collins.

GETTING THE WORD OUT:

Dr. Kray - look at fishing web sites. He is familiar with 3. Look at some of the easily read like Jersey Angler and The Fisherman. Give the fishing papers the press release. Put the scoping document on line.

Mr. Colvin - reach out to state members and ask for their assistance in getting the word out. Suggest scoping document be run in the Angler or Fisherman. At least have an announcement if not the document itself. Give the state directors a supply of scoping documents to distribute. Urge Committee to use SSC expertise on entire issue.

Dr. Hoff - looking for ideas on times and places to hold public scoping hearings. August 30 will be the SSC meeting in Philly.

Dr. Kray - how possible is it to get the document into the public's hands? We have got to get rid of things in the document that people will not understand - like acronyms.

Dr. Hoff - that is what we want to do. We are going to mail out a package to our mailing list of about 1400 people and include the scoping document, NMFS Attitudes/Value Survey, NEFSC introductory brochure on ecosystems and a press release on all 14 hearings.

DOCUMENT CHANGES:

Mr. Augustine - cut out duplication sections.

Dr. Hoff - we are going with the NMFS definition of ecosystems.

Dr. Weinberg - separate that definition from NMFS out so that it is easily noticed.

Mr. Freeman - suggests to use NMFS' definition so the public can understand what we are trying to get out of it. Pick a definition and use one that is fairly comprehensive.

Dr. Kray - need to make a distinction of what we are doing now and where we are going. Look into use of the term "single species". "Multi-species" is the term we are using now. Somehow we have to work that in.

Dr. Weinberg - NMFS definition - people are confused about the real definition. Doesn't think NMFS definition is clear. That will set off confusion right away. Does not explain what "its" refers to.

Dr. Boreman - wouldn't know what pop dynamics means either. Need to pick a definition that

would be understandable and stick with the NMFS definition.

Mr. Smith - don't use terms "overfishing" or "overfishing is occurring".

Dr. Hoff - just remove first couple of phrases and just go to successfully rebuilt. Would be reluctant to shorten it too much.

Dr. Kray - average person wouldn't know what "overfishing is occurring" would mean. Need to simplify it. Suggested to remove term.

Mr. Augustine - do not remove overfishing. In the definition, after its put: (system) dynamics.

Mr. Freeman - looks at it as a simple presentation. Present the public with how we perceive moving forward in a revolutionary process. Ask for their comments. We have a terminology that we use and understand. The public is foreign to that.

Dr. Hoff - we have a contract with NMFS that this document is to go out to public and we must have them address the nine specific questions.

Mr. Freeman - what is the benefit of the few comments received to date? You are asking the public to comment on a very technical issue which they don't understand. Need to talk about it in the big picture - where we are going with this. The Service is moving very aggressively towards this goal. Needs to be simplified as much as possible or we are going to end up with 14 meetings and only 14 people show up out of all of the meetings combined.

Mr. Witek - we are getting more technical subjects. The public should take the time to learn a little about it. Without understanding the topics and basic terms of reference, then would argue you don't understand enough to make a reasonable and valuable comment on the subject.

Mr. Augustine - what we are going to end up with, whether it is 5 people or 15 people, their comment would be most substantive because they are there for a reason. The SAFMC has done their job. Whatever their results are, they are what they are. Agreed with getting the word out in fishing news articles.

Ms. Puskas - thinks need to spot light what the environment is out there.

Dr. Hoff - the scoping meetings would be productive for people to walk in and say it is estuaries and development in those estuaries that are causing the fishing problems.

Mr. O'Shea - on issue 9 - the more open ended it is the more feedback you would probably get. It is sort of a catch all subject. The first question kind of begs for a yes or no answer. You could hit it in about 6 bullets by explaining the Council is looking to do this, this, and this. If he were doing this for the Commission, he would say that the Commission already has a habitat program and takes into account habitat issues, but the Commission is developing ways of coming up with better decisions. Would word Question under 9 "How would you propose strengthening the approach we are taking?" - this would not request a yes or no answer, but prompt an informative response.

Mr. Spitsbergen - number 4 - Mechanisms - simplify impacts on ecosystems that we do not have control over. Could put each number in a more simple fashion.

Mr. Freeman - has concerns of number 5 - Boundaries - who makes those up? This doesn't make any sense. The US ecosystems ends at the Canadian border . . . Southeast . . . Does not make sense.

Dr. Hoff - this goes back to based on last time NMFS and Councils were going to do Ecosystems. Last August in Charleston is when it was decided what the boundaries would be the identified LMEs or Large Marine Ecosystems. He believes that we should be using Cape Cod to Cape Hatteras.

Dr. Boreman - it would include the Gulf of Maine, not to the border of Canada. We are now reviewing an in-house White Paper. We are going to be developing a definition for subregions based on biology and oceanography. Doesn't want to come out with a document until he knows everyone agrees it is the way it should be done. Put this out as a document to be based on what people want to base their subregions on. NMFS has a draft document and have put together a working group. We have a lot more info and are assembling that. Trying to get out the info in time for scoping meetings. Dr. Sherman had done a paper on this issue.

Mr. Freeman - would hope it would be available to use when going to scoping meetings.

Dr. Hoff - going to have to coordinate with New England.

Mr. O'Shea - Dr. Sherman's work was to identify oceanographic perimeters. Hasn't his work been peer reviewed?

Dr. Boreman - many times. His group is an international group. They have identified about 60 ecosystems worldwide.

There will be a meeting in Philadelphia the day before or after the SSC meeting to discuss the NMFS Attitudes/Values Survey. People to be involved in the review are:

Recreational fisherman: Gary Caputi and Jim Gilford

Commercial: Dave Wallace, Greg DiDominico, and Jim Fletcher

Environmental: Sonja Fordham and Ken Hinman

OCEANS 21:

Council should let Congressman Weldon and the others know what we think about Oceans 21. Problems are it would add another layer of approval when we are submitting documents. We would have to go through the Ecosystem Commission for approval. The way the legislation is written, there is no penalty for anyone when they sue the government, their attorney fees and any consultants would be paid for by gov. It makes no distinction between offshore and inshore.

Motion to recommend to the Council that we write to Congressmen Weldon, Saxton, Allen and Farr advising them of the following concerns if the Oceans Conservation, Education and National Strategy for the 21st Century Act, [Oceans 21] were to become law in its present form:

1. It would appear to add another layer of approvals necessary for the Councils to have Fishery Management Plans and Amendments approved:

p.21 "act as the nonmilitary Federal agency with responsibility for providing oversight of all United States ocean waters and ocean resources"

Responsibilities of the Assistant Administrator for Oceans Ecosystems Management and Protection:

p.30 [viii] "fisheries research and management"

p.31 [xix] "sanctuaries and marine protected areas"

2. The National Standards [sec 111] may be in conflict with the Magnuson-Stevens Act. These standards also appear to override standards in any law dealing with ocean issues.

3. The definitions [sec 4] "biological diversity", "ecologically sustainable", "marine ecosystem health and health of marine ecosystems", "healthy marine ecosystem", and "ecosystem-based management" are all definitions that when used in the bill will either not allow any activities in the coastal or ocean environment or will be the basis for litigation to prevent activities.

4. The term "United States ocean waters" includes state waters, and when used in the bill will allow the Federal government to override state decision on ocean and land use programs or activities. This will almost certainly create a states-right controversy.

5. The term "marine" in this bill also includes state waters and the Great Lakes. The term marine is generally used to denote waters outside of state waters and does not apply to freshwater systems including these and estuarine areas that are not salt water will obviously create conflict.

Kray/Freeman

Move to postpone until next Ecosystem Committee meeting. (Have Ecosystem Committee look at the legislation in entirety and comment at the next meeting.)
Augustine/Kray.
Motion Carried.

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Daniel T. Furlong
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Deputy Director

MEMORANDUM

DATE: September 19, 2005

TO: Ecosystem Committee (Kray, Peabody, Augustine, Simms, Hoopes, Freeman, Bogan, Randall, O'Shea, Brown) Chiarella, Demarest, and Gilford.

FROM: Tom Hoff

SUBJECT: Materials for October 4 Ecosystem Committee Meeting

Please find 4 separate items in this briefing book tab. The first two items deal with the ongoing Ecosystem Scoping Meetings. I have enclosed the Press Release, that everyone should have seen, but this one has the hearing officers listed also. The second item is a preprint copy of the NEFSC introductory ecosystem brochure. Hopefully, we will have printed copies to hand out at the Committee meeting. The NMFS attitudes/values survey has not cleared OMB as of today and appears to be a victim of Hurricane Katrina. I will provide an update at the meetings.

The SSC minutes from our meeting of August 30 are also included. The Committee does not need to take any action with those minutes at this time. The SSC spent a lot of time and effort on where the Committee and Council may want to go should there be future funding to continue these efforts. I will cover these first three items and the completed meetings in NC, VA and NY during the first hour of the meeting. We will also have a scoping meeting Tuesday night at 7 PM.

The fourth item in this tab is a one page draft motion that deals with the "Oceans 21" proposed legislation that Dr. Kray has been closely following. He will be leading the review of this topic. Remember we emailed the lengthy legislation before the August meeting as well as some proposed changes from Dr. Kray in the last briefing book.

Thank you and look forward to seeing everyone on Tuesday October 4.

Ecosystems Committee
10/04/05
Southampton NY

Dr. Kray called the meeting to order at 10:10. There are no changes to agenda.

Dr. Hoff: A handout was passed out for this meeting. Four separate items are addressed on the handout. #1 spoke about the press release regarding the scoping meeting. #2 discussed a draft document regarding NE Shelf, OMB clearance for the Attitudes and Values survey. #3 is regarding the minutes from the SSC meeting. #4 was regarding the scoping hearings. We have the minutes from SSC meeting on 8/30 and there was good attendance. Bring SSC up to speed and give advice on specifications and other issues as we move forward. There is no more money for ecosystems. Tom discussed additional information from the SSC meeting.

Dr. Kray: On consensus statement, the SSC needs statements regarding goals and recommendations to Council to help out the SSC.

Dr. Hoff: I was hoping the public would provide goals and recommendations. I don't know if at this point the committee should do this. I don't know if the timing is right, we should wait for reauthorization. Wait to see what comes out of reauthorization; that is my own personal recommendation.

Dr. Kray: That sounds good to me, any other questions or objections for getting the scoping information at our December meeting.

Pat Augustine: Numbers of people are not showing up. It will come back on this committee to set the goals and objectives. The Administration is going down an ecosystem path. We will be tasked to come forward with general goals. We have agreed that this is evolutionary. I am not sure when we will move from single to multi species management. We need to come up with one or two basic goals. No, I don't want to wait for the results of the next meetings.

Dr. Kray: It is a question of timing. Let's finish the scoping hearings on 10/24, maybe there will be enough people to give our input. Maybe by February we could come up with goals and recommendations to give to the SSC.

Dr. Hoff: We have \$200,000 to produce through March.

Dan Furlong: The money runs out 12/31.

Dr. Hoff: What happens after 12/31?

Dr. Kray: We need an ecosystem committee in terms of where we are going, I just don't know. How much can we do?

Dr. Hoff: If this is an unfunded mandate, is this essential?

Ron Smith: This commitment would go forward if it is not funded and the council would try to continue through single species funding. We will not change the way we manage species.

Pat Augustine: If we have a deadline date and the report is due 90 days after that then the report needs to be in by 3/31/06. This will get dumped on Tom. We just need to report a net result.

Rick Cole: Tom you will be the author of this report. Are you going to take the whole 90 days?

Dr. Hoff: It is limited to public hearings and it includes the Attitudes and Values survey (? regarding OMB Clearance) and the technical information from the NE Science Center.

Rick Cole: What is SMB plan?

Dr. Hoff: Squid, mackerel and butterfish. There is an issue on by catch and the resources they support, PET and the resources they support, etc. An ecosystem is nothing more than a good NEPA statement. This is ecosystem management. The Gulf of Maine could be a sub ecosystem area The Service Center is looking at this.

Dr. Kray: The model to pilot is looking at weakfish, striped bass, menhaden and bluefish.

Dr. Hoff: We need to be heavily involved with the New England and the South Atlantic Councils regarding the range of the resources, we need to expand.

Bruce Freeman: The SSC is asking the same questions we asked ourselves; what aspects will be covered and do we expect the public to answer that? The question is fishing to habitat. The impact of estuarine areas is based on productivity. This is influenced by what happens in state waters. It can't operate from 3 miles out to 200 miles; it needs to incorporate the whole area. It is not integrated into the system.

Dr. Kray: We are seeing that it will have to work across jurisdiction lines. We need to work with the commission. Maybe will have to steal from Oceans 21, we can not cross jurisdictional lines; we don't have authority to do that.

Bruce Freeman: This has not been addressed. An observation, if we have the information then we can determine how to modify, it is those items we don't know about that we have to speculate and that becomes very disturbing depending on philosophies and speculations, and then conflicts occur. Or knowledge becomes diluted.

Dr. Kray: We need more data, who is going to collect the data, where is the money coming from?

Bruce Freeman: We need a lot more.

Dr. Kray: Somewhere in the report we are going to have to say that.

Dr. Hoff: That is important. It needs to show us where we don't have the data. I am not as pessimistic as Bruce, but we have done this. We are more dependent on estuaries in the Mid-Atlantic. NMFS rejected all our habitat plans, all of our activities we described in the past. We are evolving and identify habitat areas of particular concern. Ecosystem is a series of steps; we have a good first step.

Bruce Freeman: I am not pessimistic I am just raising these issues. We need information and data. This needs to be collected. The next step is looking at forage base.

Dr. Hoff: We need information and authority.

Dr. Kray: We need direction, a template.

Bruce Freeman: Have Tom keep in mind we addressed many of these issues many years ago. It needs to be brought forward.

Dr. Hoff: We need to report along same lines as our scoping document. Here is what the public said on these 9 issues; here is what we have to say.

Vince O'Shea: This is a SCIENCE ISSUE. I wonder why some people say we don't know what it is. Eco based approach to management has been out there for awhile. Take NOAA definition or another and consider adopting a specific definition. The focus is on the high end of getting information, then maybe we should start at the other end, use existing data and figure out what the next step is, don't look at challenges but work with what we have.

Dr. Hoff: I agree, but use the definition of NMFS; that is the direction we are going. A science based definition.

Dr. Kray: Let's wait for the update on the hearings.

Dr. Hoff: Discussed 2 meetings in North Carolina and 1 in Virginia. Beach VA.

Bruce Freeman: Of the hearings in the south, was there a common theme or comments from all over the place.

Dr. Hoff: I am concerned about NPA's; most don't want to do them. Some feel this is just going to be another set of regulations on commercial fishermen. Those are the themes.

Dr. Kray: Okay are we ready for Ocean's 21. This is not set in stone and I hope you all have had a chance to read this. I tried to point out the major issues. The final recommendation doesn't have to look like this. I would like to get your input and feedback and where we should go with this.

Dr. Hoff: I do have a handout from NRDC that they would like to address to you.

Dr. Kray: We had indicated that we would address this as a committee and once we reviewed it we would get back to them. I don't think there was a time certain.

Rick Cole: Do we need legal council here?

Dr. Kray: There were definitions that caused litigation. These definitions have not been universally accepted. But we can go anyway you want as a committee. I think we need to make some statement.

Pat Augustine: This letter points out a couple of issues, postpone consideration for scoping hearings is a good idea.

Dave Wallace: There seems to be 4 different views on each statement, and there are hundreds of statements.

Vince O'Shea: Gilcrest would start with full resource committee, this is my thought.

Dave Wallace: Wayne keeps saying we are considering all constituent concerns.

Pat Augustine: Just sit on this and see how it evolves. Is Stevens involved with Oceans 21? We have to stay in the loop.

Dr. Kray: Weldon had 300 e-mails concerning this but has not heard from the fishing community. MPA is being considered without science base. We may choose not to react but it is up to the committee.

Vince O'Shea: Environmental groups have taken a look at this and that is something to hang your hat on. See if we have more updates "on the Hill".

Dr. Kray: Let's put this on the agenda for the December meeting and see what comes up from the scoping hearings. Do we need to run this by Joel? Okay, Tom will do that.

Meeting adjourned at 11:15 AM

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MEMORANDUM

DATE: November 9, 2005

TO: Ecosystem Committee (Kray, Jensen, Augustine, Freeman, Holder, Hoopes, Simms, Brown, O'Shea, and Randall)

FROM: Tom

SUBJECT: Materials for December 6 Committee meeting.

We have two agenda topics for this Committee meeting. I will first review the 13 public scoping meetings that were held from September 26 to October 24. The meeting summaries are attached as are the 8 letters we have received to date. At the request of Pat Augustine, I have also enclosed "Dock Talk" from December's *National Fishermen*. I thought you also may find our Council's former Vice Chairman's article on ecosystem management in the *New Jersey Angler* of interest.

Our second topic will be revisiting the proposed "Oceans 21" legislation. Remember we had a draft motion from Dr. Kray at our October Council meeting.

Look forward to seeing everyone on December 6. Thank you.

Ecosystem Committee Minutes
Trump Plaza, Atlantic City, NJ
December 6, 2005

Ecosystems Committee

Gene Kray opened meeting at 1:15 pm. Dr. Kray passed discussion onto Dr. Hoff to go over a handout of a summary of the discussions of the ecosystems scoping meetings and a listing of people (names & addresses) of all those who attended the ecosystems public meetings.

Comments on #1 - Adequacy of current approaches for addressing ecosystem considerations.

NONE

Comments on #2 - Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

Jim Fletcher -- questioned 200 scientists regarding MPA's, are they in with the NOAA people who can't predict the weather, is this the same group of people?

Pete Jensen -- We are still struggling with terminology.

Comments on #3 - Nature of the public decision-making processes within the Council for addressing management tradeoffs, consistent with identified goals.

NONE

Comments on #4 - Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

NONE

Comments on #5 - Boundaries of sub-regional ecosystems with the areas of the various FMCs.

NONE

Comments on #6 - Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Jim Fletcher -- The people that said the Council was doing a job did they state any examples that the Council has addressed by catch.

Dr. Hoff: No

Bruce Freeman: Ecosystems has 2 themes, abundance and the maximum production of overfishing and underfishing. These are 2 different concepts. Whichever one is supported has a different outcome from the other. We are asked to support something even before we know much about it.

Dr. Kray: Perhaps a template from all the Councils which could be moved with; who will do be doing what, etc. There is no money on the table right now. I agree that there is a lot of fuzziness as to where this is headed.

Comments on #7 - Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

Pete Jensen: Is this a plan that is approved under Magnuson. What does an FEP look like and how is it adopted.

Dr. Hoff: A FEP needs money, a background document, and a strategic document.

Art Glowka - You either have a silver bullet or you are opening Pandora's box. IS there any other group successful in an ecosystem approach?

Dr. Hoff: Congress approved essential fish habitat. The council would like more authority there is a fear of litigation based from a decade ago.

Art Glowka: Is it that you do not have the authority or are you violating the Magnuson Act.

Joel McDonald: This falls under conservation management. This comes down to what types of measure you impose that is going to adversely effect someone financially.

Dr Kray: We looked at essential fish habitat and identifying it.

Art Glowka: Is anyone else doing this?

Dr. Hoff: It is not new.

Pete Jensen: The Alaskan region adopted this approach 35-30 years ago and I believe they are still using it. I don't know how successful it is.

Jim Fletcher: Again, questioned scientists, when will other scientists come in and not from the university. When will a model be made to give appropriate results? When is science going to become science instead of math? The scientists can always manipulate the numbers.

Comments on #8 - Techniques for determining success of ecosystem-based management.
NONE

Comments on #9 - Other issues considered important for our region.

Pam Gromen (National Coalition of Marine): Ecosystem based management can be implemented trough an integrated approach through predator prey relationships. Timing

is of utmost importance. Forged species as food is going to increase. The next decade the supply of forage fish will not meet up with demand.

Dr. Hoff: There are five steps we need to do; 1. Scoping Meeting, 2. Attitudes and Values Survey, 3. Technical leads from February workshop, 4. Synthesis of public comments and 5. final report to be drafted and reviewed in January.

Dr. Kray: Any comments other than these 9 points?

Bruce Freeman: Very poor attendance at these meetings with very little public comments. I am concerned about this. For a national policy to move forward from the limited public comments seems very strange to me. People seem to be frustrated because they know we need a better system but...

Spoke with Congressional staff and they recognize deficiencies. Seagrant money can be diverted for research but we need a more ambitious budget for research. The existing boundaries of Councils make no sense. Mid-Atlantic needs to go from Cape Hatteras up to Canadian borders. There is an interest in ecosystems management but there are more questions than answers.

Pat Augustine: It seems we had the money but there were publications out there that were not made available to the public. This publication would give the public a clue. If this survey just became available this week, is there any way we could put more pressure on this publication be released. I don't feel we need to spend anymore Council time and Tom's time on this. We need to be careful and Tom has done an outstanding job.

Jimmy Ruhle: What are we trying to do from here down. My concern is we need to give ourselves credit here. We have don ecosystem based management we just have not defined it as such. It hasn't been ignored, it just hasn't been defined. We look at the predator-prey relationships, with different levels of precautionary approaches. We have done what is being mandated it is just a different title.

Dr. Kray: When Tom gets draft of report we will be able to review and go from there.

Larry Simms: Just observe what is going on is not going to happen. This is turning into a dangerous thing, we don't have the power to manage the state, this causes us a big problem, and we don't have control of this.

Jim Fletcher: Concerned about reading document about ecology of northeast fishery shelf and on page 6 talks about oscillation. This person needs his degree removed. The dredged areas show scallops, etc. We are in big trouble, we need credible science, and some thought process and conclusions. If what we base it on is in this document, we are in trouble.

Jim Weinberg: The stock assessments that are done, they are single species assessments. There is an estimate of natural mortality and it has a natural value added into it. Relationships are taken into consideration and a pretty accurate report can come out of it.

This info can be inserted to a single species assessment to improve it a lot. It can be info in helping the Council with what they can or cannot do. If we break the mortality rate apart this will help us in raising or lowering the quota.

Lawrence Simms: Great idea but no one has the authority to do it. Do we need a lot of money to do this?

Jim Weinberg: Yes, a certain amount of funding, but the information needs to be integrated, know which species are eating each other and when. This is a specialized field and will not lead to a stock assessment. It is always good to increase the funding for better data. I am not prepared to come up with a list right now.

Dr. Kray: Tom is handing out a memo relating to an Oceans 21 draft motion. The original motion is the last page of tab 1.

Pat Augustine: Dan went to the Council Chairman's meeting, did this come up at that meeting?

Dan Furlong: No.

Pat Augustine: Did the other Councils have ?????

Dan Furlong: Much time spent on Magnuson. The exec directors are working directly with legislative staff. There was a hearing on NEPA and its impacts on Magnuson act. This has caught Congress's attention. The Council Chairman's meeting was Magnuson only.

Dr. Kray: Weldon has 3000 e-mails agreeing with Oceans 21.

Pat Augustine: The emphasis is on 2 - 3 committees. It has to be captured clearly in terms of importance.

Dr. Kray: I suggest that some of these issues could be assumed under Magnuson. Senator Stevens may not want this to happen. Is there a middle ground, the wording may need to be cleaned up.

Ron Smith: I think the preamble with time limits is the crux of the problem.

Pete Jensen: I agree with Ron. We need to revisit Magnuson.

Dr. Kray: I had hoped we would have the final draft of Magnuson but it hasn't happened yet.

Bruce Freeman: My concern is that this motion has some definition conflicting. We need to write Congress to deal with Magnuson first, more time is needed.

Motion to write to Congressmen Weldon, Allen, Saxton and Farr that the Council would like to see the Magnuson Act passed first and the Council would be interested in working with the Congress staff commenting on their legislation.

Freeman/Jensen

Motion carried

Vince O'Shea: Going in right direction and I support what Bruce said. Consider encourage for reaching out to the council and encourage reaching out to other councils and commissions to get response for the bill.

Gordon Colvin: I anticipate this motion will pass.

Meeting concluded at 3:07 pm.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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MEMORANDUM

DATE: January 5, 2006

TO: Ecosystem Committee (Kray, Jensen, Augustine, Freeman, Holder, Hoopes, Simms, O'Shea, and Randall)

FROM: Tom Hoff

SUBJECT: Upcoming Committee meeting

We will be meeting on January 17th at 3:30. Most of the meeting will be spent on the draft Outline for our Ecosystem Approach to Fisheries report that has to be submitted by the end of March. I have developed an expanded five page outline and have attached three specific items that should help in our Committee deliberations. The Executive Summary is from the 1999 *Ecosystem-Based Fishery Management Report to Congress* that we have talked about numerous times and been using as a road map in our ecosystem efforts. That summary, along with the Advisory Panel Report from *Managing Our Nation's Fisheries II*, should be helpful to us as we develop our recommendations (section 6). The third item is the document from the ecosystem tools workshop and what I envision will be the basis for section 4 (technical needs) of the report. Please review the expanded outline for items that I have missed or things you would like emphasized. All comments are eagerly welcomed as I am the only one who has seen this and certainly I may have blinders on as I am trying to finish the report.

Dr. Kray would like to begin the discussion of circle hooks and their effectiveness in reducing bycatch in the recreational fishery. There is a one page list of 15 questions to facilitate your initial discussion.

The final two items are mostly FYI. Dr. Kray found the three part Philadelphia Inquirer article on the Gulf Stream highly informative and the final item is from the North Pacific FMC as to their proactive position on ecosystem approaches to fisheries.

Look forward to seeing you on the 17th.

Ecosystems Committee
January 17, 2006
Annapolis, MD

Gene Kray opened meeting at 3:48 pm.

Tom Hoff went over tab 4, a 5-page outline, advisory panel report, managing our nation's fishery, etc.

Tom walked through the draft outline. Council recommendations are not called for in the grant.

Pat Augustine: It would behoove you to put results or summaries in the report. Is this a stand-alone document? Are there not some studies that indicate damage that anchors do?

Tom Hoff: There are all kinds of work on non-fishing gear impacts.

Pat Augustine: We should look at all impacts. This shows we are doing our homework and this would beef up the document. Will there be comments from Dr. Wallmo?

Tom Hoff: It was submitted to OMB in March.

Pat Augustine: I think we should leave everything she said out. We had a task to be performed but were delayed. Perhaps then just get a statement from her.

Tom Hoff: I understand where you are coming from. No need to cast stones. We will have a meeting in March, should she come in to discuss.

Pat Augustine: No.

Gene Kray: I agree with Pat.

Dennis Spitsbergen: What is the status of the survey?

Tom Hoff: They took each of the four Councils mailing lists and used them, approx. 14,000 people. Has it actually been sent?

Tom Hoff: We don't know if it has been sent.

Dennis Spitsbergen: I have heard that 66% could not give input on management plans.

Tom Hoff: Any other data needs? (No other comments on this) Let's go over the recommendations handout.

Ron Smith: I would like to add "significant" before funding.

Bruce Freeman: Explain the second sentence. Explain you really aren't going to do much.

Pete Jensen: These recommendations are more extensive than I anticipated.

Pat Augustine: I agree with Pete, but in the Exec. Summary section, the policies are there but it talks about doing with what we have. These recommendations are the issues or problems but it doesn't say what we are going to do. Additional funding is essential but somewhere in time we need to bite the bullet. Highlight the key issues and come up with what we believe is ecosystems management. Our terms are not short term.

Gene Kray: stated outline to what Pat was saying (with 3 steps).

Pete Jensen: endorse principals and goals. I was referencing the advisory report. That is consistent with 2012.

Pat Augustine: The summary is what Pete has suggested.

Gene Kray: With that approach we won't need to go through the rest of the Tom's recommendations sheet.

Jim Weinberg: "should not replace single species management."

Pete Jensen: Lack of discussion with regards to climate and weather and this is a huge part of ecosystems.

Gene Kray: Tom emailed to you and it also is in the briefing book some articles regarding weather.

Gene Kray: Discussed circle hooks. (I have downloaded this and put on screen). I am asking you to modify these if appropriate and put them in order.

Pete Jensen: Are you familiar with work that already exists?

Gene Kray: Yes.

Pete Jensen: It is not so much the circle hooks but the method of fishing.

Pat Augustine: Maybe we should try to find out (thru Seagrant) if there are 3, 4, 5 species that would help in answering these questions.

Gene Kray: I am trying to come up with an overall plan so that we have addressed the issue of circle hooks. Is this worthwhile to go through modifying and putting in order, does that sound reasonable.

Pat Augustine: Yes.

Pam Gromman: Circle hooks are a great idea. We believe education is the right way to go. Why is it limited to commercial when it could reduce bycatch?

Gene Kray: Do we want to limit it to recreational?

Ron Smith: As broad as possible.

Gene Kray: what kinds of questions do we ask commercial fishery.

Laurie Nolan: Tilefish is operated thru circle hook.

Jeff Randall: Commercial circle hooks is required for pelagic longline.

Bruce Freeman: Number of states have a requirement for certain hooks in certain waters, perhaps they could provide us with success or failure rates.

Gene Kray: Mandate circle hooks... we don't have to make that decision right now.

Jim Fletcher: the heart of the matter is to charge the S & S Committee to come up with figures, and then stop fishing to reduce bycatch.

Gene Kray: that is an issue that pat and I discussed a few years ago.

Meeting ended at 4:46 pm.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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Daniel T. Furlong
Executive Director

Christopher M. Moore, Ph.D.
Deputy Director

MEMORANDUM

DATE: March 2, 2006

TO: Ecosystem Committee (Kray, Jensen, Augustine, Holder, Hoopes, Simms, O'Shea, and Randall)

FROM: Tom Hoff

SUBJECT: Upcoming Committee meeting

We will be meeting on March 14 at 10 AM. The first half of the meeting will be spent on the *Evolution Towards an Ecosystem Approach to Fisheries* report that has to be submitted by the end of March. This report is a separate document with this briefing book. Please review the report for items that I have missed or things you would like emphasized. I have nothing in section 8 (Acronyms) right now and know that I am missing some references (section 7), but those things will be picked up with the final read through. Several staff members have been having trouble with our spellcheck programs in Word this week, so there may be some typos that will also be picked up before final submission. All comments are eagerly welcomed since I am the only one who has seen this and certainly I may have had blinders on as I have been trying to finish the report.

Dr. Kray would like to continue the discussion of circle hooks and their effectiveness in reducing bycatch in the recreational fishery. There is a one page draft (second) list of 16 questions to facilitate your discussion. There is also a one page email from Pat to Gene on this topic.

Look forward to seeing you on the 14th.

Ecosystems Committee Meeting
March 14, 2006
Congress Hall, Cape May, NJ

Gene Kray opened meeting at 10:07 am.

Tom Hoff reviewed the draft of MAFMC's Ecosystem Report regarding ecosystem based fishery management.

Pete Jensen: I noticed that the introduction, third paragraph. Are there any conflicts in any of our plans?

Tom Hoff: That is part of our scoping document, part of predator/prey.

Pete Jensen: Those conflicts are not part of the next step?

Tom Hoff: That would be my recommendation to the Council. If there are dedicated funds and staff time, that many people view the development of the Fishery Ecosystem Plan (FEP).

Dan Furlong: Tom you addressed in the summary some of these conflicts and we are addressing those now through Amendment 9 & 10. I believe we are already on that track.

Pete Jensen: I did not count that as a conflict.

Pat Augustine: These documents represent a years worth of work, how bad and how quickly do you want them to get the message. I suggest this document is tabbed like our briefing book. I think we need to ask a question and then answer that question.

Tom Hoff: I understand that issue now. Remember that each one is one of the nine topics that were addressed. These questions are not all inclusive. In some public scoping meetings we got answers to those questions and in some meetings we got no answers. There usually was not a lot of focus on those questions. I would like to keep the questions there because they were part of the process.

Pat Augustine: Some statements don't respond to the question. It makes us look like we didn't do our job.

Gene Kray: The purpose of the question was to engage the public.

Pete Jensen: The development of guidelines; are there any suggestions of these guidelines? Should we go further into this?

Tom Hoff: That would be my recommendation. There has been no activity on this since about July of last year. We don't know exactly what is coming out of Congress with the reauthorization. We don't want to go down the same path as we did in 1996 with EFH. The Council did not want hard guidelines. There does need to be guidance, but not hard deadlines, etc. If we could come up with some, I would like to carry those forward.

Pat Augustine: We should look at section 4 and suggest "future efforts" and refer to page 27 where it states "recommendation" and to follow that lead as a basis to move forward in the future.

Tom Hoff: I think section 4 is an excellent one. The issue is, beyond the issues and the goals, but the policies; we have not discussed this with the Council.

Pam Gromman: I work with Ken Hinman, we do believe that Ecosystem based management should start between predator/prey and be evolutionary not revolutionary. We feel squid is a good place to start.

Gene Kray: NE press release and their movement towards an ecosystem approach...

Tom Hoff: NE had their S&S Committee meeting and the press release stated that this was going forward, they endorse the concept and wanted to move forward with it based on availability of funding or look at it in Oct. At that time something else from 2007 would have to come off the table.

Gene Kray: Moving along to circle hooks under Tab 1, I have redrafted the questions that I had originally done, which takes a different approach. Take a look at that and Pat do you want to discuss this?

Pat Augustine: How much involvement should we have? The bulk of recreational fishing would be affected in state waters. I think we should look at that? Gordon Colvin has given me a document regarding circle hooks by Stephen Cook. He has done an exceptional look at circle hooks and I feel we should take a look at this document. Perhaps circle hooks should be put back on the states.

George Darcy: I want to caution making NMFS Headquarters the lead on this. This would have to be done through frameworks or FMP amendments. Look at what other regions are doing, because regulations are not their role.

Gene Kray: This started when Ron Smith wanted to reduce bycatch and I brought up circle hooks and it took off from there. What is a good way to get this started?

Pat Augustine: We should make a recommendation to the Regional Office on what species this would be appropriate for? We need to look at this document that I mentioned and there are 4000 sites on the Internet, however, Stephen Cook looked at all the approaches and made a strong assessment.

Scott Holder: There is some species that circle hooks do not apply to. We do need to find the species that they apply to.

Gene Kray: Could we get Steve Cook to come to one of the meetings?

Pat Augustine: If you can find him. There is another gentleman, C. D. Suskin whom I found on the Internet. The document I previously mentioned is well known throughout the world and I feel we should take a look at it.

Gene Kray: I used circle hooks exclusively and I caught a lot of sea bass but I couldn't get them out of the mouth. If we identify the species first we can talk with the Regional Office on where to go from there.

George Darcy: Yes, narrow down what you are looking at.

Larry Simns: You can use other hooks other than circle hooks.

Gene Kray: Those series of questions from the first draft....

Pam Gromman: I agree with the discussion of the Council. We have to look at the species but the science has to be completed. It should not be an omnibus approach. It should not be mandatory for circle hooks use. We start by accessing the information available. An exception is tournaments, require they use circle hooks, which is something to look at.

Pat Augustine: This is an educational process and I agree not to go with the omnibus approach.

Ed Goldman: Bycatch mortality is different from just bycatch. I feel educational approach is great. I do not use circle hooks all the time, I use plastics, and you don't lose fish and they are easy to release. I don't like the idea of mandatory circle hooks.

Pat Augustine: I think we know where we are going with circle hook. On the federal end, they are looking at opening up the EEZ again for striped bass. What priorities should be used if this is reopened? What guidelines, framework, etc need to be put in place? A slot size would be most appropriate for striped bass. 28 inches is the basic state minimum size, what would the guideline be? The slot size needs to be controlled and then a 5-year sunset clause. ASFMC would have to monitor this on an annual basis. All states know the parameters. I think we should look at this as a Committee issue. This will put us ahead of the curve. We should also look at the permit system if the federal government goes through with this. I would like these two items put on the agenda.

Jimmy Ruhle: There is a misconception that all the larger fish are in the EEZ.

Pat Augustine: That was not my belief, I agree we catch large fish elsewhere.

Larry Simns: We need to be careful with the big fish, how much longer before they get here? We need to protect that large fish. If not, this will come back to haunt us in the future. This is why the slot size is very important. It is valuable to reproduce fish for the future.

Scott Holder: Slot limit is nice but how do you manage that? The EEZ is a big area, how do you manage that?

Pat Augustine: We need to be consistent for all states. It can be self-controlling however; there is a lot of illegal stuff going on, so why not make it legal.

Gene Kray: There is illegal fishing going on for striped bass in season. I don't feel we should open the EEZ.

Jeff Randall: If you open the EEZ you will save us a lot of work. If you open the EEZ, a lot of this area is prosecuted in the wintertime, we may have a potential of an increase in boating accidents. Please keep this mind when you make a decision. Run it through the ASFMC for their input. It should also be consistent amongst the states.

Jimmy Ruhle: Illegal during the season, they are not illegal until the fish is in the boat, correct?

Gene Kray: That is being argued all the time. You are not allowed to fish, Jeff

Jeff Randall: It is illegal, it states, "you can not fish for, possess, or take striped bass."

Pat Augustine: The closed off areas are a national security zone. When you talk about legalizing something we are closing the loop.

Meeting adjourned at 11:24 am.

APPENDIX C.

GIS WORKSHOP
Table of Contents
Executive Summary
Staff Presentation



Table of Contents

Executive Summary	1
Background and Rationale	2
Summary of the Workshop Process	3
Session Summaries	
Management Needs	4
Data Availability and Gaps	5
Science Needs	7
The Way Forward	8
List of Tables	
Table 1: Data sets mentioned in the Workshop	6
Appendices	
Appendix A: Presentation Abstracts	A1
Appendix B: Workshop Agenda	B1
Appendix C: Participant List	C1

Acknowledgments

Many thanks are due to the workshop participants for their expert advice and engagement on the issue, and to Margaret Davidson and the management and staff at the NOAA Coastal Services Center for their excellent hospitality and support for the workshop.

For More Information...

Contact Tim Haverland of the NOAA Fisheries Office of Science and Technology at tim.haverland@noaa.gov, Moe Nelson of the NOAA National Ocean Service (NOS) Biogeography Program at david.moe.nelson@noaa.gov, or visit the EcoGIS website at <http://www.st.nmfs.gov/EcoGIS>.



Executive Summary

The Workshop on GIS Tools Supporting Ecosystem Approaches to Management (EcoGIS Workshop) was held September 8-10 at the NOAA Coastal Services Center in Charleston, S.C. Forty-eight people attended representing a variety of organizations, including NOAA Fisheries (NMFS); NOAA National Ocean Service (NOS); NOAA National Coastal Data Development Center (NCDDC); the New England, Mid-Atlantic, South Atlantic, and Pacific Fishery Management Councils (FMCs); Duke University, and The Nature Conservancy.

The purpose of the workshop was to define the spatial analyses and decision support tools needed by the scientists and managers implementing the four Ecosystem Pilot Projects on the Atlantic Coast and Gulf of Mexico. Through presentations and discussion sessions, the input of all participants was used to define an initial conceptual view of the needs of scientists and managers, and in developing priorities for the EcoGIS project.

The requirements for Geographic Information System (GIS) tools compiled in the workshop ranged from simple map-based queries to complex ecosystem modeling. Examples of important questions were: Given changes in regulations or environmental conditions, what is the effect of displaced fishing activity on habitat, species, fishing communities, etc.? Where and under what circumstances is bycatch occurring, and what strategies might reduce it? How should ecosystem boundaries be delineated?

Data management coordination was also a major topic of the workshop. Because of the cross-cutting nature of ecosystem management, contributions of data will come from dozens of federal, state, private, and academic sources. To make these data more accessible and up-to-date, the workshop participants agreed to coordinate with existing data sharing efforts led by the NOAA GIS Committee, GeoSpatial One Stop, and observing system architectures.

The next step is the formation of a steering committee to guide development of the EcoGIS project. In conjunction with the steering committee and through face-to-face meetings with individual project partners, NMFS and NOS staff will define the scope of the project, develop a detailed project plan, flesh out the initial GIS tool requirements compiled in the workshop, assess data needs, and inventory and evaluate existing data sources.

Presentations and other materials from the workshop, including this summary, can be accessed online at <http://www.st.nmfs.gov/EcoGIS>. This web site will be expanded to include background information and the latest news about the EcoGIS project, project plans, and links to the developments of the Ecosystem Pilot projects.

MANAGEMENT NEEDS OF MAFMC ECO-GIS

PRESENTED AT GIS TOOLS SUPPORTING ECOSYSTEM APPROACHES
TO MANAGEMENT

CHARLESTON, SC
SEPTEMBER 8, 2004

THOMAS B. HOFF

MAFMC FMPs

- Surfclam and Ocean Quahog (1977)
- Atlantic Mackerel, Squid, Butterfish (1978)
- Summer Flounder (1988), Scup (1996),
Black Sea Bass (1996)
- Bluefish (1990)
- Dogfish (1999)
- Tilefish (2001)

FISHERY ECOSYSTEM PLAN -- OR CUMULATIVE IMPACTS

- Target Fishery and Resources
- Non-Target Fisheries or Bycatch
- Habitat
- Protected Resources
- Communities -- Socioeconomics

Surfclam and Ocean Quahog

- Not overfished and overfishing not occurring
- Gear – 100% clam dredges
- Minimal and Temporary Gear Impacts
- Minimal Bycatch
- Long-lived (200+ years)
- Inshore/southern end of range may be impacted by global warming
- Larval settlement dependent on density, predators, environmental and oceanographic

Atlantic Mackerel, *Loligo*, *Illex*, and Butterfish

- Not overfished and overfishing is not occurring
- Gear – Bottom and Mid-water Trawls
- Bycatch issues in *Loligo*/Butterfish for scup
- Marine Mammal issues in all 4 fisheries
- Prey for MM, HMS, most fishes, and themselves
- Squid annual species and recruitment likely highly dependent on environmental factors

Summer Flounder, Scup, and Black Sea Bass

- None Overfished
- Overfishing occurring with SF, and unknown on other two species
- Gear – SF (95% BT), Scup (75% BT, 10% traps), BSB (45% traps, 40% BT, 10% H)
- SF has HAPC which are SAV beds
- All three are commercial and recreational fisheries
- Limited encounters with MM and ES

Bluefish

- Overfished but overfishing is not occurring
- Gear – Gill net 50%, Bottom Trawl 20%
- EFH and Social Impacts disapproved
- Recreational (80%) vs. commercial (20%)
- Significant biomass decline during last decade, belief could be competition with striped bass

Dogfish

- Overfished but overfishing is not occurring
- Gear – GN 75%, BT 15%, H&L 10%
- Largest biomass in Northeast, but declining
- Bycatch only fishery now
- Problems – few adult females, practically no recruitment for last 7 years, pup survival of small females very low

Tilefish

- Overfished and overfishing occurring
- Gear – longline 95%, bottom trawl 5%
- 10 year rebuilding plan with constant quota
- Structure oriented species
- HAPC but no gear restrictions
- New assessment 2005, Industry wants ITQs

Current FMP Goal

Rebuild Tilefish – OY Obtained

- Prevent overfishing and rebuild to biomass that supports MSY
- Prevent overcapitalization and limit new entrants
- Identify and describe essential tilefish habitat
- Collect necessary data to develop, monitor, and assess biological, economic, and social impacts of management measures

Five Pillars for Fishery Ecosystem Plan

Target Fishery and Resources

- Survey abundance and distribution over time
- Commercial catch & effort by gear over time
- Recreational catch & effort over time
- Biological data, especially food habits
- Oceanographic – water temp, DO, productivity, distribution of plankton over time

Non-Target or Bycatch

- Survey abundance and distribution over time
- Commercial catch & effort by gear over time
- Recreational catch & effort over time
- Biological data, especially food habits
- Oceanographic – water temp, DO, productivity, distribution of plankton over time
- VTR data needs corroboration and therefore need more observers

Habitat

- Bottom sediments
- Marine Sanctuaries, existing MPAs. closed areas, artificial reefs
- HAPCs, i.e., SAV beds
- Survey and commercial hang downs
- Survey distributions of all species for all life stages by time
- Other anthropogenic impacts
- Critical to have State survey data for resource distribution

Protected Resources

- Species distribution and migrations over time for marine mammals, turtles, birds and endangered or threatened fishes
- Maps of endangered species critical habitat
- Maps of encounters with other human activities, i.e., ship strikes, strandings

Socioeconomics

- Coastal development
- Coastal fishing communities
- Ports
- Other anthropogenic impacts – power plants, beach replenishments, nutrient loadings, coastal wetlands losses, fish tissue contaminations, beach closures, wind mills, oil rigs, etc.

SUMMARY

- Single species management has worked for MAFMC because it has been quota based and limited access in overcapitalized fisheries
- Recognize that fishery ecosystem management goals need to be based on more than MSFMCA
- Recognize process needs to be more evolutionary than revolutionary
- Envision using GIS tool like time lapse photography
- Concern always of paralysis by analysis

APPENDIX D.

ECOSYSTEM TOOLS WORKSHOP

Agenda

Working Groups

Staff Presentation



Workshop on Ecosystem-Based Decision Support Tools for Fisheries Management

February 14-18, 2005
Key Largo, Florida

Agenda	Participants	Objectives	Working Groups	Contact
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Monday : Governance, Indicators

Background	Steve Murawski	NOAA Fisheries Service, Office of Science and Technology
Ecosystem-based management or now that we have Ocean Commissions reports, what do we do?	Andrew Rosenberg	University of New Hampshire
EBFM Governance – Aussie style	Tony Smith	CSIRO Marine Research
Ecosystem Indicators, a bouillabaisse of ideas	Marie-Joelle Rochet	IFREMER
	Kerim Aydin	NOAA Fisheries Service, Alaska Fisheries Science Center
	Patricia Livingston	NOAA Fisheries Service, Alaska Fisheries Science Center
	Jason Link	NOAA Fisheries Service, Northeast Fisheries Science Center

Tuesday: Functional Relationships, Models

Functional relationships and decision tools for EAF: Evaluating environmental, ecosystem, and anthropogenic impact	Villy Christensen	UBC Fisheries Centre
Functional Relationships	Michael Fogarty	NOAA Fisheries Service, Northeast Fisheries Science Center
EBFM and modeling	Beth Fulton	CSIRO Marine Research
Overview of multispecies and ecosystem models	Jeremy Collie	University of Rhode Island

Wednesday: Data-Information, Council Needs, Social Science Needs

Ecosystem data and information needs	Patrick Sullivan	Cornell University
Mid-Atlantic Fisheries Management Council current management needs	Tom Hoff	Mid-Atlantic Fishery Council
Ecosystem-based support tools for fisheries management: Gulf Council needs as case histories	Steven Atran	Gulf of Mexico Fishery Council
	Robert Shipp	University of South Alabama
Data needs for ecosystem management, South	Myra Brouwer	South Atlantic Fishery Council

Atlantic Council	Vishwanie Maharaj	South Atlantic Fishery Council
Towards EBFM: Trends, emerging issues and data needs	Chad Demarest	NOAA Fisheries Service, Southeast Fisheries Science Center

Social Science Data & Analytical Needs

Ecosystem Approaches to Fishery Management: - A Mandate for Integrated Assessments	Rita Curtis	NOAA Fisheries Service, Office of Science and Technology
Assessing Stakeholder Attitudes Toward Ecosystem Management	Kristy Wallmo	NOAA Fisheries Service, Office of Science and Technology
Ecosystem Management: Facts, Fiction, or Fantasy And Something About Menhaden	Jim Kirkley	College of William & Mary, Virginia Institute of Marine Sciences
Economics of Ecosystem Change	Doug Lipton	University of Maryland
Decision Models and Ecosystem Management	David Tomberlin	NOAA Fisheries Service, Southwest Fisheries Science Center
A General Equilibrium Ecology/Economy Model Applied To An Alaskan Marine System	John Tschirhart David Finnoff	University of Wyoming

Thursday: Talking Points for Working Groups

[Indicators](#)

[Data-Information Needs](#)

[Functional Relationships](#)

[Models](#)

[Science Supporting Governance Systems](#)

[Social Science Needs](#)

Friday: Plenary, Report from Working Groups, Recommendations

[Indicators](#)

[Data-Information Needs](#)

[Functional Relationships](#)

[Models](#)

[Science Supporting Governance Systems](#)

[Social Science Needs](#)



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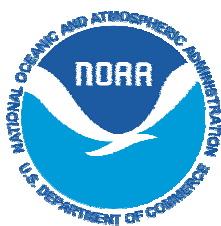


Working Groups

Workshop on

Ecosystem-Based Decision Support Tools for Fisheries Management

14-18 February 2005
Key Largo, Florida





Working Groups

For the purposes of the workshop, a schematic representation of a science-support system informing EAF is developed. The components of the scheme include:

1. Data / Information
2. Indicators / Reference Points
3. Functional Relationships among system components
4. Models and forecasts
5. Science supporting governance systems
6. Social science aspects supporting ecosystem approaches

Working Group participants and some issues considered:

Indicators/Reference Points

Jason Link
Kerim Aydin
Marie-Joelle Rochet
Kathy Mills
Steve Brown

Much current research and discussion has centered on the development of suites of indicators such as richness/diversity indices, trophic levels, balance among components of biological systems, economic/social performance indicators, etc. A recent SCOR/IOC workshop (www.ecosystemindicators.org) reviewed the use of candidate indicators. There are important links between the selection of potential indicators, and data/information supporting routine assessments of the state of the ecosystem relative to the indicators. Similarly, there are important links between indicators and models that evaluate the responsiveness of candidate indicators, and the consequences to the system of managing so as to achieve desired levels of various indicators

Data/Information Needs

Pat Sullivan
Fred Serchuk
Jim Cowan
Bob Shipp
Myra Brouwer
Vishwanie Maharaj
Tom Hoff
Chad Demarest



Three main components of data/information needs include biological, social and physical. Biological data include standard information on the abundance, distribution and demography of various species. Additionally, in order to understand feedback effects, information on trophic interactions, habitat requirements and the degree of competition and predation among species is required. In order to evaluate the efficacy of MPAs and other place-based management measures, movement patterns and site-specific demographic information is required. Social sciences information required to evaluate ecosystem issues include revenue, profit and employment patterns by fishery and community. Observer data can provide information about fishery interactions. In order to understand how climate variability and trends interact with biological and social systems, information linking ocean variability, human disturbances and biological productivity are required. Importantly, medium- and long-term predictions concerning regime change are dependent on adequate suites of biological and physical measurements.

Functional Relationships

Mike Fogarty
Villy Christensen
Bill Overholtz
Chris Harvey
Ned Cyr
Josh Nowlis

Many of the important predictive capabilities necessary to inform management require the assumption of relationships among various biological, social and physical components of ecosystems. Simple examples currently in use are stock-recruitment relationships used to predict stock rebuilding for individual species. Providing similar predictions in a multispecies or ecosystem context requires more sophisticated relationships. Similarly, functional relationships among predators and prey, water mass characteristics and productivity, density and movement patterns, abundance and fishing effort distribution, predator and prey abundance and predation mortality rates, and other relationships are key components of model-based predictions. Validating functional relationships requires time series data for systems that have shown dynamic responses. In the absence of data, multiple plausible functional relationships may explain the observed relationships among some components, with potentially diverging predictions relative to policy choices.

Models

Jon Brodziak
Beth Fulton
Jeremy Collie
Phil Levin
Clay Porch



Gerard Dinardo
Beth Babcock

Quantitative models support resource management decision-making at many levels. Assessment models evaluate the current resource abundance and many aspects of population demography. A typical output of assessment models is the recent and historical rate of harvest. Multispecies models inform on the interdependence of species. Predictive models use current stock status from assessment model and estimates of recruitment to forecast short- (1-2 years ahead, medium- (3-10 years), and long-term (equilibrium) effects of management policy choices. Models can be used to evaluate the use of indicators, and to evaluate the consequences of policy choices for the biological and human components of the ecosystem. An important aspect of modeling is to inform on the consequences for policy choice outcomes of type II errors in underlying functional relationships used to construct models, and the impacts of data gaps and other process uncertainty (errors). Model robustness is evaluated using sensitivity analyses with frequentist approaches or Bayesian model approaches. Striking a balance between possible model states and informative and clear advice to managers is difficult when model uncertainty is high.

Science Supporting Governance Systems

Andy Rosenberg
Tony Smith
Lee Anderson
Ellen Pikitch
Joe Powers
Dave Dow
Joe Kimmel
Frank Parrish
Tom Hoff

Information on the status of ecosystems, predictions about future ecosystem states, and evaluations of the consequences of management policy choices are used by the governance system to select management measures amongst numerous alternatives. These choices will, necessarily be made under greater levels of process and measurement uncertainty in an ecosystem context, as opposed to current species-by-species or fishery-by-fishery management schemes. How are management guidelines developed, using model predictions and indicators of ecosystem performance? What are the most important concerns of stakeholders and the public regarding ecosystem issues that would not be addressed if conservative single species or FMP management were pursued across the board? That information would be necessary to further inform those issues outside the current sphere of management? How does one approach a governance system for data poor situations vs. data rich situations?



Social Science Aspects Supporting Ecosystem Approaches

Rita Curtis
Kristy Wallmo
Brad Gentner
David Tomberlin
Joe Terry
Jim Kirkley
Doug Lipton
John Tschirhart
Kathi Kitner

Social science needs are highlighted as a separate category for discussion for a number of reasons. First, there are ongoing discussions regarding the type and extent of issues to be included under an umbrella of EAF. Surveys of stakeholder groups and broader constituencies can help shape the discussion of what needs to be included in quantitative decision support tools. Second, the types of social science data requirements, models of functional relationships between human activities and biological resources, and indicators of performance from social perspectives have not been considered in detail. Finally, this discussion will provide an overview of issues to be included in social science survey instruments, and the revised survey instrument will be reviewed

Cross-cutting issues for all task teams:

What spatial/temporal scales necessary for EAF?

How do definitions of regional ecosystems relate to information and modeling issues to support EAF?

What are appropriate quantitative assessments for management measures evaluation in an EAF context (models, indicators, data, functional relationships)?

What science-governance relationships are applicable to differing data models (e.g., data rich, data poor)? How does the precautionary approach fit in such a scheme?

How do we forge links between EAF and EAM, given scientific uncertainty in linkages between fishery resources and broader ecosystem processes and management institutions?



Working groups were expected to evaluate these issues for each topic:

- 1) What is the current state of the art in this discipline?
- 2) Are there appropriate experiences worldwide that demonstrate how research in this discipline can inform ecosystem-based fisheries management?
- 3) What new data, models or information management system are required to advance the discipline so that its products form the basis for ecosystem-based decision making (priority ranking)?
- 4) Based on the above, what changes in policy, governance, or science administration are required to more effectively inform on ecosystem approaches to fisheries

MAFMC CURRENT MANAGEMENT NEEDS

PRESENTED AT ECOSYSTEM-BASED DECISION SUPPORT TOOLS
FOR FISHERIES MANAGEMENT

KEY LARGO, FLORIDA
FEBRUARY 16, 2005

THOMAS B. HOFF

MAFMC FMPs

- Surfclam and Ocean Quahog (1977)
- Atlantic Mackerel, Squid, Butterfish (1978)
- Summer Flounder (1988), Scup (1996), Black Sea Bass (1996)
- Bluefish (1990)
- Dogfish (1999)
- Tilefish (2001)

FISHERY ECOSYSTEM PLAN -- OR CUMULATIVE IMPACTS

- Target Fishery and Resources
- Non-Target Fisheries or Bycatch
- Habitat
- Protected Resources (PET)
- Communities -- Socioeconomics

Surfclam and Ocean Quahog

- Not overfished and overfishing not occurring
- Gear – 100% clam dredges
- Minimal and Temporary gear impacts
- Minimal bycatch
- Long-lived (200+ years)
- Inshore/southern end of range may be impacted by global warming
- Larval settlement dependent on density, predators, environmental and oceanographic

Atlantic Mackerel, *Loligo*, *Illex*, and Butterfish

- Not overfished and overfishing is not occurring
- Gear – bottom and mid-water trawls
- Bycatch issues in *Loligo*/butterfish for scup
- Marine mammal issues in all 4 fisheries
- Prey for MM, HMS, most fishes, and themselves
- Squid annual species and recruitment likely highly dependent on environmental factors

Summer Flounder, Scup, and Black Sea Bass

- None Overfished
- Overfishing occurring with SF, and unknown on other two species
- Gear – SF (95% BT), Scup (75% BT, 10% traps), BSB (45% traps, 40% BT, 10% H)
- SF has HAPC which are SAV beds
- All three are commercial and recreational fisheries
- Limited encounters with MM and ES

Bluefish

- Overfished but overfishing is not occurring
- Gear – gill net 50%, bottom trawl 20%
- EFH and social impacts disapproved
- Recreational (80%) vs. commercial (20%)
- Significant biomass decline during last decade, belief competition with striped bass

Dogfish

- Overfished but overfishing is not occurring
- Gear – GN 75%, BT 15%, H&L 10%
- Largest biomass in Northeast, but declining
- Bycatch only fishery now
- Problems – few adult females, practically no recruitment for last 7 years, pup survival of small females very low

Tilefish

- Overfished and overfishing occurring
- Gear – longline 95%, bottom trawl 5%
- 10 year rebuilding plan with constant quota
- Structure oriented species
- HAPC but no gear restrictions
- New assessment 2005, industry wants ITQs

Current FMP Goals

Rebuild Tilefish – OY Obtained

- Prevent overfishing and rebuild to biomass that supports MSY
- Prevent overcapitalization and limit new entrants
- Identify and describe essential tilefish habitat
- Collect necessary data to develop, monitor, and assess biological, economic, and social impacts of management measures

Five Pillars for Ecosystem Plan Target Fishery and Resources

- Survey abundance and distribution over time
- Commercial catch & effort by gear over time
- Recreational catch & effort over time
- Biological data, especially food habits
- Oceanographic – water temp, DO, productivity, distribution of plankton over time
- Identification of limiting factors or bottlenecks

Non-Target or Bycatch

- Survey abundance and distribution over time
- Commercial catch & effort by gear over time
- Recreational catch & effort over time
- Biological data, especially food habits
- Oceanographic – water temp, DO, productivity, distribution of plankton over time
- VTR data needs corroboration and therefore need more observers

Habitat

- Bottom sediments
- Marine sanctuaries, existing MPAs, closed areas, artificial reefs
- HAPCs, SAV beds
- Survey and commercial hang downs
- Survey distributions of all species for all life stages by time
- Other anthropogenic impacts
- Level 3 and 4 EFH data relating productivity of the resource to specific habitat

Protected Resources

- Species distribution and migrations over time for marine mammals, turtles, birds and endangered or threatened fishes
- Identification of limiting factors for populations and their migrations

Socioeconomics

- Coastal development
- Coastal fishing communities
- Revenue, profit, and employment
- Other anthropogenic impacts – power plants, ports, beach replenishments, nutrient loadings, coastal wetlands losses, fish tissue contaminations, beach closures, etc.
- Stakeholder preferences

SUMMARY/SERMONETTE

- Single species management has worked for MAFMC because it has been quota based and limited access in overcapitalized fisheries – adaptive
- “Crisis” (necessary for quantum change) does not exist and majority of Congressional perception
- Recognize that fishery management goals/objectives based on more than MSFMCA – Satisficing for decades
- National Standards – 1, 2, 3, 5, 8 and 9, along with EFH
- Recognize process needs to be more evolutionary than revolutionary and evolving more comprehensive
- Ecosystem models will be wonderful tools, especially in identifying bottlenecks and trade offs

SUMMARY (CONT)

- Concern always of paralysis by analysis --KISS
- Need FMCs as stakeholders and full partners in collaborative and iterative process
- Must avoid EFH type fiasco with 2 year implementation
- Objective setting will be the key
- How do we move forward – SARC and surveys
- Need good public relations. “We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years.”

Sissenwine 2005

APPENDIX E.

MAFMC SCOPING DOCUMENT

Scoping Meeting on the MAFMC's EVOLUTION TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT(EAF)

I. Introduction

The Mid-Atlantic Fishery Management Council (along with the 3 other Atlantic Councils) was tasked by Congress in the FY-2004 appropriations to incorporate ecosystem considerations into fisheries management. The purpose of the Congressional outlay was to engage the 4 Councils and their constituencies in public debate on goal setting, the types of considerations to be included in ecosystem management, and to identify issues not covered under existing authorities. The purpose of this scoping meeting is to address the first part of the Council's grant from National Marine Fisheries Service which calls for the Council to undertake public meetings with stakeholder groups and interested parties "to facilitate wide-ranging discussions with affected/interested parties and the general public in nine topic areas: (1) views regarding the adequacy of current approaches for addressing ecosystem considerations, (2) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues, (3) the nature of the public decision making processes within the Councils for addressing management tradeoffs, consistent with identified goals, (4) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity, (5) the boundaries of sub-regional ecosystems within the areas of the various FMCs, (6) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals, (7) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP), (8) techniques for determining success of ecosystem-based management, and (9) other issues considered important in any particular region." We will focus on these nine topic areas for much of this scoping meeting. There are questions after each of the nine topic areas discussed later in the document which are designed to initiate, but not limit, the debate.

A. Ecosystem Approach to Fisheries Management (EAF)

There is a growing awareness that EAF is important to the way we rethink fisheries management for the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research.

The U.S. Commission on Ocean Policy (USCOP 2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

The National Oceanic and Atmospheric Administration (NOAA; as well as the National Marine Fisheries Service within NOAA) have fully embraced the concept of EAF. The 2005 through 2010 strategic plan for NMFS has an objective to: "Protect, restore, and manage the use of the coastal and ocean resources through an ecosystem approach to management" (NOAA 2004).

The NMFS defines an ecosystem as: "a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics."

When Congress last re-authorized the Magnuson-Stevens Act (MSA in 1996), it required the eight regional Councils and NMFS to account for bycatch, protect habitat, and improve monitoring and research. Also established in 1996 by Congress was an Ecosystems Principles Advisory Panel (EPAP). This EPAP was charged to review the extent to which ecosystem principles are incorporated in fishery management and research, and recommend management and research activities that would integrate ecosystem principles (EPAP 1999). In addition to proposing comprehensive principles, goals, and policies for fishery management, the EPAP recommended the development of Fishery Ecosystem Plans (FEPs) and research to support them.

A comprehensive ecosystem approach to fisheries management would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. An initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem (EPAP 1999).

Are there questions about the purpose of this meeting, and do you understand that the majority of our time here tonight will be spent accepting comments on the nine topic areas listed above?

Are there any general questions about the Council or ecosystems?

B. MAFMC Current Management

The Council began single-species fisheries management nearly 30 years ago with their now very successful efforts for surfclams and it has 12 others species under their lead authority: ocean quahogs, Atlantic mackerel, butterfish, *Loligo* and *Illex* squid, summer flounder, scup, black sea bass, bluefish, dogfish, and most recently, tilefish. All of these species are being successfully rebuilt or are at their maximum sustainable yield. This Council is generally perceived as being responsible managers and as Roger Rufe (Executive Director of The Ocean Conservancy) pointed out in his scorecard at *Managing Our Nations Fisheries II* (Washington Conference March 2005) the MAFMC scored the highest of the east coast Councils.

During the evolution of the various FMPs the Council has amended its: Surfclam and Ocean Quahog FMP 13 times; Summer Flounder, Scup and Black Sea Bass FMP 13 times; Atlantic Mackerel, Squid and Butterfish FMP 9 times and the Bluefish FMP once. The Dogfish and Tilefish FMPs were recently implemented and are already undergoing management changes.

As the FMPs were amended they generally evolved from single-species to multi-species, and now many of the management issues facing the Council currently deal with ecosystem-type

ideas. For example, the surfclam and ocean quahog FMP currently is dealing with the loss of the southern and inshore portion of the surfclam biomass which is most likely a function of global warming. For the Atlantic mackerel, *Loligo*, *Illex*, and butterfish FMP the Council is addressing bycatch issues in the *Loligo* and butterfish fisheries for scup, as well as, the fact that all four species are prey for marine mammals, highly migratory species, most fishes, and themselves. In the summer flounder, scup, and black sea bass FMP there are ecological issues of summer flounder juveniles strongly associated with submerged aquatic vegetation which is very vulnerable to man-made disturbances in the estuaries. Bluefish and striped bass are competitors with an inverse relationship between the two. Finally, tilefish are structure-oriented and while an HAPC (habitat area of particular concern) has been identified, there are no gear restrictions.

Council management of our fisheries resources has been based on the goals and objectives set through public participation under MSA and often times compromises have resulted in not the maximization of a certain parameter or output but rather the overall "optimizing" for society. Many of the current 10 National Standards that FMPs are required to meet under the MSA (i.e., 1 – overfishing, 2 – best science, 3 – managed as unit throughout its range, 5 – efficiency, 8 – communities, 9 – bycatch) and the essential fish habitat provisions require a more holistic approach that has evolved the fisheries management efforts towards EAF.

II. Nine Topic Areas for Discussion at this Scoping Meeting

1. Adequacy of current approaches for addressing ecosystem considerations.

The Council believes that the process needs to be more evolutionary than revolutionary and will evolve towards more comprehensive, ecosystem-considered decision making. As Dr. Michael Sissenwine, former Chief Scientist of NMFS stated in January 2005: "We have been doing ecosystem management. We are doing it better today than we did 5 years ago, and we will be doing it better in the next 5 years."

Are there overarching ecological or socioeconomic issues that have been missed by the Council through its approach to single species management?

Has enough Council attention in the past been paid to bycatch, predator-prey, gear impacts, other man-made impacts, and PETs (protected, endangered, and threatened resources)?

2. Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues.

The Council firmly believes that the overall ecosystem goal should be to manage for both sustainability **and** productivity. A productive ecosystem supports human activities, including resource extraction by both recreational and commercial fishermen, as part of the natural balance.

What is the desired state of our ecosystem i.e., should we be conserving and managing or preserving?

What should the short/long-term goals and objectives be to get us to the desired ecosystem state?

3. Nature of the public decision making processes within the Council for addressing management tradeoffs, consistent with identified goals.

Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders – fishermen, mineral extractors, energy producers, aquaculture, transportation, etc. The Council believes (as was identified by the Ecosystem Panel at the March 2005 Washington conference) that the first step to engaging stakeholders and building the first partnership should be with an overall national NMFS/Council Steering Committee for ecosystem goals and objectives. The Council reinforces its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among various Councils, NMFS, partner agencies, and stakeholders.

What is the best forum for the public involvement in the decision making process?

How should the Councils reconcile the often competing requirements and agendas among state and Federal agencies, often times even within the same agency, i.e., zero mortality for marine mammals as opposed to realizing the full potential of the Nation's fishery resources as part of Magnuson-Stevens Act?

4. Mechanisms for considering activities outside the Council's purview but influencing ecosystem productivity.

Unquestionably, there are multiple uses for our ocean, and competition for resources i.e., houses on wetlands versus preservation of that habitat because of its contribution to fishery productivity. Fisheries and the mid-Atlantic ecosystem are affected by many human actions that go beyond fishing and the purview of the Magnuson-Stevens Act and the Councils. When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem efforts will require coordination and participation by all governmental authorities; Federal, state, and local, with jurisdiction within the ecosystem under consideration.

Councils are mandated to manage fishing mortality and fishing gear impacts, while other man-made impacts can contribute greatly to resource declines (i.e., coastal development, pollution, cable routing, energy production, climate change) as well as loss of biodiversity. How should other non-fishery agencies be engaged formally or informally?

What issues/agencies are necessary to address the requirements of EAF that are beyond the Council/NMFS control to effect i.e., North Atlantic oscillation, head-water development, Federal flood insurance?

5. Boundaries of sub-regional ecosystems with the areas of the various FMCs.

The "Northeast U.S. Large Marine Ecosystem (LME)" is the area from Cape Hatteras north to the Canadian border while the "Southeast U.S. LME" is Cape Hatteras through the Florida Keys. Thus, both the New England and Mid-Atlantic Councils share one large biogeographical province. There can be subdivisions of an LME and one could justify the former NMFS

separation of the Northeast LME in the six "water management units" identified (NMFS 1985) as: coastal Gulf of Maine, Gulf of Maine, Georges Bank west to Block Channel, coastal middle Atlantic, middle Atlantic shelf, and offshelf. One could also identify the "mid-Atlantic ocean area" as the NRDC did in 2001 as the area between Cape Hatteras and Cape Cod. In some instances, sub-regions of LMEs may be more appropriate for planning, however, USCOP (2004) cautions that geographic scale and scope of ecosystem plans "will need to be broad to enable them to realize their potential".

The MAFMC ecosystem efforts will overlap with both the New England and South Atlantic jurisdictions. Should a formal or informal partnership be used with our sister FMCs?

How far inshore of the Exclusive Economic Zone (EEZ) should the range of issues extend for purposes of EAF?

6. Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals.

Management of mid-Atlantic resources has been adaptive and has worked mostly because of hard quotas that close the fisheries, if exceeded, and because of limiting access in order to limit capitalization in the fisheries. This Council believes that all of the FMCs and regions need to retain the flexibility to be able to manage their regional fisheries.

What types of management measures would be incorporated into EAF, consistent with the identified goals?

How should the NEFMC and MAFMC coordinate fishery management efforts within this one LME that we share, given that NE is generally effort-based while MAFMC has quota-based management regimes?

7. Specific regional issues that need to be addressed in a fishery ecosystem plan (FEP).

The EPAP (1999) recommended the development of FEPs and the research to support them. The Council's current concept is that an FEP would not supplant existing FMPs, but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. There is some support for FEPs but numerous knowledgeable individuals are seriously concerned about data limitations that could delay or prevent the lack of an approved FEP or slow necessary management decisions. The Council believes that if they develop an FEP, that it should be a strategic guidance document that looks at what we currently know, identify the gaps in our knowledge, and recommend ways to fill the research needs. An FEP would discuss the food web, predator/prey, interactions with PET species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of other FMP management options.

Should the Council create an umbrella-like FEP that provides all the background information on our ecosystem?

How would an FEP be different from the current National Environmental Policy Act (NEPA) requirements to address "cumulative effects" which focus attention on five areas: 1) targeted fishery and resources, 2) non-target fisheries or bycatch, 3) habitat, 4) PET species, and 5) communities– socioeconomics?

8. Techniques for determining success of ecosystem-based management.

The techniques for single species management are well documented. All successful management to date has focused on meeting National Standard 1 with its focus on maximum sustainable yield which may be reduced for any relevant economic, social, or ecological factor to generate the optimum yield (OY). Our Council's science is generated mostly through the Northeast stock assessment process which focuses on managed fisheries. Better efforts will need to be made to incorporate the stock assessment information and the ecosystem information of NMFS into usable products for management.

What new tools are required for risk assessment, monitoring, and evaluation in an EAF?

What techniques are available for determining success of ecosystem-based management?

9. Other issues considered important for our region.

The initial Congressional funds run through December 2005. No additional monies are currently available. Currently, the Council is using the cumulative effects requirements under NEPA (question 7) as a surrogate for ecosystem-approaches to fisheries management. The Council feels they have done a pretty good job with the targeted fishery and resources area, the non-targeted fisheries or bycatch area, and a decent job of the other three areas of habitat, PETs, and socioeconomics.

How would you propose strengthening the Councils approach to ecosystem management?

The Council treats EFH as an unfunded mandate and relies nearly totally on NMFS, thus if no new monies come to the Council, should we treat EAF as we do EFH?

III. References are available upon request to the Council.

IV. Additional Comments

Thank you for participating in this scoping activity to engage our constituencies in public debate on ecosystems. This scoping hearing was recorded and summary minutes will be produced and submitted to NMFS as part of the cooperative agreement. Should you have additional comments on any of these issues, please provide them by October 31 to: Mr. Daniel T. Furlong, Executive Director, MAFMC, Room 2115, Federal Building, Dover, DE. 19904.

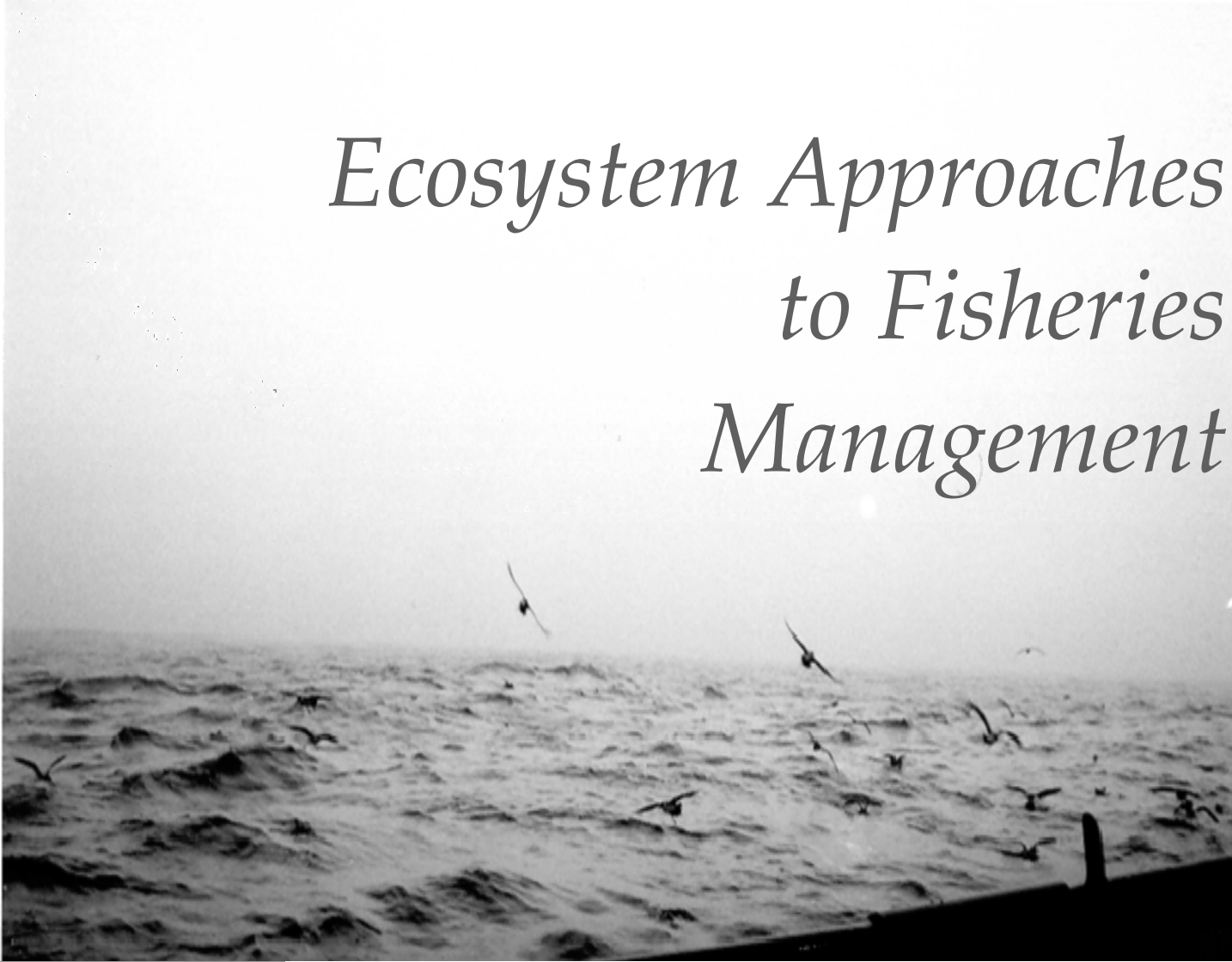
APPENDIX F.

SCOPING DOCUMENTS FOR
OTHER EAST COAST COUNCILS

New England Council

South Atlantic Council

Gulf Council



*Ecosystem Approaches
to Fisheries
Management*

Stakeholder Workshops

October and November, 2005

*New England Fishery Management Council
Newburyport, MA*



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
Frank Blount, *Chairman* | Paul J. Howard, *Executive Director*

September 21, 2005

Dear Fishery Stakeholder:

I would like to invite you to join my staff this fall at a series of workshops designed to gather important information from fishery stakeholders like yourself.

As fisheries managers and scientists continue to take a more holistic, ecosystem-based approach toward our fisheries, the attitudes and values of stakeholders will play an increasingly crucial role in developing future policy. These workshops are an important opportunity for all stakeholders in the New England region to gather together and share their thoughts on how managers and scientists may improve our stewardship of New England's fishery resources.

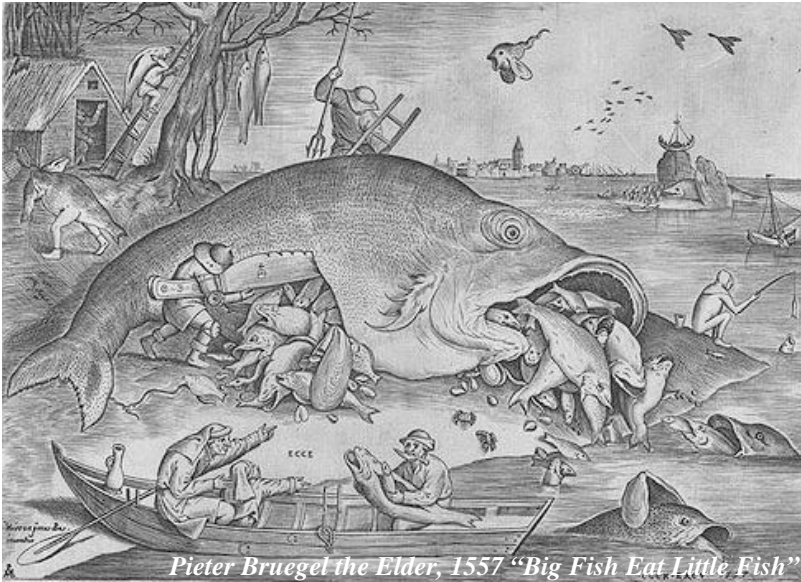
The discussions at these workshops, and the information we hope to gather, will be broad-based and applicable to all fisheries. The opinions of fish consumers, recreational anglers, commercial fisherman and many others are all equally valuable. In fact, the broadest possible participation will surely result in a clearer picture of our stakeholder's values regarding our fisheries.

Please see the schedule of workshops contained in this booklet. We have made every attempt to schedule these workshops close to your homes and places of work, and we sincerely hope that you will be able to attend.

If for any reason you cannot attend but would still like to participate, please contact my program manager, Chad Demarest, at (508) 495-2237 or cdemarest@nefmc.org. You may be able to participate in the project by telephone, email or mail—your opinions are valuable and we'll do everything we can to make it easy for you to share them.

Sincerely,

Paul J. Howard
Executive Director



Pieter Bruegel the Elder, 1557 "Big Fish Eat Little Fish"

Schedule of workshops

Gouldsboro, ME	Sunday, October 2, 1:00 pm	Gouldsboro Fire Station, 6 Walters Road, Route 1, Gouldsboro, ME 04607
Rockland, ME	Monday, October 3, 5:30 pm	Tradewinds Motor Inn 2 Park Drive Rockland, ME 04841
Portland, ME	Tuesday, October 4, 5:30 pm	Portland Fish Exchange 6 Portland Fish Pier Portland, ME 04101
Portsmouth, NH	Wednesday, October 5, 5:30 pm	The Courtyard by Marriott 1000 Market Street Portsmouth, NH 03801
Gloucester, MA	Wednesday, October 12, 5:30 pm	Division of Marine Fisheries Annisquam River Station 30 Emerson Avenue Gloucester, MA 01930
Boston, MA	Thursday, October 13, 5:30 pm	Seaport World Trade Center 200 Seaport Boulevard Boston, MA 02210
Mystic, CT	Tuesday, October 18, 5:30 pm	Comfort Inn 48 Whitehall Avenue Mystic, CT 06355
Hyannis, MA	Tuesday, November 1, 5:30 pm	Radisson Hotel Hyannis 287 Iyannough Road Hyannis, MA 02601
Fairhaven, MA	Wednesday, November 2, 5:30 pm	Hampton Inn One Hampton Way Fairhaven, MA 02719
Narragansett, RI	Thursday, November 3, 5:30 pm	Village Inn One Beach Street Narragansett, RI 02882

What is an ecosystem approach to management?



An ecosystem approach to management considers all the components of the ecosystem (biological, chemical and physical) and their interactions.

This includes an appreciation of natural ecosystem dynamics, and it explicitly recognizes that man is part of the system and seeks to include stakeholders in setting management goals.

(European Union Fisheries Ecosystem Plan (2004))

An ecosystem approach to management:

- Is adaptive and incremental
- Takes into account both knowledge and uncertainty
- Considers multiple external influences
- Strives to balance diverse societal objectives

(NOAA Fisheries Ecosystems Goal Team (2005))



What is the New England Council's Pilot Project?

The New England Council, together with the three other Gulf and Atlantic-coast Council's, received a grant from Congress intended

to initiate discussions that would assist the Council and the National Marine Fisheries Service develop an approach for integrating Ecosystem-based concepts into fisheries management.

In March of 2005, the New England Council passed a motion signaling its intent to pursue drafting a Fishery Ecosystem Plan. Such a plan would, upon completion, serve as a guidance document for all Council-managed fisheries. At least eight steps may be required for completing a Fishery Ecosystem Plan:

- (1) Determine who the fishery stakeholders are
- (2) Define the boundaries of local ecosystems
- (3) Characterize the structure and function of the ecosystems, including both the biological and economic environments
- (4) Define long-term objectives based on stakeholder values
- (5) Define indicators of ecosystem and fishery health
- (6) Determine robust, flexible methods for reaching stated objectives
- (7) Monitor and assess impacts of decisions relative to objectives
- (8) Determine impacts on adjacent ecosystems/fisheries

(Adapted from the International Union for the Conservation of Natural Resources, 2004)

The workshops



With these steps in mind, the Council is looking to our stakeholders to help guide us as we attempt to incorporate ecosystem approaches into our stewardship to initiate discussions that would assist the Council and the National Marine Fisheries Service develop an approach for integrating Ecosystem-based concepts into fisheries management. of marine resources and our fisheries. We need to know not only what is important to you, but what you can tell us that will help us manage our fisheries better.

Objectives

Our intention is to gather the broadest possible views on topics essential to incorporating ecosystem approaches into fisheries management. As we only have a limited amount of time, we will be focusing on four primary areas:

- Local or regional ecosystems and issues specific to them
- Ecosystem-level indicators of a healthy fishery
- Community-based or collaborative fisheries management
- Matching management 'tools' to management objectives

Agenda

5:30 PM—Introductions and ground rules

5:45 PM—Small group breakouts to discuss assigned topics

6:45 PM—Shuffle breakout groups and topics

7:45 PM—Plenary discussion, future directions, etc.

8:00 PM—Adjourn

Format

The workshops will be facilitated discussions focused on obtaining the widest possible array of views on the four areas of interest. We are not seeking consensus statements; rather, we are interested in everyone's individual views. Larger groups will divide into smaller breakout sessions; each individual will be given the opportunity to provide information within these groups. At the conclusion of the workshop, the group will reassemble to review the assembled information and make any changes.



Final thoughts

The following questions are provided to get expose you to some of the concepts we're considering. Your input at the workshops need not be limited by these—in fact, we are most interested in the attitudes and values that we can't foresee.

Local or regional ecosystems

- *What is the most appropriate scale for management in your region? How local, or how broad?*
- *Are there differences in fish or fisheries across regions that would benefit from geographically-applied regulations? Do these differences apply only to individual fisheries, or across all fisheries?*
- *Where do you see consistent differences in the biological processes that drive fisheries in your area?*

Indicators of a healthy ecosystem and fishery

- *What are the best indicators of a healthy fishery in your area?*
Some examples may be physical (such as temperature, salinity, pollution and/or water quality), biological (such as presence/absence of major predators, size and/or weight of fish species, total biomass, fishing mortality rate) or social/economic (such as opportunity within the fishery, average wage, vessel profitability, community structure)
- *How does a healthy ecosystem affect fisheries? How can we determine if an ecosystem is healthy?*
- *What data might we need that we don't have now?*

Community-based or collaborative management

- *If local ecosystems are designated by physical, biological or other boundaries, are these areas best managed at the regional or local level?*
- *How can we accommodate the mobility of our fishing fleet with the potential for geographically-specific (local ecosystem) management?*
- *How appropriate is local or community-based management?*
- *Are you involved now in a fisheries organization? Do they participate actively in the management process? Would that group want to be involved in setting management objectives for local or regional ecosystems?*

Matching management “tools” to management objectives

- *How well do you understand the relationship between management tools (such as Days-at-sea, trap limits, mesh restrictions, etc.) and objectives?*
- *Which tools currently work best to achieve their objectives?*
- *Do our current tools have positive, negative or neutral affects on the ecosystems of your area? How could they be improved?*



MAGNUSON - STEVENS ACT/NEPA SCOPING DOCUMENT:

THE SOUTH ATLANTIC COUNCIL'S APPROACH TO FISHERY ECOSYSTEM MANAGEMENT

June 2005

South Atlantic Fishery Management Council
1 Southpark Circle, Suite 306
Charleston, South Carolina 29407-4699
(843) 571-4366
(843) 769-4520 (FAX)
Email: safmc@safmc.net
Website: www.safmc.net



A publication of the South Atlantic Fishery Management Council pursuant to
National Oceanic and Atmospheric Administration Award Number NA05NMF4410004

Scoping meetings are less formal than public hearings and occur prior to the Council taking any position on a management issue. When the Council is considering the need for management, scoping meetings provide an opportunity for members of the public to make suggestions BEFORE the Council has made any decisions.

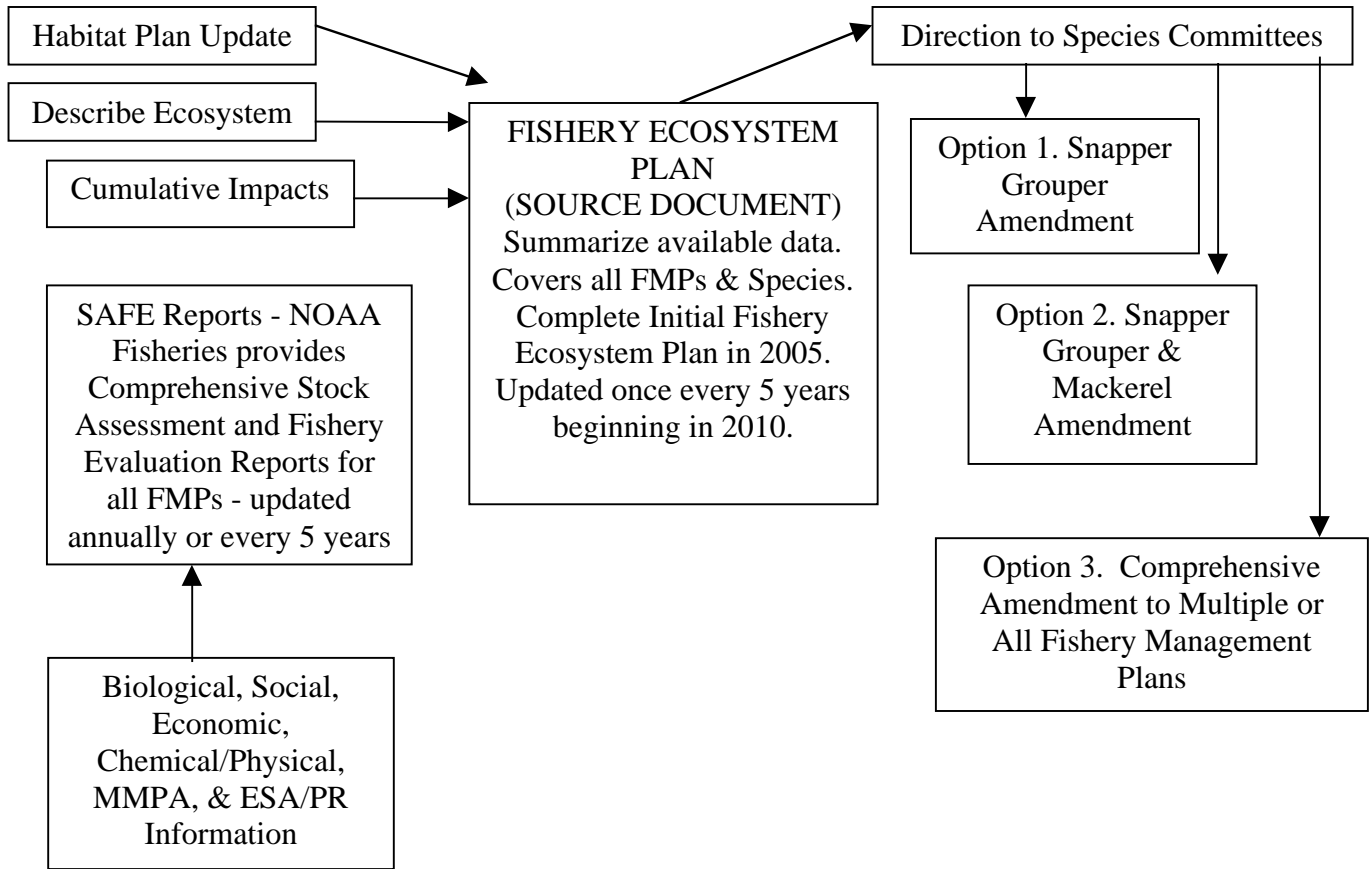
The purpose of this document is to request that the public provide additional and specific input on possible areas that the Council should examine in their consideration of ecosystem management.

What is Ecosystem Management?

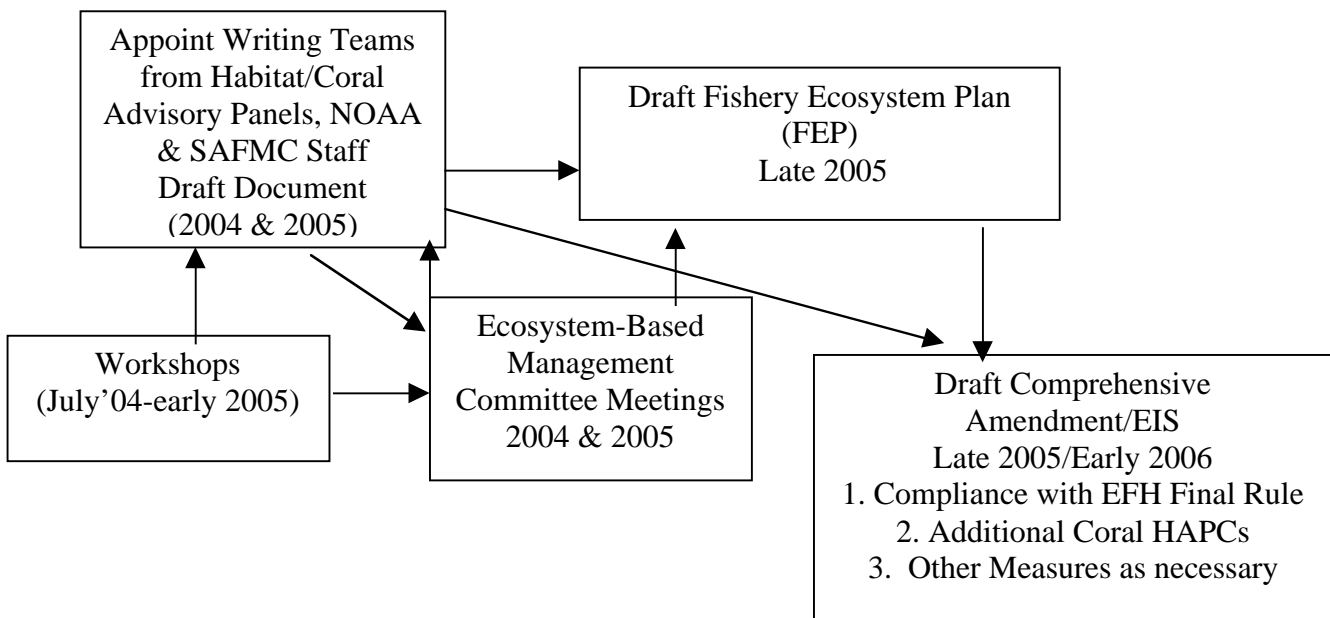
With the Habitat Plan as a cornerstone, the Council is developing an ecosystem-based approach to resource management. Evolution of the Habitat Plan into a Fishery Ecosystem Plan (FEP), and transition from single species management to ecosystem-based management, will require a greater understanding of the South Atlantic Bight ecosystem and the complex relationships among humans, marine life and essential fish habitat. This effort will provide a more comprehensive understanding of the biological, social and economic impacts of management.

The South Atlantic Council has adopted a 3-pronged approach: (1) Map fishermen and document their catch/bycatch as they move across fisheries in our ecosystem; (2) Expand existing relationships with other management agencies; and (3) Expand and refine the South Atlantic Ecopath Model and explore sub-models for the *Oculina* Bank HAPC, FL Keys, Deepwater Snapper Grouper Habitat and Albermarle-Pamlico Sound areas. The initial plan will be completed in 2005 (see detailed timing below), and it is the South Atlantic Council's intent that the Fishery Ecosystem Plan be updated every five years beginning in 2010 (see figure below).

5-YEAR SAFMC SYSTEM-WIDE EVALUATION



DRAFT TIMELINE 2004/2005/2006



What is the South Atlantic Fishery Management Council (SAFMC)?

The South Atlantic Fishery Management Council, headquartered in Charleston, South Carolina, is responsible for the conservation and management of fish stocks within the federal 200-mile limit (often referred to as the Exclusive Economic Zone or EEZ) off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West.

Congress established the Council along with seven other regional fishery management councils with the passage of the Magnuson Fishery Conservation and Management Act (now called the Magnuson-Stevens Act) in 1976.

The Council's membership is a balance of commercial and recreational fishermen, marine scientists, and state and federal fisheries managers, who combine their knowledge to prepare Fishery Management Plans (FMPs) to manage the living marine resources within the South Atlantic region. Fishery Management Plans are prepared through a deliberative planning process that includes public input provided by fishermen and other persons concerned with management of these resources.

Council members serve on committees which address issues specific to certain species or Council affairs. The Fishery Ecosystem Plan Committee was established in 2004 in response to the growing realization of the potential utility of ecosystem management.

The Council intends to use the Habitat and Environmental Protection and Coral Advisory Panels to provide advisory panel input. In addition, the chair and vice-chair of the individual species fishery management plan Advisory Panels will also provide input. These panels are made up of recreational and commercial fishermen, scientists, environmentalists, and other interested members of the public to advise the Council. Appendix A contains a list of phone numbers and addresses of Council Members and Council staff responsible for marine protected areas.

What is the history of ecosystem management in the South Atlantic?

From deepwater canyons off the Carolinas to the shallow tropical waters surrounding the Florida Keys, marine habitats found in the South Atlantic region are as diverse as the species that inhabit them. The South Atlantic Council is at the forefront of habitat conservation and risk-averse management through three broad actions:

- A. Adoption of a proactive approach to **protect and enhance Essential Fish Habitat** (EFH) for all managed species under its jurisdiction;
- B. Adoption of **precautionary and proactive management plans**; and
- C. Developing an **ecosystem-based approach** to fisheries management in the South Atlantic region.

Ultimately, by broadening the scope of management, the Council will achieve long-term sustainability of fisheries and of the ecosystem as a whole.

A. HABITAT CONSERVATION

The Council regulates fisheries to protect habitat from direct and/or indirect impacts of fishing through the following regulations:

1. Snapper/Grouper FMP

- prohibits use of bottom longlines inside of 50 fathoms or anywhere south of St. Lucie Inlet, Florida;
- prohibits use of fish traps;
- prohibits use of bottom tending (roller-rig) trawls on live bottom habitat;
- prohibits use of entanglement nets;
- establishment of an Experimental Closed Area within the *Oculina* HAPC where the harvest and retention of all snapper/grouper species is prohibited; and
- establishment of Special Management Zones (SMZs) which limit use of highly efficient and potentially habitat damaging gear.

2. Shrimp FMP

- prohibits rock shrimp trawling in the *Oculina* HAPC; and
- requires Vessel Monitoring Systems (VMS) on vessels participating in the rock shrimp fishery off Florida and Georgia.

3. Coral, Coral Reef and Live/Hardbottom Habitat FMP

- prohibits all harvest or possession of these resources which serve as essential fish habitat to many managed species with the exception of the limited harvest of soft coral by permit; and
- establishment and expansion of the *Oculina* Bank Habitat Area of Particular Concern (HAPC). All bottom tending gear (including trawls) prohibited.

4. EFH and EFH-HAPC Designations Translated to Cooperative Habitat Policy Development and Protection

In addition to implementing regulations outlined above, the Council actively comments on non-fishing projects or policies that may impact fish habitat. The Council adopted a habitat policy and procedure document that established a four-state Habitat Advisory Panel and adopted a comment and policy development process. Members of the Habitat Advisory Panel serve as the Council's habitat contacts and professionals in the field. Advisory Panel members bring projects to the Council's attention, draft comment letters, and attend public meetings. With guidance from the Advisory Panel, the Council has developed and approved policies on:

- (i) Energy exploration, development and transportation;
- (ii) Beach dredging and filling and large-scale coastal engineering;
- (ii) Protection and enhancement of submerged aquatic vegetation; and
- (iv) Alterations to riverine, estuarine and nearshore flows.

The NMFS, State and other Federal agencies apply EFH and EFH-HAPC designations and protection policies in the day-to-day permit review process.

5. A Habitat Benchmark – the South Atlantic Council’s Habitat Plan

In 1998, the South Atlantic Council developed its Habitat Plan and Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans for the South Atlantic Region. The EFH Plan and Comprehensive Amendment were the first in the nation to be approved by the Secretary of Commerce and not challenged in court and overturned. The Habitat Plan serves as a source document, consolidating the best available information on habitat essential to species managed in the South Atlantic, from the headwaters of river systems to off the continental shelf. The Habitat Plan was prepared through a cooperative effort of State, Federal and regional habitat partners on the Council’s Habitat and Coral Advisory Panels.

6. *Sargassum* Fishery Management Plan

The *Sargassum* FMP is another effort undertaken by the Council to provide long-term protection to pelagic fish habitat. Approved in 2003, the management plan protects *Sargassum*, a free-floating seaweed found throughout the blue waters of the South Atlantic from extensive commercial harvest. *Sargassum* provides habitat to a wide variety of marine organisms including invertebrates, fish, sea turtles and marine birds. The seaweed is familiar to offshore fishermen who look for “weed lines” or mats of floating *Sargassum* where ocean currents meet and fish such as dolphin, wahoo, billfish and other pelagic species often gather to look for food and take shelter in the open ocean.

7. *Oculina* Coral HAPC - Protecting Rare and Fragile Habitat

In 1984, the Council established the 92-square-mile *Oculina* Bank Habitat Area of Particular Concern (HAPC) through implementation of the Coral and Coral Reefs Fishery Management Plan in order to protect the fragile coral. Within the *Oculina* Bank HAPC use of bottom-tending fishing gear including bottom trawls, bottom longlines, dredges, fish traps and fish pots was prohibited. Subsequent amendments to the Snapper/Grouper, Coral and Coral Reefs and Shrimp FMPs provided further protection to the *Oculina* HAPC through prohibitions on anchoring of fishing vessels, trawling for rock shrimp and by requiring the use of vessel monitoring systems (VMS) in the rock shrimp fishery. Expanded in 2000, the HAPC now encompasses 300-square-miles.

B. PRECAUTIONARY MANAGEMENT PLANS

1. *Sargassum* Fishery Management Plan - *Sargassum* is a free-floating seaweed found offshore in mats throughout the South Atlantic region. These mats of vegetation provide crucial habitat for a wide variety of marine animals in the open ocean, including economically important pelagic species such as tuna, dolphin, wahoo and billfish as well as sea turtles and marine birds. The Fishery Management Plan for Pelagic *Sargassum* Habitat in the South Atlantic Region was approved in 2003 and implemented strict restrictions on commercial harvest of this important fish habitat. A North Carolina company had been harvesting *Sargassum* for use in the feed supplement industry. The approved plan includes strong limitations on future commercial harvest. Restrictions include a prohibition of harvest south of the NC/SC state boundary, a total allowable catch (TAC) of 5,000 pounds wet weight per year, a limit on harvest to November

through June to protect turtles, a requirement for observers onboard any vessel harvesting *Sargassum*, a prohibition on harvest within 100 miles of shore and gear specifications.

2. Dolphin/Wahoo Fishery Management Plan - While not overfished, the Council has adopted a precautionary and risk-averse approach to management for this fishery. The South Atlantic Council, in cooperation with the Mid-Atlantic and New England Councils, developed a Dolphin/Wahoo Fishery Management Plan for the Atlantic. Recognizing the significant importance of the dolphin/wahoo fishery to the recreational fishing community in the Atlantic, the goal of the plan is to maintain the current harvest levels of dolphin and ensure that no new fisheries develop. With the potential for effort shifts in the historical commercial longline fisheries for sharks, tunas and swordfish, these shifts or expansions into near-shore coastal waters to target dolphin could compromise the historical (1994-1997) and current allocation of the dolphin resource between recreational and commercial fishermen. The Dolphin/Wahoo FMP was partially approved on December 23, 2003.

3. Golden Crab Fishery Management Plan - When the Council prohibited fish traps in the snapper grouper fishery in 1992, a few of the displaced trap fishermen began developing a specialized fishery for golden crabs. Harvesting of this little known species required fortitude and ingenuity in developing gear modifications to trap the deepwater crabs. The Nielsen family of Dania, Florida was instrumental in developing harvesting techniques, creating a market for golden crab and encouraging other fishermen to join the fishery. As the fishery began to grow, these same fishermen, who had been displaced earlier by the Council from their snapper grouper trap fishery, showed a remarkable good faith effort by approaching the Council with their own plan proposal for the golden crab fishery. This plan included measures to protect the stock, as well as a limited entry program to protect them from large vessels entering the fishery from outside the area. The Council worked cooperatively with the fishermen to provide a sustainable fishery by developing a management plan that would eventually limit the number of fishermen in established fishing zones (southern, middle and northern) as well as implement the protective measures for the crabs as outlined by the fishermen themselves. The plan was approved in 2001 and management has been so effective that the Council is in the process of adding more vessels to the northern zone. The Golden Crab Fishery Management Plan represents an excellent example of co-management between fishermen and the Council.

4. Coral, Coral Reef and Live/Hard bottom Habitat Fishery Management Plan - The Coral, Coral Reef and Live/Hardbottom Habitat Plan, approved in 1982, prohibits harvest of stony corals, seafans, coral reefs and live rock (living marine organisms attached to a hard substrate) except as authorized for scientific and educational purposes. The harvest of allowable octocorals for the aquarium trade is limited in number and only allowed south of Cape Canaveral, Florida. In addition, Coral Habitat Areas of Particular Concern (HAPC), the *Oculina* Bank and Satellite Coral HAPCs have been designated in the South Atlantic. Within those areas, habitat damaging fishing gear is prohibited including bottom tending trawl gear, traps, dredges and bottom longlines. Anchoring or the use of grapples is also prohibited for all fishing vessels.

5. Live Rock Aquaculture Program in the Coral FMP - Aquaculturists in the marine aquarium trade have greatly benefited from a unique permit program created by the Council in 1995. This system allows permitted aquaculturists to put geologically distinguishable rock in their permit site. The rock can later be harvested with any growth, including prohibited hard corals and octocorals as long as they are attached to the cultured rock.

Public Input on the Fishery Ecosystem Plan

The Council, with assistance from appropriate NMFS staffs, will undertake a series of public meetings seeking input regarding ecosystem objectives for fisheries management. The purpose of these meetings will be to facilitate wide-ranging discussions with stakeholder groups and the general public in eight topic areas:

- (i) views regarding the adequacy of current approaches for addressing ecosystem considerations;
- (ii) the nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues;
- (iii) the nature of the public decision making processes within the FMCs for addressing management tradeoffs, consistent with identified goals;
- (iv) mechanisms for considering activities outside the FMC's purview but influencing ecosystem productivity;
- (v) the boundaries of sub-regional ecosystems within the areas of the various FMCs;
- (vi) the types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals;
- (vii) the specific regional issues that need to be addressed in a fishery ecosystem plan (FEP);
- (viii) techniques for determining success of ecosystem-based management; and
- (ix) other issues considered important to the stakeholders in any particular region.

The importance of these stakeholder meetings conducted at the outset of the process of developing FEPs cannot be over-emphasized. The meetings are intended to survey as wide a cross section of views as possible before objectives for ecosystem approaches are adopted by the Councils. These meetings will serve to articulate the list of outstanding questions that should be addressed in both technical analyses and public policy decision-making. For example, if one species regulated in an existing FMP is a significant prey for predators regulated in another FMP, what technical and policy questions should be addressed in order to choose policies that result in the greatest benefit to society, consistent with applicable laws?

Regional stakeholder meetings should address the nine topic areas listed above. Written minutes of the meetings should be kept, consistent with applicable operating procedures of the FMCs. A summary of public comments at the various stakeholder meetings should be provided. While the specific nature of public meetings will vary with each FMC, according to its circumstances, overall there should be sufficient opportunity for all

relevant stakeholder and public groups to provide input. This could involve meetings that are targeted to specific groups (e.g., fishing industry groups, local communities, NGOs, recreational fishing groups). Multiple opportunities within the purview of the various FMCs should be provided to encourage broad-based community participation.

SAFMC Approach: The Council will add “Ecosystem-Based Management” as an agenda item to each of the Advisory Panel meetings scheduled for 2004 and 2005. Each Advisory Panel will be asked to address the items identified above as well as providing their recommendations on the Council’s approach to develop a Fishery Ecosystem Plan (FEP). In addition, they will be asked to provide input on what items should be addressed in the Comprehensive FEP Amendment. Minutes are routinely provided for all such meetings and Council staff provides a summary of recommendations for the Ecosystem-Based Management Committee. A document containing all input received during the scoping/stakeholder meetings will be prepared. Advisory Panels are scheduled to meet as follows:

Advisory Panel	Date/Location
√Mackerel	June 16, 2004 in Key West, FL
√Habitat	October 25-29, 2004 in Charleston, SC
√Coral	October 25-29, 2004 in Charleston, SC
√Shrimp	September 2004 in Pawley’s Island, SC
Snapper Grouper	June 13-14, 2005
Marine Protected Areas	2005
√Law Enforcement	November 2004
√Information & Education	August 24-26, 2004 in Charleston, SC

The Council’s Scientific and Statistical Committee addressed these issues during their September 2004 meeting.

In addition, beginning with the September 2004 meeting, the Council will schedule time during each species committee meeting and each Ecosystem-Based Management committee meeting to give the public an opportunity to provide input on these issues.

The Council will publish and widely distribute the agendas of the various advisory panels and Council meetings well before the meetings so that people understand that these issues will be considered as part of the specific advisory panel meetings and the Council meetings. The Council’s web site, newsletter and pre-meeting publicity will be used to get the word out to the public.

This approach follows the Council’s process for gathering stakeholder input and incorporating the input into the FMP/Amendment development process. All input will be compiled and summarized for use by the Ecosystem-Based Management committee to draft both the Fishery Ecosystem Plan and the Comprehensive FEP Amendment.

Public Input on the Comprehensive Amendment

In determining the actions to be taken in the initial FEP Comprehensive Amendment, the Council is adopting several recommendations from an Ecosystem Principles Advisory Panel 1999 report to Congress. The report outlined eight basic principles that should be contained in a FEP. Included in these are delineation of geographical extents of ecosystems that occur within the Council's authority, development of a conceptual model of the food web, and calculation of total removals from an ecosystem as a function of fishery-related actions. Using these eight principles as guidance, the Council is considering the following actions in the initial FEP Comprehensive Amendment/DEIS:

A. In order to calculate and characterize total removals from the ecosystem as a consequence of fishery-related actions (i.e., landings, discards, bycatch), the Council is considering requiring a permit to fish for, harvest, or possess any resource in the EEZ for all recreational and commercial fishermen. Other alternatives to calculate and characterize total removals being considered include: 1) replace the current Snapper/Grouper and Mackerel paper logbook programs by implementing the use of electronic logbooks and 2) implement the Atlantic Coastal Cooperative Statistics Program's (ACCSP) modules. These modules provide the minimum data elements to be collected by all ACCSP partners conducting data collection programs.

B. The following three actions are being considered in order to comply with the Essential Fish Habitat (EFH) final rule (published in the Federal Register on January 17, 2002):

1. Refine existing EFH and Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) as necessary;
2. Identify new EFH and/or EFH-HAPCs as necessary; and
3. Implement measures to reduce impacts of fishing and non-fishing impacts on EFH and EFH-HAPCs as necessary.

C. Establishment of deep water coral HAPCs, with possible gear limitations in the newly protected areas, is being considered.

D. For enforcement and data collection purposes, requiring Vessel Monitoring Systems (VMS) on commercial, for-hire, and/or private recreational vessels is being considered.

E. The Council is considering amending the Mackerel FMP (as part of the Comprehensive FEP Amendment) with the following ten actions:

1. Add little tunny, bonita, false albacore, greater barracuda, and blackfin tuna to the fishery management unit;
2. Revert to utilizing a control rule in place of a quota-based management system;
3. Modifications to the mackerel framework;
4. Implement a permit to include all fisheries with an endorsement for mackerel;

5. Add new qualifications for king mackerel.
6. Prohibit the sale of recreationally caught coastal migratory pelagics;
7. Implement a standardized bycatch reporting protocol;
8. Modify the current bag, size, and trip limits;
9. Implement a moratorium and limited-entry for Spanish mackerel; and
10. Modify the king mackerel management boundaries.

F. The Council is considering amending the Shrimp FMP with the following two actions:

1. Investigate ways to reduce turtle mortality in the South Atlantic EEZ as a result of shrimp trawling (i.e., prohibition of shrimping during the night-time and gear adjustments); and
2. Implement a limited-entry program for the penaeid shrimp fishery.

G. In order to maintain the optimum size, age and genetic structure of slow growing, long-lived, deepwater snapper and grouper species (e.g., snowy grouper, speckled hind, and yellowedge grouper) the Council is considering the use of marine protected areas (MPAs) in the South Atlantic EEZ. A total of nine proposed sites are currently being considered.

H. Any other actions that the Council feels are necessary to implement ecosystem-based fishery management in the South Atlantic following the scoping process.

What Next?

Comments should be provided to the Council by June 30, 2005. All comments will be considered by the Council in drafting the Fishery Ecosystem Plan and Comprehensive Amendment. There will be a number of opportunities to provide public input as the Council develops both of these documents.

**Written comments will be must be received in the Council office (address on cover)
on or before June 30, 2005.**

The Council accepts comments sent by mail, fax, or E-mail.

APPENDIX A

South Atlantic Fishery Management Council 2004-2005 Membership

The names of the Council Members who serve on the Ecosystem-Based Management Committee appear in bold.

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South Carolina Obligatory Seat - vacant

Ecosystem Management Workshops



Michael Jepson, Ph.D.
Facilitator

Workshop Overview

- Review of Ecosystems Management Approach
- Gulf Council Ecosystem Plan Approach
- Discussion of Stakeholder Concerns
- Review Stakeholder Comments and Consensus

Why Ecosystems Management?

- Over half of the U.S. population lives on the coast
- Human activities on land, along the coast and in the ocean are affecting marine ecosystems by
 - altering marine food web
 - changing the climate
 - damaging habitat
 - eroding coastlines
 - introducing invasive species
 - and polluting coastal waters

Why Ecosystems Management?

NOAA established an ecosystems division within which NOAA fisheries management was placed

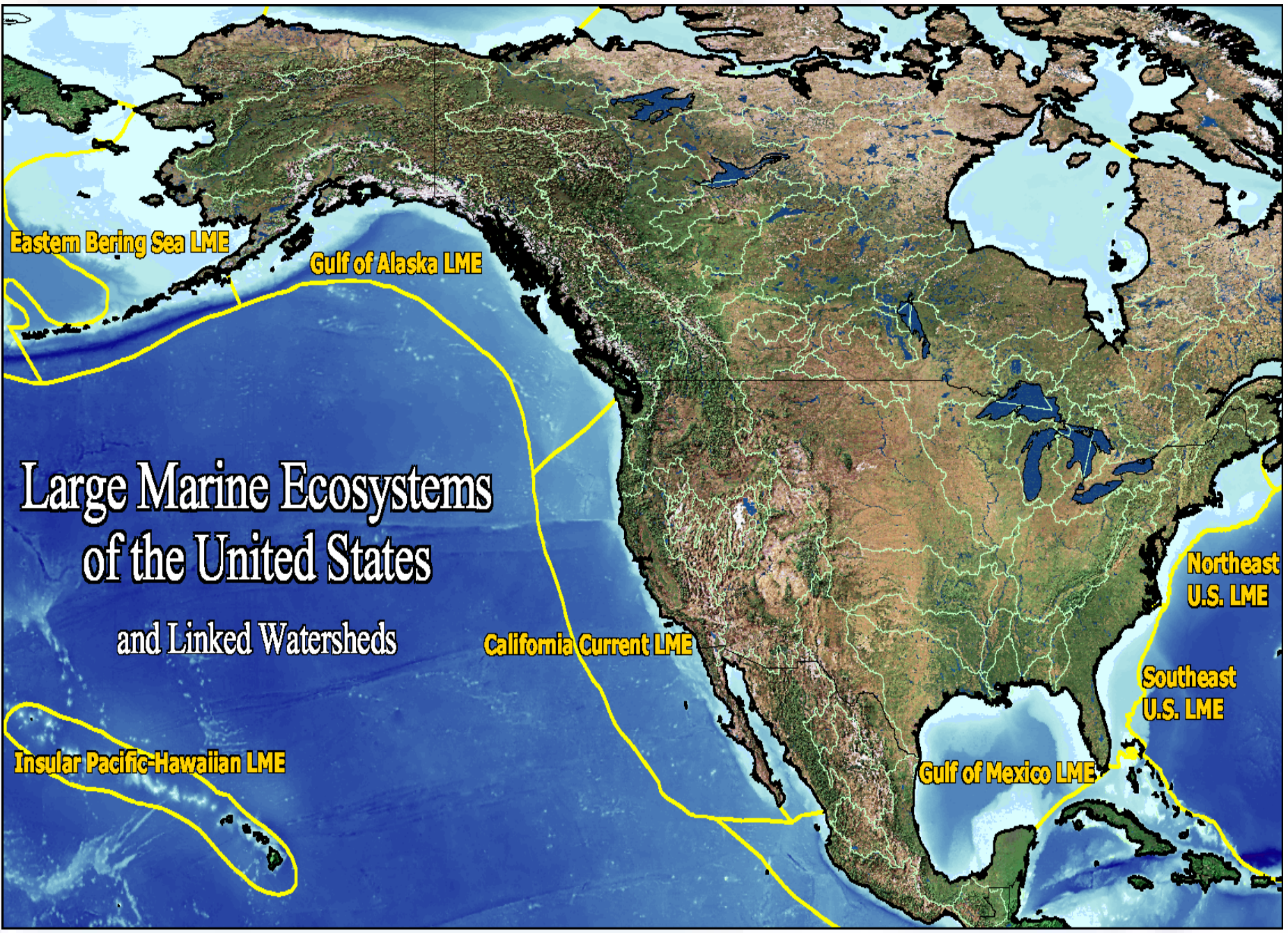
In FY04, Congress allocated ~\$2 million for NOAA-Fisheries to conduct ecosystem management pilot projects in four regions

Development of the Generic Essential Fish Habitat Amendment (1998)

- Linkages between different habitats and life cycles
- Relationships between terrestrial and marine habitats
- Species interactions

What is an Ecosystem

- An *ecosystem* is a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics.
 - Humans are an integral part of marine and terrestrial ecosystems
 - Ecosystems come in many sizes, often with smaller systems embedded within larger ones.



Large Marine Ecosystems of the United States

and Linked Watersheds

Eastern Bering Sea LME

Gulf of Alaska LME

Insular Pacific-Hawaiian LME

California Current LME

Gulf of Mexico LME

Northeast
U.S. LME

Southeast
U.S. LME

What is different?

- Ecosystem approach to management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors
- Present species oriented management incorporates many aspects of ecosystem management, but not always in the same context
- Ecosystems approach to management will not replace current management, but will supplement and enhance it

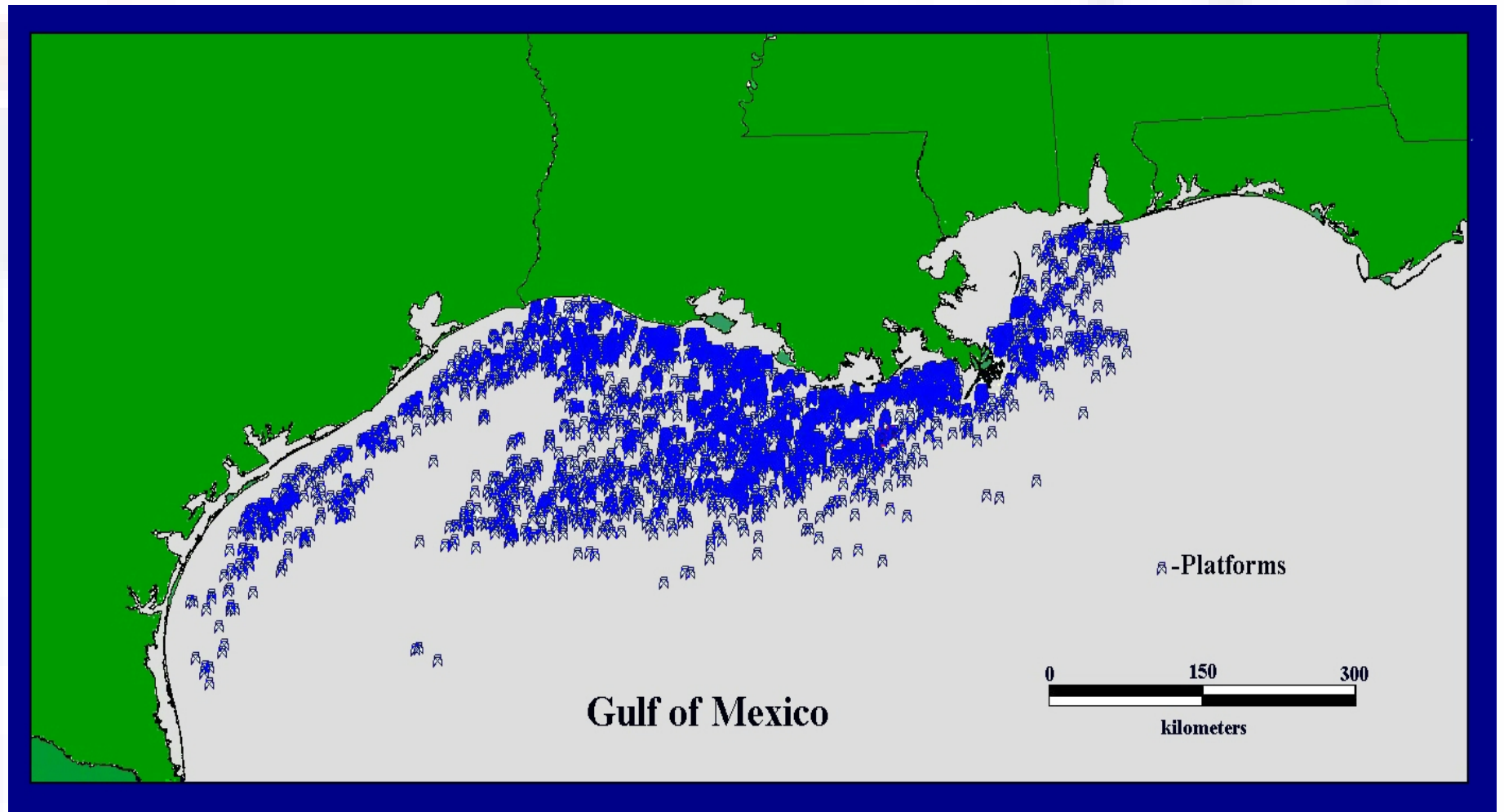
Issues of Importance to the Gulf

- Bycatch or Fishery Interactions
- Indirect Effects of Harvesting
- Interactions between Biological and Physical and Human Components of Ecosystems

Fishery Issues in the Gulf

- Shrimp trawls \leftrightarrow Red Snapper \leftrightarrow Vermilion Snapper
- LNG Terminals \leftrightarrow Estuarine dependent species
- Shallow-water grouper \leftrightarrow Deep-water grouper
- Offshore Aquaculture

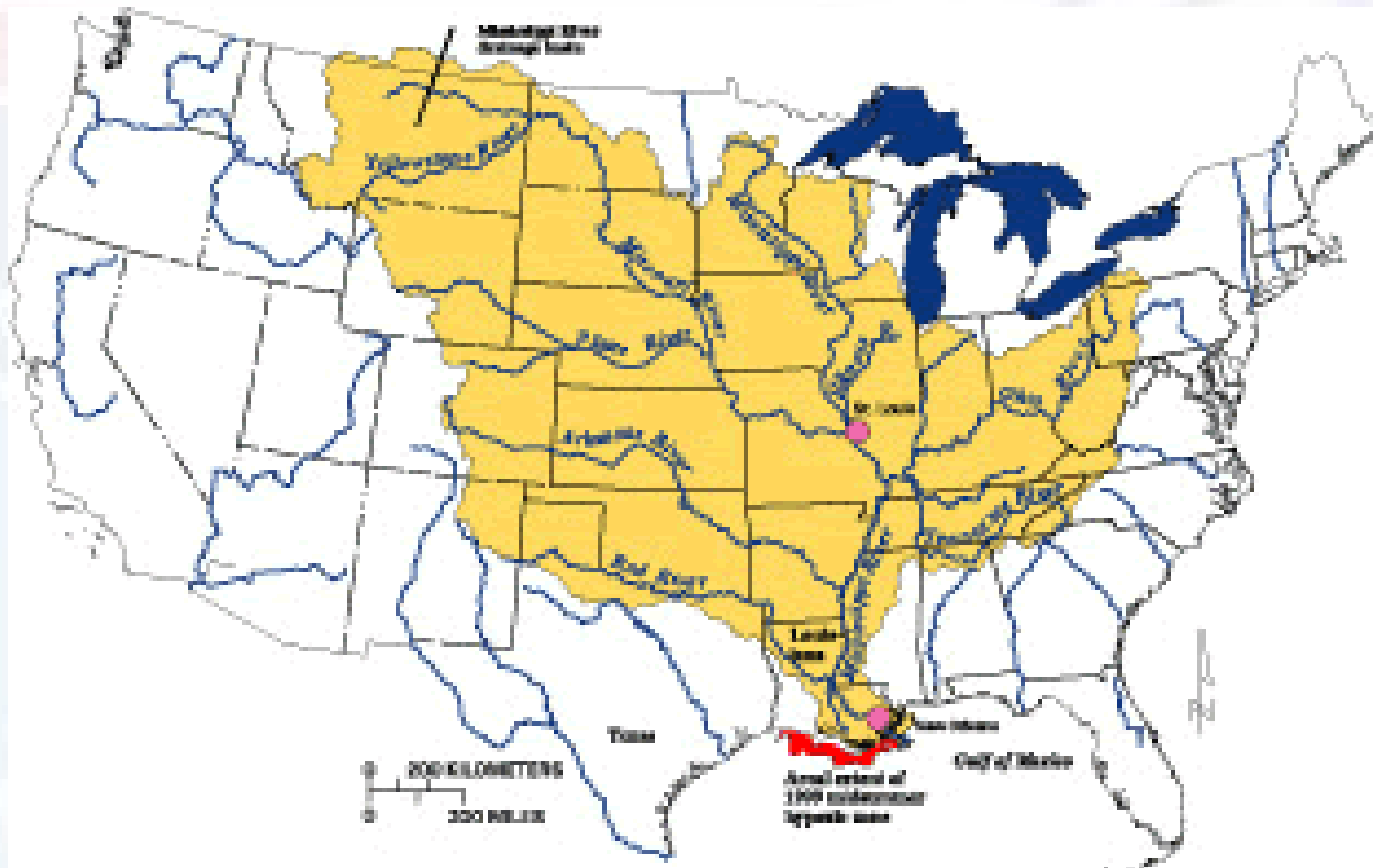
Fishery Issues in the Gulf



Environmental Events in the Gulf

- Tropical storm/Hurricane effects
- Red tide effects
- Hypoxic (Dead) Zone effects

Gulf of Mexico Hypoxia Zone



Gulf Council Ecosystem Plan Approach

- Step 1: Collect information
 - Task 1: Public Meetings with Stakeholder Groups
 - Task 2: Attitudes/Values Survey
 - Task 3: Identification of Technical Needs and Inventory of Existing Information
 - Task 4: Synthesis of Public Input on Ecosystem Goals and Objectives
- Step 2: Develop Fishery Ecosystem Plan (FEP)
- Step 3: Modify Species Oriented Approach to incorporate the components of the FEP

Topic Areas for Workshops

- (1) Adequacy of current approaches for addressing ecosystem considerations
- (2) Nature of ecosystem-based management and the goals to be achieved in addressing ecosystem issues
- (3) Nature of the public decision making processes for addressing management tradeoffs, consistent with identified goals
- (4) Mechanisms for considering activities outside the Gulf Council's purview
- (5) Boundaries of sub-regional ecosystems within the Gulf of Mexico

Topic Areas for Workshops

- (6) Types of management measures that would be incorporated into ecosystem approaches for fishery management, consistent with the identified goals
- (7) Specific regional issues that need to be addressed in a FEP
- (8) Techniques for determining success of ecosystem-based management
- (9) Other issues considered important to the stakeholders in any particular region.

APPENDIX G.

NAMES AND ADDRESSES
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10/18/05	Lewes, DE	John Mateyko

APPENDIX H.

ECOSYSTEM-BASED FISHERY MANAGEMENT
REPORT TO CONGRESS

ECOSYSTEM-BASED FISHERY MANAGEMENT

A Report to Congress

by the

Ecosystem Principles Advisory Panel

As mandated by the Sustainable Fisheries Act amendments to the
Magnuson-Stevens Fishery Conservation and Management Act 1996

**NATIONAL MARINE FISHERIES SERVICE
ECOSYSTEM PRINCIPLES ADVISORY PANEL**

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TABLE OF CONTENTS

Acknowledgments	iii
Preface	v
Executive Summary	1
Section One: Introduction	9
Section Two: Ecosystem Principles, Goals and Policies	13
Section Three: Current Application of the Ecosystem Principles, Goals and Policies ...	23
Section Four: Recommendations for Implementing the Ecosystem Principles, Goals and Policies in U.S. Fisheries Conservation, Management and Research	27
Section Five: Summary and Conclusions	37
Glossary	39
Literature Cited	41
Appendix A: Charter—NMFS Ecosystem Principles Advisory Panel.....	47
Appendix B: MSFCMA Section 406 Fisheries Systems Research	51
Appendix C: Meeting Participants	53

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came from State and other agencies, individuals and organizations who met with us (Appendix C) and provided considerable insight. A special thanks is due to Alec MacCall and four other (anonymous) reviewers of the report. Ned Cyr, David Detlor and Aliçon Morgan, NMFS Office of Science and Technology, composed the core team who coordinated meetings, produced drafts and attended to all the details of text manipulation. Willis Hobart and David Stanton, NMFS Scientific Publication Office, deserve special recognition for their editing assistance and development of a format for this presentation. Panel members owe a collective debt of gratitude to our respective institutions, colleagues, friends and families who have supported and encouraged our participation in this endeavor.

PREFACE

Seeking solutions to reverse the decline of New England's fisheries in 1871, Congress created the U.S. Commission of Fish and Fisheries (Hobart 1995). The first appointed Commissioner, Spencer Baird, initiated marine ecological studies as one of his first priorities. According to Baird, our understanding of fish "... would not be complete without a thorough knowledge of their associates in the sea, especially of such as prey upon them or constitute their food..." He understood that the presence or absence of fish was related not only to removal by fishing, but also to the dynamics of physical and chemical oceanography.

Despite this historical, fundamental understanding of fisheries as part of ecosystems, we have continued to struggle to manage fish harvests while simultaneously sustaining the ecosystem. Recognizing the need for a more holistic management approach, Congress charged the National Marine Fisheries Service (a direct descendant of the U.S. Commission of Fish and Fisheries) with establishing an Ecosystem Principles Advisory Panel to assess the extent that ecosystem principles are used in fisheries management and research, and to recommend how such principles can be further implemented to improve our Nation's management of living marine resources. The resulting Panel was composed of members of industry, academia, conservation organizations and fishery management agencies. The Panel's diversity played a substantial role in the development of a pragmatic approach to expand ecosystem-based fishery management within the context of the existing fishery management system.

The Panel attempted to build on the progress of past efforts, namely the 1996 Sustainable Fisheries Act's (SFA) amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (NMFS 1996). The provisions of the SFA require the Regional Fishery Management Councils to set harvest rates at or below maximum sustained yield levels; develop rebuilding plans for

those species that are currently below the long-term sustainable yield; better account for and minimize bycatch and discard of fish; identify essential fish habitat and take measures to protect it; and determine the effects of fishing on the environment. These actions are being implemented and are vital to achieving ecosystem-based management. Still, it will take years to decades before the results are fully realized.

The Panel forged a consensus on how to expand the use of ecosystem principles in fishery management. We do not have a magic formula, but we offer a practical combination of principles and actions that we believe will propel management onto ecologically sustainable pathways. By asking more encompassing questions about fisheries management such as, "What are the effects of fishing on other ecosystem components?" and "What are acceptable standards for fisheries removals from ecosystems?" we are broadening the scope of management and ultimately making fisheries sustainable.

Ecosystem-based fishery management is likely to contribute to increased abundance of those species that have been overfished. It may, however, require reduced harvest of species of critical importance to the ecosystem. We expect that ecosystem-based fishery management will contribute to the stability of employment and economic activity in the fishing industry and to the protection of marine biodiversity on which fisheries depend. As a society, we are recognizing the limits of the sea to provide resources and of our abilities to stay within those limits. What are acceptable levels of change in marine environments due to fishing? This Report does not answer that question for society, but it does set a framework for beginning to take actions based on the insight of Baird 125 years ago.

David Fluharty
Chair, Ecosystem Principles Advisory Panel
Seattle, Washington
November 15, 1998

EXECUTIVE SUMMARY

Ecosystem-based management can be an important complement to existing fisheries management approaches. When fishery managers understand the complex ecological and socioeconomic environments in which fish and fisheries exist, they may be able to anticipate the effects that fishery management will have on the ecosystem and the effects that ecosystem change will have on fisheries. However ecosystem-based management cannot resolve all of the underlying problems of the existing fisheries management regimes. Absent the political will to stop overfishing, protect habitat, and support expanded research and monitoring programs, an ecosystem-based approach cannot be effective.

A comprehensive ecosystem-based fisheries management approach would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. However, the approach need not be endlessly complicated. An initial step may require only that managers consider how the harvesting of one species might impact other species in the ecosystem. Fishery management decisions made at this level of understanding can prevent significant and potentially irreversible changes in marine ecosystems caused by fishing.

Recognizing the potential of an ecosystem-based management approach to improve fisheries management, Congress requested that the National Marine Fisheries Service (NMFS) convene a panel of experts to: 1) assess the extent to which ecosystem principles are currently applied in fisheries research and management; and 2) recommend how best to integrate ecosystem principles into future fisheries management and research. In response, NMFS created the National Marine Fisheries Service Ecosystem Principles Advisory Panel (Panel).

WHAT BASIC ECOSYSTEM PRINCIPLES, GOALS AND POLICIES CAN BE APPLIED TO FISHERIES MANAGEMENT AND RESEARCH?

To guide our deliberations, we developed a set

of eight ecosystem operating principles (Principles) with societal goals for ecosystems (Goals), and a set of six management policies (Policies). These Principles, Goals and Policies were used to evaluate the current application of ecosystem-based fisheries management and to develop recommendations for further implementation of such approaches.

BASIC ECOSYSTEM PRINCIPLES, GOALS AND POLICIES

Based on the Panel's experience and review of the fisheries ecosystem literature, we suggest that the following Principles, Goals and Policies embody key elements for ecosystem-based management of fisheries.

Principles

- The ability to predict ecosystem behavior is limited.
- Ecosystems have real thresholds and limits which, when exceeded, can effect major system restructuring.
- Once thresholds and limits have been exceeded, changes can be irreversible.
- Diversity is important to ecosystem functioning.
- Multiple scales interact within and among ecosystems.
- Components of ecosystems are linked.
- Ecosystem boundaries are open.
- Ecosystems change with time.

Goals

- Maintain ecosystem health and sustainability.

Policies

- Change the burden of proof.
- Apply the precautionary approach.
- Purchase "insurance" against unforeseen, adverse ecosystem impacts.
- Learn from management experiences.
- Make local incentives compatible with global goals.
- Promote participation, fairness and equity in policy and management.

TO WHAT EXTENT ARE ECOSYSTEM PRINCIPLES, GOALS AND POLICIES CURRENTLY APPLIED IN RESEARCH AND MANAGEMENT?

The Panel considered a management system based on the ecosystem Principles, Goals and Policies, as a framework with which to evaluate the current application in U.S. marine fisheries management and research. This model was then compared to the current state of research and management.

We conclude that NMFS and the Regional Fishery Management Councils (Councils) already consider and apply some of the Principles, Goals and Policies outlined above, but they are not applied comprehensively or evenly across Council jurisdictions, NMFS Regions, or ecosystems. The fact that the Principles are not applied consistently in U.S. fisheries management and research should not be interpreted as reluctance or intransigence on the part of these entities to adopt ecosystem approaches. Rather, these agencies lack both a clear mandate and resources from Congress to carry out this more comprehensive, but ultimately more sustainable approach. Furthermore, the ecosystem-based management of fisheries is a relatively new concept and there are considerable gaps in knowledge and practice.

HOW CAN WE EXPAND THE APPLICATION OF ECOSYSTEM PRINCIPLES, GOALS AND POLICIES TO FISHERIES RESEARCH AND MANAGEMENT?

Several practical measures can be implemented immediately to make U.S. fisheries management and research more consistent with the ecosystem Principles (see **Summary of Recommendations**). These measures comprise an incremental strategy for moving toward ecosystem-based fisheries research and management.

Councils should continue to use existing Fishery Management Plans (FMP) for single species or species complexes, but these should be amended to incorporate ecosystem approaches consistent with an overall Fisheries Ecosystem Plan (FEP). The FEP, to be developed for each major ecosystem under Council jurisdiction, is a mechanism for incorporating the Principles, Goals and Policies into

the present regulatory structure. The objectives of FEPs are to:

- Provide Council members with a clear description and understanding of the fundamental physical, biological, and human/institutional context of ecosystems within which fisheries are managed;
- Direct how that information should be used in the context of FMPs; and
- Set policies by which management options would be developed and implemented.

Fisheries management based on the ecosystem Principles, Goals and Policies must be supported by comprehensive research. Significant ecosystem research is now conducted by the National Oceanic and Atmospheric Administration (NOAA) and other agencies, as well as the academic community. This research is critical and must continue, but must expand into several key areas. First, we must better understand the long-term dynamics of marine ecosystems and how they respond to human-induced change, particularly changes brought about by fishing. Second, we must develop governance systems which have ecosystem health and sustainability, rather than short-term economic gain, as their primary goals.

THE FUTURE OF ECOSYSTEM APPROACHES IN U.S. FISHERIES MANAGEMENT

Fisheries scientists and managers are beginning to grasp the potential of ecosystem-based fishery management to improve the sustainability of fisheries resources. Given the depressed state of many U.S. fisheries, this awareness must be expanded and actions taken to implement this approach. Our management recommendations and research actions provide a pragmatic framework within which to apply the ecosystem Principles, Goals and Policies. The success of this approach depends on full implementation of measures already underway as a result of the passage of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (NMFS 1996), particularly the essential fish habitat (EFH) requirements and strengthened national standards. The recommendations contained in this report provide the required next steps.

While some of the recommended actions can start

immediately, we believe that legislation is required to implement measures like the FEP. Given that legislative processes may require three to five years to enact the proposed regulations, we recommend interim actions by the Secretary of Commerce to develop demonstration FEPs and to encourage voluntary adoption by management Councils of the Principles, Goals and Policies proposed herein. We also are aware that these new tasks will require additional human and financial resources for full implementation.

The benefits of adopting ecosystem-based fishery management and research are more sustainable fisheries and marine ecosystems, as well as more economically-healthy coastal communities. We have identified the actions required to realize these benefits. We urge the Secretary and Congress to make those resources available.

SUMMARY OF RECOMMENDATIONS

Fisheries management and policy recommendations are directed toward Congress for implementation by NMFS and the Councils. Interim measures and research recommendations are directed toward the Secretary of Commerce for implementation by NMFS and other appropriate agencies.

Develop a Fisheries Ecosystem Plan (FEP)

Require each Council to develop an FEP for the ecosystem(s) under its jurisdiction. The FEP is an umbrella document containing information on the structure and function of the ecosystem in which fishing activities occur, so that managers can be aware of the effects their decisions have on the ecosystem, and the effects other components of the ecosystem may have on fisheries.

Each FEP should require the Councils to take, at least, the following eight actions:

- 1. Delineate the geographic extent of the ecosystem(s) that occur(s) within Council authority, including characterization of the biological, chemical and physical dynamics of those ecosystems, and “zone” the area for alternative uses.**

The first step in using an ecosystem approach to management must be to identify and bound the

ecosystem. Hydrography, bathymetry, productivity and trophic structure must be considered; as well as how climate influences the physical, chemical and biological oceanography of the ecosystem; and how, in turn, the food web structure and dynamics are affected. Transfers across ecosystem boundaries should be noted.

Within each identified ecosystem, Councils should use a zone-based management approach to designate geographic areas for prescribed uses. Such zones could include marine protected areas, areas particularly sensitive to gear impacts and areas where fishing is known to negatively affect the trophic food web.

2. Develop a conceptual model of the food web.

For each targeted species, there should be a corresponding description of both predator and prey species at each life history stage over time. FEPs can then address the anticipated effects of the allowed harvest on predator-prey dynamics.

3. Describe the habitat needs of different life history stages for all plants and animals that represent the “significant food web” and how they are considered in conservation and management measures.

Essential fish habitat (EFH) for target and non-target species at different life stages should be identified and described. Using habitat and other ecosystem information, Councils should develop zone-based management regimes, whereby geographic areas within an ecosystem would be reserved for prescribed uses. FEPs should identify existing and potential gear alternatives that would alleviate gear-induced damage to EFH, as well as restrict gears which have adverse affects. Further, FEPs should evaluate the use of harvest refugia as a management tool to satisfy habitat needs.

4. Calculate total removals—including incidental mortality—and show how they relate to standing biomass, production, optimum yields, natural mortality and trophic structure.

Total removals (i.e., reported landings, unreported landings, discards, and mortality to fish that come into contact with fishing gear but are not captured) should be incorporated into qualitative

food web and quantitative stock assessment models. These models will allow managers to reduce uncertainty, monitor ecosystem health and better predict relative abundance of species affected by the harvest of target species.

5. Assess how uncertainty is characterized and what kind of buffers against uncertainty are included in conservation and management actions.

Given the variability associated with ecosystems, managers should be cognizant of the high likelihood for unanticipated outcomes. Management should acknowledge and account for this uncertainty by developing risk-averse management strategies that are flexible and adaptive.

6. Develop indices of ecosystem health as targets for management.

Ecosystem health refers to a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization that has evolved naturally. Provided that a healthy state can be determined or inferred, management should strive to generate and maintain such a state in a given ecosystem. Inherent in this management strategy would be specific goals for the ecosystem, including a description of “unhealthy” states to be avoided.

7. Describe available long-term monitoring data and how they are used.

Changes to the ecosystem cannot be determined without long-term monitoring of biological indices and climate. Long-term monitoring of chemical, physical and biological characteristics will provide a better understanding of oceanic variability and how climate changes affect the abundance of commercially important species and their corresponding food webs.

8. Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/Department of Commerce (DOC) authority. Included should be a strategy to address those influences in order to achieve both FMP and FEP objectives.

Councils and DOC have authority over a limited

range of the human, institutional and natural components of a marine ecosystem. It is important to recognize those components of the ecosystem over which fisheries managers have no direct control, and to develop strategies to address them in concert with appropriate international, Federal, State, Tribes and local entities.

Measures to Implement FEPs

The following are general recommendations to ensure effective development and implementation of FEPs:

1. Encourage the Councils to apply ecosystem Principles, Goals and Policies to ongoing activities.

In preparation for FEP implementation, Councils should begin to apply the ecosystem Principles, Goals and Policies to the conservation and management measures of existing and future FMPs. Three actions are particularly important; specifically, each FMP’s conservation and management measures should:

- Consider predator-prey interactions affected by fishing allowed under the FMP.
- Consider bycatch taken during allowed fishing operations and the impacts such removals have on the affected species and the ecosystem as a whole, in terms of food web interactions and community structure.
- Minimize impacts of fisheries operations on EFH identified within the FEP.

2. Provide training to Council members and staff.

To facilitate an ecosystem approach and to aid the development and implementation of FEPs, NMFS should provide all Council members with basic instruction in ecological principles. Further, training materials should be made available to the fishing industry, environmental organizations and other interested parties.

3. Prepare guidelines for FEPs.

The Secretary of Commerce should charge NMFS and the Councils with establishing guidelines

for FEP development, including an amendment process. NMFS and the Councils should conduct a deliberative process—similar to the process of developing National Standards Guidelines—to ensure that FEPs are realistic and adaptive.

4. Develop demonstration FEPs.

While encouraging all Councils to develop framework FEPs, the Secretary of Commerce should designate a Council or Councils to develop a demonstration FEP, as a model to facilitate rapid implementation of the full FEP when required in MSFCMA reauthorization.

5. Provide oversight to ensure development of and compliance with FEPs.

To ensure compliance with the development of FEPs, the Secretary of Commerce should establish a review panel for FEP implementation oversight. Implicit in this action is the establishment of a timetable for development of a draft FEP, its review by the panel, and any necessary revisions before the draft FEP becomes a basis for policy.

6. Enact legislation requiring FEPs.

To provide NMFS and the Councils with the mandated responsibility of designing and implementing FEPs, Congress should require full FEP implementation in the next reauthorization of the MSFCMA.

Research Required to Support Management

Require, and provide support for NMFS and other appropriate agencies to initiate or continue research on three critical research themes which will provide the information necessary to support ecosystem-based fisheries management. These themes are:

1. Determine the ecosystem effects of fishing.

Fishing affects target species, non-target species, habitat and potentially marine ecosystems as a whole. A directed program must be initiated to determine all effects of fishing on marine ecosystems.

2. Monitor trends and dynamics in marine ecosystems (ECOWATCH).

In order to detect, understand and react appropriately to ecosystem changes, a broad-scale ecosystem research and monitoring program must be undertaken based on the best available technology. We refer to this program as “ECOWATCH” because it will enable scientists and managers to observe ecosystem changes in a comprehensive manner.

3. Explore ecosystem-based approaches to governance.

Many of today’s fisheries problems stem from governance systems which create incentives that are incompatible with, or inimical to, ecosystem-level Goals (e.g., health and sustainability). Alternate governance systems must be identified which provide fishermen and others with incentives to consider the health and sustainability of the ecosystem as primary goals.

ECOSYSTEM-BASED FISHERY MANAGEMENT

SECTION ONE: INTRODUCTION

The National Marine Fisheries Service (NMFS) was charged by Congress to establish an Ecosystem Principles Advisory Panel (Panel) to identify ecosystem principles, evaluate how those principles are currently used in fishery management and research, and then to recommend measures that would expand their use in fishery management and research. Our Charter (Appendix A) describes the rationale for our effort and provides the charge to this Panel. Here we outline our views of the historical developments and current issues leading to this charge. We lay out a conceptual framework that includes management actions and research on marine resources and fisheries in an ecosystem context.

THE PROBLEM

The world's oceans are at or near maximum sustainable fishery yields. The number of overexploited stocks increased by 2.5 times between 1980 and 1990 (Alverson and Larkin 1994). Much of the global sustained yield is being accomplished by increased fishing for species at progressively lower trophic levels (Pauly et al. 1998). The prospect of increasing total sustained yield is unlikely (Pauly and Christensen 1995). Although fisheries provide direct or indirect employment to about 200 million people (Garcia and Newton 1997), overfishing is the most commonly observed result of fishery development. The consequences of overharvesting are expressed in social, economic, cultural and ecological changes. The ecological consequences of overfishing often are undocumented and may be poorly known or overlooked.

Since 1990, annual harvests by U.S. fleets have been slightly in excess of 4.5 million metric tons, with nearly half of that coming from two fisheries—menhaden and Alaska pollock. In its annual report to Congress on the status of the fisheries of the U. S., NMFS states that of the 727 managed stocks in the United States, 86 are overfished, 10 are approaching overfished status, and 183 are not overfished (NMFS 1997). This leaves 448 stocks, for which the status is virtually unknown. NMFS (1997) also indicates that “additional stocks will likely be identified as overfished” under the new definition of overfishing in the Magnuson-Stevens

Fisheries Conservation and Management Act (MSFCMA).

While there are some encouraging recoveries (e.g., striped bass in the Atlantic and Pacific sardine), record-setting yields (e.g., Alaska salmon), and management successes (e.g., Pacific halibut), those cases are the exceptions rather than the rule. As in the global case, we should be concerned that overfishing will be a common consequence for most fisheries (Ludwig et al. 1993, Mooney 1998), although this need not be the case (Rosenberg et al. 1993).

This issue is urgent because the current harvest levels are high and because new fisheries will rise, be fully capitalized and reach unsustainable levels of catch levels before the management process can establish effective constraints. That, unfortunately, is the too-common lesson of history (Ludwig et al. 1993). In many cases, the ecological correlates of changing fish populations could have served as evidence of intensified exploitation effects. Frequently, the advent of a fishery and implementation of catch restrictions have unknown ecological consequences. Too often, we learn about ecological consequences after the fact, because we do not consider them in our decision-making, nor do we monitor ecosystem changes due to increased exploitation. Those lessons are not unique to fisheries. Many Federal, regional and State resource management agencies are now moving toward or considering an ecosystem approach in their attempt to provide a holistic framework for resource management. Fisheries must do so as well (Langton and Haedrich 1997).

FISHERIES IN AN ECOSYSTEM CONTEXT

Much of the foundation of fisheries science provides a basis for determining maximum yields so that fishing can safely remove surplus production (Hilborn and Walters 1992). However, when fishing is examined in an ecosystem context, the rationale for harvesting surplus production is unclear. Marine ecosystems are effective at capturing energy, cycling nutrients and producing biomass. Very little, if any

of this biomass, is truly “surplus” to an ecosystem; before the advent of fisheries, it was recycled within the ecosystem. Consequently, our societal decision to harvest fish, induces ecological changes among competitors, prey and predators as the system responds to fishing and the trophically-induced changes fishing causes in ecosystems. These changes affect future levels of surplus production of the harvested population, including the possibility that there may be none.

We understand that fisheries must continue, because they provide food and desirable social and economic benefits and because the cultural traditions of fishing are highly valued. However, we also understand that overutilized fisheries are a serious threat to those traditions and benefits (National Research Council 1999). Conflict thus develops when management agencies (e.g., NMFS, Regional Fishery Management Councils, etc.) seek to implement sustainable yield policies for open-access resources, when fishery effects extend to animals protected by our Endangered Species Act or Marine Mammal Protection Act, and, most recently, when conservation and management interests assert that the burden of proof should be placed on the fishing industry (i.e., to demonstrate that exploitation does not produce large-scale and long-term ecological changes) (Dayton 1998). Finding the balance between competing interests is a difficult challenge, and each fishery will have its unique solutions. On the Federal level, NMFS will be expected to provide the ecological insights that are essential for long-term protection of fish stocks and their ecosystems.

Decisions regarding fishing practices derive from our social, economic, political and cultural context, and only secondarily from the ecological context that supports fisheries (Mooney 1998). A holistic view requires that we recognize fishery management and exploitation as a real and integral part of the marine ecosystem (Langton and Haedrich 1997). Because

fishing actively removes a percentage of one or several species, it can affect the predators and prey of those species, their physical habitat, and it can change the growth and mortality rates of target and non-target species alike. In short, fishing can and is likely to alter the structure and function of marine ecosystems (Dayton 1998, Pauly et al. 1998). Humans are at the top of the global marine food chain. We thus have the obligation and opportunity to make choices to affect the marine environment positively.

While fishing has a long history, it is a relatively new force in the scales of evolutionary time. Fishing is typically a species-selective and size-selective agent of mortality and, therefore, is unlike the natural causes of mortality. Most of the fish removed by fishing activities are in the middle or near the tops of food webs in their habitats. Fishing can be viewed as a keystone predator; the ecological effects of fishing are therefore

substantially greater and more complex than simply the biomass removed. Thus, we should expect that substantial changes have or could occur in those ecosystems due to fishing. We have witnessed changes in the landscape around us with the advent of technology evolved from the axe and the plow. We should expect equally profound ecological changes from modern, large-scale uses of the hook and net.

MANAGING FISHERIES IN AN ECOSYSTEM CONTEXT

Ecosystem-based fisheries management does not require that we understand all things about all components of the ecosystem. We know that the traditional single-species approach of fisheries management is tractable, but we also know that it may not be sufficient. We know that an ecosystem perspective is desirable, but it is complex and unpredictable. There simply is not enough money, time or talent to develop a synthetic and completely

Nature has limits

If nature is a shifting mosaic or in essentially continuous flux, then it may be wrong to conclude that whatever societies choose to do in or to the natural world is fine. The question can be stated as, “If the state of nature is flux, then is any human-generated change okay?” ... The answer to this question is a resounding “No!” ... Human-generated changes must be constrained because nature has functional, historical, and evolutionary limits. Nature has a range of ways to be, but there is a limit to those ways, and therefore, human changes must be within those limits. (Pickett et al. 1992).

informed view of how fisheries operate in an ecosystem context. There will always be unmeasured entities, random effects, and substantial uncertainties, but these are not acceptable excuses to delay implementing an ecosystem-based management strategy.

Each fishery and each ecosystem is unique and yet, in all cases, we are confronted with four fundamental problems:

- We do not have a complete understanding of the ecological system that produces and supports fishes.
- We cannot forecast weather or climate and their effects on ecosystems.
- Systems evolve over time and knowing how the system works does not necessarily mean that an ecosystem would respond predictably to future changes in weather, climate or fisheries.
- Our institutions are not configured to manage at the ecosystem scale. Fish and the fisheries that pursue them are not easily aligned with our political and jurisdictional boundaries.

These constraints are not unique to fisheries, they confront all attempts to manage natural resources in an ecosystem context. We know that the removal of one species can and does affect others, but rarely have we developed management plans that adequately account for those direct and indirect effects. We know that ecosystems have a limited carrying capacity that results in bounds on fish yields. We know that habitat loss contributes to declines in species abundance, but too often we only regulate catch, gear or effort for one target species as a way

to compensate for habitat loss and its effects on other species. We know that major, unexpected events (e.g., El Niño) can alter ecosystem processes, thus affecting species targeted by fisheries, but we have no method for integrating these events into our assessments of target species population trends (Mantua et al. 1997, Francis et al. 1998).

What are the potential gains of implementing an ecosystem approach to management, and how do we develop a holistic view that is both sufficient and tractable? In this report, we develop a strategy for implementing ecosystem-based management.

First, we develop a conceptual model that sets fisheries in the context of what we know about ecosystem theory (which is provided in the section on **Ecosystem Principles, Goals and Policies**). Second, we provide a brief assessment of the extent to which ecosystem principles, goals and policies are applied in U.S. fisheries research and management (**Current Applications of the Principles, Goals and Policies**). Third, we offer a series of specific recommendations for applying these principles to the operational context of NMFS, the Regional Fishery Management Councils (Councils), their administrative structure and their management activities (**Recommendations for Implementing the Ecosystem Principles, Goals and Policies in U.S. Fisheries Conservation, Management and Research**). Finally, we recommend a comprehensive research program to provide the ecological and governance underpinnings for ecosystem-based fishery management.

Taken as a whole, the report presents our best

*Legal Authorities for
Ecosystem Management of Fisheries*

The Magnuson-Stevens Fishery Conservation and Management Act allows fishery managers to consider ecosystems in setting management objectives. National Standard 1 requires conservation and management measures to “prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery” (Sec. 301(a)(1)). The “optimum” yield is defined as providing “the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems” (Sec. 3(28)(A)). Moreover, the optimum yield is prescribed as “the maximum sustainable yield from each fishery, as reduced by any relevant economic, social or ecological factor” (Sec. 3(28)(B)). In addition, the Act states as one of its purposes “to promote the protection of essential fish habitat” (Sec. 2(b)(7)). To the extent that ecosystems are not being adequately considered in FMPs, it is not because of a lack of statutory authority so much as it is a lack of direction about what information is required and how it should be put into operation.

advice about innovative approaches that can help set fisheries in an ecosystem context. Ecosystem-based management is an important new challenge. We expect that NMFS and Council managers and scientists will develop creative ways to help meet that challenge. But these new approaches cannot substitute for compliance with existing mandates. Ecosystem-based management will require re-evaluation of the institutional structure necessary for effective management. It will also demand a strong political will expressed through Congress, NMFS and the Councils—one based on a broader appreciation of the ecosystem context within which we prosecute our fisheries (Hutchings et al. 1997).

SECTION TWO: ECOSYSTEM PRINCIPLES, GOALS AND POLICIES

There are two requirements for managing human interactions with marine ecosystems. One is to develop an understanding of the basic characteristics and principles of these ecosystems—what patterns they exhibit and how they function in space and time. The second is to develop an ability to manage activities that impact marine ecosystems, consistent with both their basic principles and with societal goals concerning the kinds of behavior we would like ecosystems to exhibit (i.e., health and sustainability).

This section lists eight basic ecosystem principles (Principles) and their parallels in human systems that are part of marine ecosystems. A discussion of societal goals (Goals) for ecosystem-based management follows. Finally, a list of general management policies (Policies) to achieve the Goals is provided.

BASIC ECOSYSTEM PRINCIPLES

Marine ecosystems are complex, adaptive systems composed of interconnected groups of living organisms and their habitats. Living organisms are constantly adapting and evolving to their environment (both to the physical environment, which varies on multiple scales, and to other living organisms with which they co-exist); this evolution leads to complex, sometimes chaotic dynamics.

Marine ecosystems are generally extensive and open. Their fluid environments are subject to variability in both local and remote inputs of energy (a consequence of physics operating on many spatial and temporal scales) which may dominate such systems. Highly variable and chaotic dynamics of living resources are often observed as well.

Today, humans are a major component in most ecosystems. The human component of the ecosystem includes the humans themselves, their artifacts and manufactured goods (economies), and their institutions and cultures. The human imposition of fishing mortality, at rates often higher than natural

mortality, can have major impacts not only on targeted species but on the ecosystem itself.

The following eight Principles have analogs in both the human and nonhuman aspect of ecosystems:

1. **The ability to predict ecosystem behavior is limited.**

Uncertainty and indeterminacy are fundamental characteristics of the dynamics of complex adaptive systems. Predicting the behaviors of these systems cannot be done with absolute certainty, regardless of the amount of scientific effort invested. We can, however, learn the boundaries of expected behavior and improve our understanding of the underlying dynamics. Thus, while ecosystems are neither totally predictable nor totally unpredictable, they can be managed within the limits of their predictability.

Properties characterizing marine ecosystems may vary within wide bounds on decadal and longer time scales (Fig.1). For example, El Niño events and decadal climate changes may displace species, restructure communities and alter overall productivity in broad oceanic areas. Other phenomena, sometimes operating on smaller time scales, may precipitate regime shifts characterized by major fluctuations in constituent species (Steele 1996), but our ability to predict such events is only now evolving (Langton et al. 1996) and will always be shrouded in a degree of uncertainty. Nevertheless, management policies can be guided by the broad understanding we possess of marine ecosystem boundaries and production potential limits.

The ability to predict human behavior in fishery systems is also limited, but evolving. Many fishermen pass through rounds of fishing in regular annual patterns, markets respond in predictable ways to price changes, and fishermen often have predictable responses to policy proposals or regulatory changes. Fisheries systems respond to

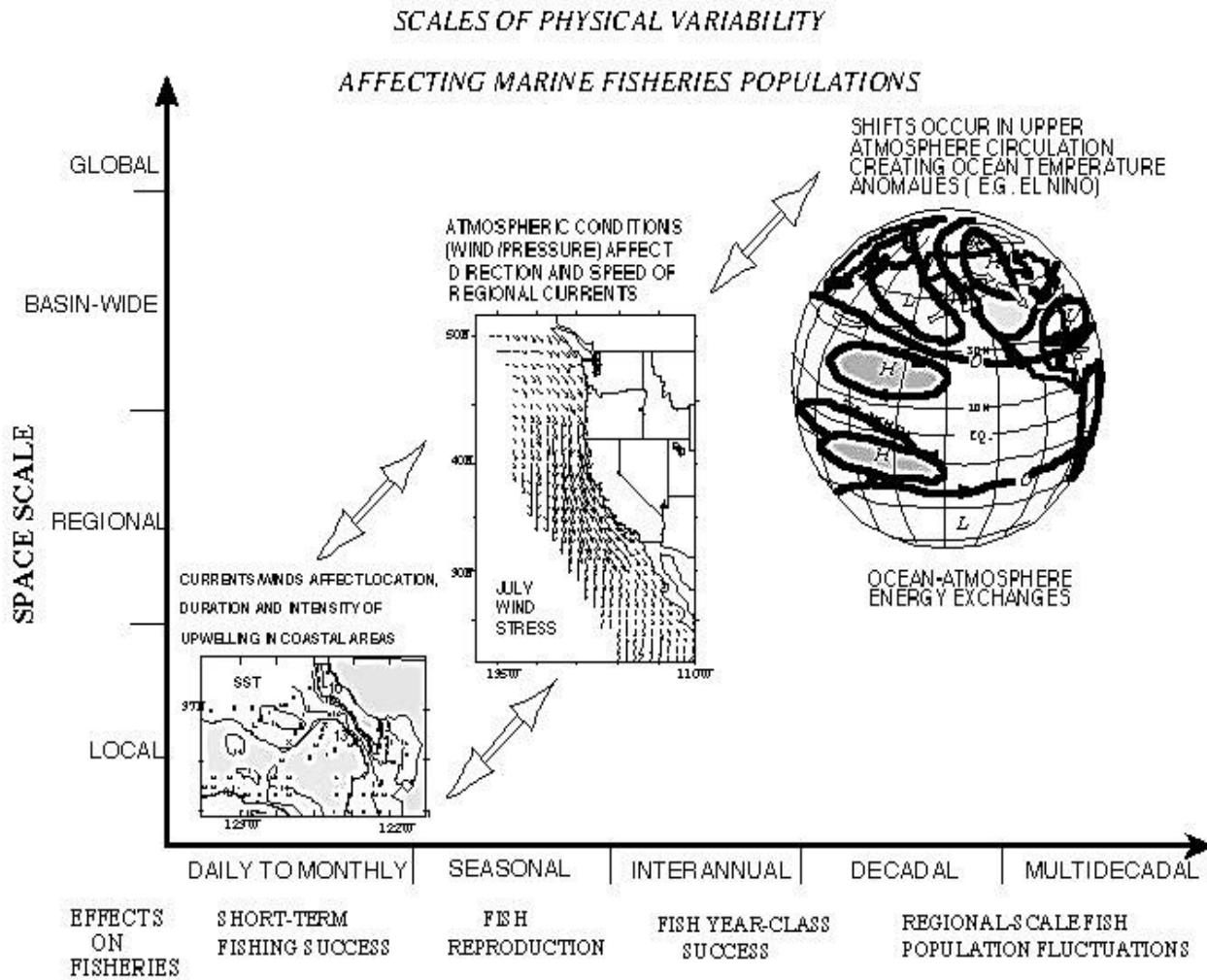


Figure 1. Scales of physical variability affecting marine resources. Variability in marine ecosystems is linked to variability in the physical environment on a continuum of time and space scales. We are often constrained to work on scales at which data are available, and long term monitoring must be carefully designed to address appropriate scales. Figure courtesy of NMFS Pacific Fisheries Environmental Laboratory.

global market trends and economic changes, social preferences and philosophies. The ability to describe, explain and predict these human behaviors, although the behaviors vary according to circumstance, is increasing with the growing body of social scientific data and information on fishery systems.

2. **Ecosystems have real thresholds and limits which, when exceeded, can effect major system restructuring (Holling and Meffe 1996).**

Ecosystems are finite and exhaustible, but they usually have a high buffering capacity and are fairly resilient to stress. Often, as stress is applied to an ecosystem, its structure and behavior may at first not change noticeably. Only after a critical threshold is passed does the system begin to deteriorate rapidly. Because there is little initial change in behavior with increasing stress, these thresholds are very difficult to predict. The nonlinear dynamics which cause this kind of behavior are a basic characteristic of ecosystems.

The concepts of limits and thresholds have been misused in single-species fishery management in the sense that they have been viewed as targets for fish catches rather than levels to be avoided. Because single-species management has prevailed, limits and thresholds rarely have been applied in a broader ecosystem context. Limits in fisheries management often have been biological reference points such as prescribed fishing mortality rates or yields, that are set without concern for other components in the ecosystem. Many limits are in fact thresholds that, when exceeded, challenge the resilience of the managed stock and associated species. Experience has shown that some past target levels used by managers, for example maximum sustainable yield, because they are too close to critical thresholds (Caddy and Mahon 1995), ultimately lead to stock declines or damage to ecological communities. Thresholds are to be avoided to maintain resilience at the species and community levels. Fishery targets should be set conservatively, well below the limits and critical thresholds that compromise the productive potential and stability of the ecosystem. Limits and thresholds of non-targeted organisms have only recently been considered through mandates of the Marine Mammal Protection Act, the Endangered Species Act, and in the new overfishing level definitions, bycatch and essential fish habitat (EFH) provisions of the MSFCMA.

Human systems (fishermen, their communities and fishery management systems) are both resilient and generally resistant to change. Thresholds of profitability, tolerance of regulatory conditions, and risk or uncertainty-induced stress on fishery-dependent human communities are real. Thresholds must be determined through both constituent advice and independent research on individual and group responses to stress. Identification of reference points for the limits of human resilience may be possible.

3. Once thresholds and limits have been exceeded, changes can be irreversible.

When an ecosystem is radically altered, it may never return to its original condition, even after the stress is removed. This phenomenon is common in many complex, adaptive systems.

It is probable that some estuaries, coral reefs (Hughes 1994), and mangrove ecosystems have been irreversibly altered by fishing, aquaculture, and other

habitat-destructive activities. Farther offshore, effects of fishing itself on abundances of target and non-target organisms may radically alter communities and ecosystems. It is too soon to know whether heavily fished systems, such as Georges Bank, will return to their previous states when fishing effort is relaxed (Fogarty and Murawski 1998). Fisheries scientists and managers have demonstrated an abiding faith in the ability of fish stocks to compensate for fishing effects by increasing their level of productivity. Implicitly, that faith is extended to ecosystems which support exploited stocks. Up to a point, recoveries are possible. In some coastal ecosystems, however, resilience and limits have been exceeded, often by the combined effects of habitat destruction and fishing, and it is doubtful if they will return to their original condition.

Changes in ecosystems may permanently alter human behaviors. When a fisherman goes out of business, when an annual season of fishing is disturbed, or when market flow is interrupted, it is often not possible to reestablish the former business, pattern or market. Some aspects of human systems and behavior can be reestablished given enough time and attention, whereas changes in natural components of ecosystems are typically more enduring. In contrast, policy and management systems are continually subject to change and reversal.

4. Diversity is important to ecosystem functioning.

The diversity of components at the individual, species, and landscapes scales strongly affects ecosystem behavior. Although the overall productivity of ecosystems may not change significantly when particular species are added or removed, their stability and resilience may be affected.

Long-term consequences of diversity losses due to overfishing or poor fishing practices in marine systems are largely unknown. It is clear, however, that the economic value of specific components of catch change dramatically as some stocks are overfished, to be replaced in the ecosystem by lower-valued species (Deimling and Liss 1994, Fogarty and Murawski 1998). At the ecosystem level, drastic alterations of diversity certainly have occurred, and biological productivity has been redirected to alternative species, but it is not clear that these

ecosystems are less productive or less efficient. However, such ecosystems are often valued less; witness the loss of tourist revenue in areas that have suffered damage to coral reef systems. It is prudent to presume that changes in biodiversity will decrease resiliency of species, communities and ecosystems, especially with perturbations that occur over long time scales (Boehlert 1996).

This principle also applies to the human element. An economy with more than one sector, a community with more than one industry, a fishing family with more than one income from different sources, or an industry large enough to foster technological innovation, are all aspects of the strength in diversity found in human society. Communities which lose such diversity are more susceptible to stress and unexpected sources of change.

5. Multiple scales interact within and among ecosystems.

Ecosystems cannot be understood from the perspective of a single time, space, or complexity scale. At minimum, both the next larger scale and the next lower scale of interest must be considered when effects of perturbations are analyzed.

Consequences of perturbations at one scale in marine systems may be magnified at larger and smaller scales (Langton et al. 1995). For example, destruction of a species' spawning habitat—typically a small fraction of its range—may translate into major impacts on species associations and trophic interactions in the broader feeding areas of recruited fish. Likewise, effects of fishing on a broad ecosystem scale may have profound impacts on components of ecosystems far removed in space and time—scientists are investigating the relationship between pollock fishing and the general decline of Steller sea lion populations in the eastern Bering Sea and Gulf of Alaska. Seemingly small human perturbations, applied at a point in time or in one part of a marine ecosystem, may have unforeseen impacts because of the open nature and fluid environment that characterize marine ecosystems. These features elevate the probability that a stress applied at one scale will be transmitted and may have unforeseen effects at other scales in the ecosystem.

Human impacts on ecosystems cannot be

understood from the perspective of a single time, space, or complexity scale. A fishing community is subject to perturbations both from its own members and from outside forces. Fishery systems in one location are subject to environmental, social, economic and regulatory forces far removed in time and space, especially with respect to markets.

6. Components of ecosystems are linked.

The components within ecosystems are linked by flows of material, energy, and information in complex patterns.

Critical linkages in marine ecosystems are sustained by key predator-prey relationships. Large, long-lived predators and small, short-lived prey (e.g., forage fishes) both contribute in major ways to marine fish catches. Heavy fishing may precipitate species replacements, both at lower trophic levels (e.g., sand lance replacing herring and vice-versa) and at upper trophic levels (e.g., sharks and rays replacing Atlantic cod) (Fogarty and Murawski 1998). Loss from ecosystems of large and long-lived predators is of particular concern because they potentially exercise top-down control of processes at lower trophic levels. Global data sets have indicated that the mean trophic level of fish caught declined significantly from 1950-1994 (Pauly et al. 1998). Fishing down food webs (i.e., fishing at lower trophic levels) disrupts natural predator-prey relationships and may lead first to increasing catches, but then to stagnating or declining yields.

Disruption of ecosystem linkages clearly may have resounding impacts on human economies and, in the worst cases, ecosystem stability and productivity are compromised. Components of human systems are linked by flows of material, energy and information. The collapse of a market may drastically change fishing behavior. A technological innovation or entry of a new segment of a fishing fleet may cause far-reaching changes in dependent human communities.

7. Ecosystem boundaries are open.

Ecosystems are far from equilibrium and cannot be adequately understood without knowledge of their boundary conditions, energy flows, and internal cycling of nutrients and other materials. Environmental variability can alter spatial boundaries and energy

inputs to ecosystems.

Productive potential of marine ecosystems is especially sensitive to environmental variability over a spectrum of temporal and spatial scales. The unbounded structure of marine communities provides the backdrop for the high (relative to terrestrial) variability that is observed (Steele 1991). Boundaries of ecosystems, or productive regions, shift with weather and longer-term climate change. Species abundances and distributions vary in accord with annual to decadal shifts in ocean features (e.g., Percy and Schoener 1987, Polovina et al. 1995, Roemmich and McGowan 1995, Francis et al. 1998, McGowan et al. 1998). In open systems, local heavy fishing in combination with major changes in ocean conditions (e.g., El Niño), can lead to fishery collapses and associated shifts in the partitioning of energy or biomass among trophic levels (e.g., Walsh 1981, Barber and Chavez 1983).

Human behavioral systems are also subject to variability over a spectrum of temporal and spatial scales, and cannot be understood without knowledge of their boundary conditions. Certain components of human systems (people) are closely related and interact regularly over time; others are only sporadically in contact and interact in cyclical or irregular patterns. The more intermittent or sporadic the contact or interaction, the less stable the human system (Axelrod 1984).

8. Ecosystems change with time.

Ecosystems change with time in response to natural and anthropogenic influences. Different components of ecosystems change at different rates and can influence the overall structure of the ecosystem itself and affect the services provided to society in the form of fish catch, income and employment.

Marine ecosystems experience directional changes. Shifts in climate are responsible for many such changes, but the role of biological interactions in the absence of human influence are largely unknown. Dramatic changes in coastal and estuarine ecosystems, attributable to long-term geological and erosional processes are easily observed (e.g., Chesapeake Bay, see Mountford 1996). Anthropogenic changes are all too common, especially in neritic and estuarine ecosystems, or

enclosed seas (e.g., San Francisco Bay (Nichols et al. 1986), Great Lakes, Black Sea, Aral Sea, Chesapeake Bay). Species introductions, excess nutrient loading, damming of tributaries, poor stewardship of bordering forests, bad agricultural practices, and poorly-managed fisheries are examples of factors that cause change. Rapid advances in fishing technologies (e.g., vessel power, navigation, sensing-locating and harvest efficiency), the propensity for fisheries to selectively remove species, failure to control bycatch, and unintended damage to the physical structure of ecosystems, have changed the character of heavily fished ecosystems (e.g., Georges Bank) (Fogarty and Murawski 1998). Selective fishing, that often targets long-lived predators, can have cascading effects on community structure (Marten 1979, Laws 1977), while heavy industrial fishing on forage species may have unintended impacts on top predators, especially those (e.g., marine mammals) unable to adapt quickly to changes in the forage base. Removal of large whales through past whaling practices, likewise, may have lingering effects on the nature of ecosystem structures today (National Research Council 1996). Deterioration of coastal ecosystems may also generate active attempts at remediation or enhancement through aquaculture and other means (Morikawa 1994), which can also generate pollution and wastes (Wu 1995).

Human activities dependent on ecosystems may change in response to environmental change and changes induced by fishing and other activities. In the short run, these impacts may be considered the normal consequences of a highly variable activity. However, humans adapt to long-term changes in composition of fisheries by stopping fishing or shifting effort to other species; changes which may produce adverse impacts. In addition, changes in perception, values, preferences, patterns of use, and accumulation of knowledge or expertise may cause changes over time in the ways humans interact within ecosystems. Human components of ecosystems (especially technology and institutions) can change rapidly in ways that outstrip the capacity for change of other ecosystem components. Communities may continue to grow and consumption rates increase, for example, yet the capacity of the seas to increase yields of living marine resources is limited. Thus, fishery management policies must be prepared to take into account these factors.

**BROADENING SOCIETAL GOALS
FOR ECOSYSTEMS**

Traditionally, societal goals have emphasized benefits to humans resulting from extractive uses of ecosystem components. For example, fishery management has typically had revenues, employment, recreational fishing opportunities, and/or maintenance of traditional lifestyles as explicit or implicit goals. From an ecosystem perspective, these goals need to be broadened to include concepts of health and sustainability (Lubchenco et al. 1991, National Research Council 1999). Ecosystem health is the capability of an ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the region (Sparks 1995). This concept is also referred to as biotic integrity, which is defined as a system's wholeness, including the presence of all appropriate elements and occurrence of all processes at appropriate rates (Angermeier and Karr 1994, Angermeier 1997). While the concept of health applied to marine ecosystems is relatively new and untested, it has become a guiding framework in several areas, including forest ecosystems (Kolb et al. 1994), agroecosystems (Gallopini 1995), desert ecosystems (Whitford 1995) and others (Rapport et al. 1995).

A healthy ecosystem provides certain ecosystem goods and services, such as food, fiber, the capacity for assimilating and recycling wastes, potable water, clean air, etc. (International Society for Ecosystem Health, 1998). How do we extract from, and otherwise utilize ecosystems, while maintaining their health and the array of non-use services that they also provide (Costanza et al. 1997) into the indefinite future?

The challenge to scientists and managers is to develop useful, quantitative measures of ecosystem health which can guide management. What level of fishing, for example, can a "healthy" ecosystem sustain? How can vigor and resilience be expressed quantitatively so that managers can maintain them within healthy limits? These are difficult questions which will not be answered in their entirety in the foreseeable future, but incremental implementation of ecosystem-based fisheries management will begin to identify ecosystem variables (or indicators) that are unacceptable. These could be used to guide management away from unhealthy ecosystem states.

**GENERAL ECOSYSTEM-BASED
MANAGEMENT POLICIES**

Ecosystem Principles to achieve societal Goals must be implemented through ecosystem-based management Policies. There are three overriding aspects of the Principles that are taken into account in the six Policies discussed below. These are the exhaustibility of ecosystems (reflected in Principles 2 and 3), uncertainty about ecosystems (reflected in Principles 1, 2, 4, and 8), and the role of humans within ecosystems (reflected in all of the Principles). The exhaustibility of the ecosystem requires a policy to change the burden of proof (Policy 1). Both the exhaustibility of ecosystems and uncertainty about ecosystems require policies to manage by a precautionary approach (Policy 2) and to "purchase insurance" (Policy 3) against adverse ecosystem impacts. Uncertainty about ecosystems also dictates that there is learning from management experiences (Policy 4). The role of humans within ecosystems requires policies to make incentives for human behavior consistent with societal goals for ecosystems (Policy 5). Acceptance and effective implementation of the policies and management is served by promoting participation, fairness and equity (Policy 6). Each of the Policies is discussed below.

1. Change the burden of proof.

We live in a world where humans are an important component of almost all ecosystems. Thus, it is reasonable to assume that human activities will impact ecosystems. The *modus operandi* for fisheries management should change from the traditional mode of restricting fishing activity only after it has demonstrated an unacceptable impact, to a future mode of only allowing fishing activity that can be reasonably expected to operate without unacceptable impacts.

To date, almost any type of fishing activity has been allowed until problems arise and regulations are established to solve them. Decision makers have to be convinced that management restrictions are needed. As W. F. Thompson (1919) wrote "... proof that seeks to change the way of commerce and sport must be overwhelming." Several authors have argued that a change is needed in this "burden of proof" (Sissenwine 1987, Mangel et al. 1996, Dayton 1998).

The key elements of the change are: 1) that future fishing activity should be allowed, if and only if it is explicitly provided for by fishing regulations which take into account risk and uncertainty and are promulgated to protect all elements of the ecosystem, and 2) that to a substantial degree the responsibility for providing the information and other support (e.g., the cost of management) necessary to manage fisheries in a sustainable manner, lies with participants in the fishery.

The first part of the change is analogous to changing the “null” hypothesis from “marine fisheries are inexhaustible” (Huxley 1883), to today’s reality that marine fisheries will usually evolve to a state of overfishing unless they are carefully managed (Garcia and Newton 1997). The second element of the change makes clear that the direct beneficiaries from fishing should accept a greater share of the burden (i.e., costs) of fishery management. The standard of proof associated with the change (i.e., how much certainty is needed before a fishing activity is allowed) should be commensurate with the severity of the risk of a mistake. Applying the proper standard of proof is implicitly an element of the precautionary approach (see Policy 2).

In practice, changing the burden of proof will mean that, when the effects of fishing on either the target fish population, associated species, or the ecosystem are poorly known (relative to the severity of the potential outcome), fishery managers should not expand existing fisheries by increasing allowable catch levels or permitting the introduction of new effort and should not promote or develop new fisheries for so-called “underutilized species.”

2. Apply the precautionary approach.

The precautionary approach is a key element of the United Nations Agreement for Straddling Stocks and Highly Migratory Species (United Nations 1996) and the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (FAO 1995). The U.S. is a signatory of both.

All ecosystems are complex and uncertainty is unavoidable. Within uncertainty, there is always a risk of undesirable consequences on fishery resources (e.g., overfishing) and/or on ecosystems.

The precautionary approach was motivated by the widely accepted conclusion of scientists and fishery managers that many of the current problems of fisheries (i.e., a large number of overfished stocks) have been caused by the practice of making risk-prone fishery management decisions (i.e., to err toward overfishing) in the face of uncertainty (Garcia and Newton 1994). One approach to coping with uncertainty, which is widely applied to other human endeavors, is to encourage behaviors (often by enacting regulations) that reduce risk. Thus, the precautionary approach calls for risk averse decisions (i.e., to err toward conservation). FAO (1995) provides guidelines on the application of the precautionary approach.

3. Purchase “insurance” against unforeseen, adverse ecosystem impacts.

Even under the precautionary approach, there is a risk of unforeseen, adverse impacts on ecosystems. Insurance can be used to mitigate these impacts if and when they occur.

Insurance is a common method for guarding against the risks of unforeseen, adverse impacts of many human endeavors, and it has been proposed to guard against adverse ecosystem impacts (Costanza and Cornwell 1992). A requirement to purchase insurance provides an incentive to avoid risk-prone behavior (to reduce the cost of insurance). Thus, this management policy supports the precautionary approach.

Insurance can take many forms in addition to the traditional form of insurance policies or environmental bonds. Marine protected areas, for example, are a form of insurance. Protecting parts of the ecosystem from exploitation can insure future productivity and sustainability (Carr and Reed 1993, Dugan and Davis 1993, Agardy 1994, Bohnsack and Ault 1996, Roberts 1997, Lauck et al. 1998). Reserves also serve as baseline areas to evaluate natural variation in animal and plant populations that are free from fishing impacts.

Another form of insurance is a system to detect adverse impacts at an early stage so that actions can be taken to prevent further damage and/or to repair damage. This form of insurance is more effective if corrective actions have already been planned and adopted, such that there is minimal delay when a

problem is detected.

Environmental bonding, marine protected areas and a system to detect and respond to adverse impacts can serve as both insurance and elements of a precautionary approach.

4. Learn from management experiences.

Management actions and policies can be considered as experiments and should be based upon hypotheses about the ecosystem response. This requires close monitoring of results to determine to what extent the hypotheses are supported.

Sustainable management of complex, adaptive ecosystems must itself be adaptive (Holling 1978). Management policies are experiments from which we can learn and improve, rather than absolute “solutions.” Adaptive management in an “active” context would demand that hypotheses be put forward for testing and that alternative models be considered. Active, adaptive management often presumes that changes in fishing mortality rates will be imposed purposefully to induce a response in the fished stock or in the ecosystem under investigation (Walters 1986, Hilborn and Walters 1992). This “active” experimental approach to management is scientifically sound, but may have limited applicability in extensive marine ecosystems, at least within the time scales in which managers must act and in which fisheries operate. Walters (1997), while arguing eloquently about potential advantages of active adaptive management, recognizes the many arguments that detract from its adoption. For instance, modeling exercises and experiments required for the implementation of adaptive management have often been seen as excessively expensive or ecologically risky. A less aggressive form of the adaptive approach, however, is more generally acceptable and applicable. In this form, managers learn from actions to the greatest extent possible and respond expeditiously with alternative management actions. The willingness and institutional capability to respond are critical for this form of management to succeed.

5. Make local incentives compatible with global goals.

Changing human behavior is most easily accomplished by changing the local incentives to be consistent with broader

social goals. The lack of consistency between local incentives and global goals is the root cause of many “social traps,” including those in fisheries management (Costanza 1987). Changing incentives is complex and must be accomplished in culturally appropriate ways.

Global goals, such as long-term sustainability of a fish population or ecosystem health, are generally beyond the control of people at a local scale. Their incentive for conservation is diminished if they have no assurance that others will conserve or if they will not share in future benefits from conservation. This phenomenon is illustrated by the well known “race for the fish” which can lead to overfishing and wasteful overcapitalization (Graham 1935, Gordon 1954, Sissenwine and Rosenberg 1993).

A key element of making local incentives consistent with global goals is to allocate shares of the fishery such that people at local scales (down to the scale of individuals) have the incentive to use their shares efficiently (i.e., not wasting resources by racing for a share) and to conserve the entire resource to enhance the value of their shares in the future. Shares can take many forms such as a fraction of the total allowable catch (known as an individual quota), units of fishing effort, or exclusive rights to fish specific areas. Share-based allocation schemes might be broadened to take account of indirect impacts on ecosystems. There are several options for the local scale to which shares are allocated, such as to individuals or to communities. The most effective configuration of a share-based allocation scheme depends on the specific fishery and ecosystem that is being managed, but some form of share-based allocation will usually be necessary to fulfill this management policy.

6. Promote participation, fairness and equity in policy and management.

Ecosystem approaches to management rely on the participation, understanding and support of multiple constituencies. Policies that are developed and implemented with the full participation and consideration of all stakeholders, including the interests of future generations, are more likely to be fair and equitable, and to be perceived as such.

The level and quality of stakeholder participation

in fishery management varies widely, as does the definition of “stakeholder.” Participation varies from passive consultation to shared decision making authority (Sen and Nielsen 1996). Systems organized to promote the maximum involvement of stakeholders, including the interests of future generations, and to emphasize the maximum appropriate delegation of responsibility and authority to the lowest possible levels of the management system (e.g., the local or regional level), tend to have the highest credibility among fishery constituents (Pinkerton 1989). This often leads to such effects as better data sharing and lower enforcement costs.

SECTION THREE: CURRENT APPLICATION OF THE ECOSYSTEM PRINCIPLES, GOALS AND POLICIES

We reviewed how the Councils and NMFS currently apply the ecosystem Principles, Goals, and Policies in order to help shape strategies for greater application in the future. We could not undertake a comprehensive fishery-by-fishery assessment of the application of the ecosystem Principles in current research and management activities. Such a task was beyond our scope given the limited time and resources available, and was certain to be incomplete. In addition, we saw little to be gained by evaluating the past performance of agencies relative to a set of ecosystem Principles, Goals, and Policies that were not known to the organizations whose performance might be judged. Most importantly, the 1996 amendments to the MSFCMA substantially changed the guidelines for certain management actions so that past practices are no longer relevant.

Information for the assessment was solicited from a number of sources, including NMFS Regional Offices and Fishery Science Centers. NMFS was asked to consult with Councils and other appropriate organizations to prepare this information. At our first meeting, representatives from each NMFS Fishery Science Center briefed us on the application of general ecosystem principles. Relying on that input and on our own knowledge and experience we then prepared regional overviews which served as the basis for this assessment.

To organize the assessment, we posed a series of questions that reflect the application of the Principles. These questions and our answers to each are given below.

Q: Have science-based ecosystem boundaries been identified, and are they used to specify resource management units?

A: Marine ecosystem boundaries are generally open, but bathymetric and other oceanographic features create biological discontinuities or shape gradients that allow marine ecosystems to be defined. On a regional scale, the Council jurisdictions reasonably correspond to such bathymetric and oceanographic

features. Within these jurisdictions, management unit boundaries generally parallel the scientific information about the distribution of exploited fish stocks. Because fish distributions are also affected by the topographic and oceanographic features that are important to other biological components of ecosystems, it is often the case that management units corresponding to stock distributions also correspond to ecosystem boundaries. For example, this occurs with cod in the Gulf of Maine ecosystem, which are managed as a single stock by the New England Fishery Management Council. There are many situations where this is not the case, and many cases where the scientific basis for defining stock boundaries is minimal. Exchange rates across boundaries are seldom known or explicitly considered in management. This is particularly true for highly migratory species such as tunas, swordfish and billfishes. Exchange rates are important within ecosystems for some forms of management, such as area closures (including marine protected areas) that are used to conserve exploited stocks of fish, or more broadly, to conserve marine ecosystems.

The issue of ecosystem boundaries also has connections with human institutions. In some cases, the jurisdiction of management institutions does not match ecosystem boundaries or stock boundaries of some resources. This has led to various arrangements for interjurisdictional management of fisheries, such as international commissions, interstate fishery management commissions, and joint Fishery Management Plans (FMP) of two or more Councils. While some useful steps have been taken to deal with interjurisdictional issues, little consideration has been given to mobility of the fishing industry (both recreational and commercial) between jurisdictions, or to the diversity of people within the jurisdictions.

Another factor related to the definition of ecosystem boundaries is the impact that nonfishing sectors of society have on marine ecosystems. Management of coastal resources, agriculture and forestry, in addition to fisheries, is also required to effectively apply the ecosystem Principles, Goals and

Policies. If it is impractical to include these activities within ecosystem boundaries, exchanges across boundaries caused by these activities must be considered. In addition, institutional arrangements are needed to address cross-sectorial effects on ecosystems. Generally, such arrangements are lacking, although the recent MSFCMA amendment that calls for the identification of EFH should be an impetus for making such arrangements.

We conclude that ecosystem boundaries are generally defined and are reflected in management, but these definitions will have to be amended in order to integrate our recommendations for an ecosystem approach to management.

Q: Is scientific uncertainty in stock assessments and knowledge about marine ecosystems described to managers, and is this uncertainty considered in FMPs (such as by including buffers)?

A: Many sources of uncertainty affect stock assessments: 1) imperfections in catch statistics (sometimes from misreporting), 2) imprecise estimates of biological parameters, 3) variability in fishery independent resource surveys, and 4) natural variability in biological processes, particularly in recruitment. All these sources of uncertainty should be considered when determining the variance associated with estimates of current and future stock size. But, the uncertainty in stock assessment estimates is not always characterized, and even when it is, the true uncertainty is probably greater since it is difficult to account for all sources of uncertainty. Nevertheless, managers are usually made aware of at least some degree of uncertainty; their reaction to uncertainty varies among regions. For example, the North Pacific Fishery Management Council is noted for generally acting conservatively in the face of uncertainty (i.e., applying the precautionary approach), whereas some other Councils have consistently done the opposite (i.e., making risk-prone decisions) in the past. Recent changes in the MSFCMA and international agreements requiring the application of the precautionary approach should encourage risk-averse decisions by all Councils in the future.

Stock assessment uncertainty is only one of several areas of imprecision that should concern fishery managers. Uncertainty about fishery effects on ecosystems is high and generally is not

characterized. There are some cases where fishery managers have attempted to account for ecological relationships in spite of uncertainty, such as prohibiting pollock trawling within 10-20 miles of islands that are occupied by endangered Steller sea lions, to minimize the risk that near-shore fishing will deplete their prey, however, these cases are rare.

Scientific uncertainty in stock assessments and ecosystems is an inherent reflection of highly complex systems that extend over vast areas and depths. We conclude that uncertainty is characterized to some degree. In the future, fishery managers need to consistently apply the precautionary approach in the face of uncertainty.

Q: Is there routine monitoring of ecosystems and are the results used to support management?

A: The fish component of marine ecosystems is monitored routinely for many stocks and in most U.S. regions. Standardized trawl surveys of the northeastern U.S., initiated in 1963 and now conducted three times per year, are the most extensive example of monitoring of the fish component, yet, some fish stocks are virtually unsampled by the current survey program. In other regions, fish stocks are only surveyed every third year. In addition, fishery-dependent monitoring is conducted.

Monitoring of fish is far more extensive than is the monitoring of other marine ecosystem components. Some systems such as San Francisco Bay, Chesapeake Bay and the Northeast U.S. have long-standing ecosystem monitoring programs which measure ecosystem components other than fish, but the use of such programs is not widespread for ecosystems and fisheries under the jurisdiction of NMFS and the Councils.

Other ecosystem components that might be monitored are human demographics, marine mammals, birds, benthos, zooplankton, phytoplankton, and physical and chemical factors. While there is a significant amount of human census data and other information about people, changes in the demographics and cultural aspects of participants in fisheries are not routinely monitored, nor are there studies of economics. As a result of the Marine Mammal Protection Act, many populations of marine mammals are monitored, although this monitoring is limited in extent. Coastal sea birds are monitored

in some regions. There are long-term time-series of plankton data, such as California Cooperative Oceanic Fisheries Investigations data off of California, and Marine Resources Monitoring Assessment and Prediction and Continuous Plankton Recorder data in New England waters. With advances in satellite remote sensing, it is now possible to monitor primary production and some physical variables synoptically over vast regions. There has been very little monitoring of benthos, except for a few sites and generally for only a few years. Lack of time-series data on the benthos is an impediment to understanding the effects of mobile fishing gear on benthic habitats.

Monitoring data are used in a variety of ways in the management process. Fish monitoring results constitute a critical input to stock assessments, which are used to support fisheries management. Limited socioeconomic data are used for various impact analyses that accompany fishery management decisions. Information on other ecosystem components is sometimes considered to help explain variability in fishery resources, but such relationships are usually uncertain or speculative and therefore are seldom used by managers.

Q: Have the food webs of target species been identified and is this information used in FMPs?

A: There are extensive databases on the stomach content of fishes in some regions, such as the Northeast and Alaska where hundreds of thousands of fish of many species have been sampled over several decades. Some multispecies predator/prey models have been developed, but generally these models are better at explaining the effects that trophic relationships might have had, rather than predicting future patterns and variations.

To date, use of food web information in fisheries management has been limited. This reflects the limited predictive power of existing multispecies predator/prey models. Knowledge of food webs is considered qualitatively in some management decisions, such as the Pacific Fishery Management Council's FMP for anchovies which sets aside some of the population as forage.

Q: Are total removals, including discards, taken into account in stock assessments and management?

A: Total removals are made up of the reported landings, unreported landings, discards, and mortality to fish that come in contact with fishing gear but are not captured. Stock assessments are routinely based on reported landings and discard estimates, if available. Discard estimates are derived from fishing vessel logbook reports and/or from at-sea observers on fishing vessels. Larger groundfish vessels operating in the northeast Pacific are required to have 100% observer coverage, and this improves the quality of discard data for these fisheries. Observers in the Gulf of Mexico shrimp fishery estimate that discards of finfish are over four times larger than the catch of shrimp. For at least one important Gulf species, red snapper, discards are the largest component of mortality. But there are many species where there are virtually no discard data (although discarding exists). Estimates of unreported landings and/or mortality of fish that come in contact with fishing gear, but are not captured, are very rare. Stock assessments are robust to under estimates of total removals so long as the proportion not included in removal estimates is constant, which is a reasonable assumption under some circumstances.

There are alternative ways for fisheries management to account for total removals. When discards are estimated, they are usually included in the stock assessments which support fisheries management. For example, discards of juvenile swordfish are factored into the swordfish stock assessments conducted by the member countries of the International Commission for the Conservation of Atlantic Tunas. The discards may be taken into account by reducing the allowable catch based on the expected level of discards, or by counting estimates of discards against the allowable catch. Alternatively, management might use measures that are less dependent on knowing total removals, such as gear restrictions, effort controls or area closures.

We conclude that total removals are probably underestimated, and significantly so in some cases. Therefore, more effort is needed to estimate total removals and to apply management strategies that are robust in the face of uncertainty about total removals.

Q: Have the effects of fishing on the ecosystem been studied?

A: This is a relatively new research endeavor. There

is clear evidence that fishing alters species composition (e.g., fishing on Georges Bank appears to have shifted the community from predominately Atlantic cod to sharks and skates (Fogarty and Murawski 1998)). Pauly et al. (1998) recently showed that there has been a significant worldwide reduction in mean trophic level of species fished. Several studies that have demonstrated that mobile fishing gear alters benthic habitat (Auster and Langton 1999), but little is known about the implications of these changes. Further, there has been even less research conducted on other fishing gears.

Q: Are the habitat needs of different life history stages of target and nontarget species known and are they considered in FMPs?

A: The habitats that are used by some or all of the life-history stages of many species of fish are known. But habitat utilization does not mean that the habitat is obligatory (i.e., the species must have that habitat to successfully complete its life-cycle). The mechanistic relationship between a fish species at a particular life history stage, and the type of habitat it occupies, is unknown for most species and life-history stages. It is most critical to understand the essential habitat needs of fish near shore, where anthropogenic effects on habitat are likely to be most significant.

The relationships between fish and habitat are summarized as a basis of EFH determinations to be included in FMP amendments, as required by the MSFCMA. These amendments require that the habitat needs of fish populations be given serious consideration in the future when government agencies make decisions that are likely to adversely affect EFH. Fishing itself is an activity that has the potential to affect EFH. Taking account of these potential effects is a major challenge facing Councils.

SECTION FOUR: RECOMMENDATIONS FOR IMPLEMENTING THE ECOSYSTEM PRINCIPLES, GOALS AND POLICIES IN U.S. FISHERIES CONSERVATION, MANAGEMENT AND RESEARCH

In this section, we describe approaches for incorporating the Principles, Goals and Policies established in Section II into the fisheries management and research processes of the current Council system. We strongly believe that the key to an effective ecosystem approach is to fish more conservatively. The depressed condition of many U.S. stocks is related primarily to unsustainable levels of fishing effort, rather than ecosystem effects. With few exceptions, scientists understand the levels of fishing effort required to produce sustainable yields, but fishery managers are challenged by a highly politicized process to exceed those levels for short-term gains. Setting maximum sustainable yield and optimum yield conservatively, and respecting these conservative goals in the face of political and economic pressure is essential in any ecosystem approach.

Many current U.S. fishery management problems such as overfishing, bycatch and protection of EFH are addressed in the Sustainable Fisheries Act (SFA) of 1996. Each of these SFA provisions is an important step toward the use of ecosystem principles in fishery management. However, these measures do not add up to an ecosystem approach.

FMPs for single species or species complexes should continue to be the basic tool of fisheries management for the foreseeable future. However, managements actions under FMPs alone are not sufficient to implement an ecosystem approach. A mechanism is required to integrate FMPs and include the ecosystem Principles, Goals, and Policies in a way that will be meaningful. That mechanism is the Fisheries Ecosystem Plan (FEP).

THE FISHERIES ECOSYSTEM PLAN (FEP)

Our primary recommendation is that each

Council (including NMFS in the case of Atlantic highly migratory species) develop the FEP as a mechanism for incorporating ecosystem Principles, Goals and Policies into the present fisheries management structure. The objectives of FEPs are to:

- Provide Council members with a clear description and understanding of the fundamental physical, biological, and human/institutional context of ecosystems within which fisheries are managed;
- Direct how that information should be used in the context of FMPs; and
- Set policies by which management options would be developed and implemented.

Councils would develop FEPs for each major ecosystem under their jurisdiction. For example, the North Pacific Fishery Management Council might have two FEPs—one for the Bering Sea/Aleutian Islands and one for the Gulf of Alaska. Councils with overlapping ecosystems, or with significant species migration across ecosystem boundaries would work together on a joint FEP. In the event of transnational ecosystems, appropriate international arrangements would be sought to implement an ecosystem approach.

The FEP should be used as a metric against which all fishery-specific FMPs are measured to determine whether or not management effectively incorporates the ecosystem Principles, Goals and Policies. The FEP should also contain regulations or management measures which extend across individual FMPs. The FEP should serve as a nexus for existing FMPs and provide a context for considering Council management actions with respect to all living marine resources, whether managed or not.

FEPs must contain the information about ecosystem that allows managers to make informed decisions, but the primary purpose of the plans is to prescribe how fisheries will be managed from an ecosystem perspective. Careful consideration must be given to the structure and required content of an FEP to balance the needs for plans to be both substantive and realistic. It is appropriate that NMFS lead a deliberative and inclusive (of a broad range of interests and expertise) process to prepare guidelines for FEPs (analogous to the processes that have been used to prepare guidelines for implementing National Standards). Preparation of such specific guidelines was beyond the scope of our Panel Charter, but we did identify Council actions that must be taken when guidelines are prepared, to be consistent with the Panel's recommendations:

1. Delineate the geographic extent of the ecosystem(s) that occur(s) within Council authority, including characterization of the biological, chemical and physical dynamics of those ecosystems, and “zone” the area for alternative uses.
2. Develop a conceptual model of the food web.
3. Describe the habitat needs of different life history stages for all plants and animals that represent the “significant food web” and how they are considered in conservation and management measures.
4. Calculate total removals—including incidental mortality—and show how they relate to standing biomass, production, optimum yields, natural mortality and trophic structure.
5. Assess how uncertainty is characterized and what kind of buffers against uncertainty are included in conservation and management actions.
6. Develop indices of ecosystem health as targets for management.
7. Describe available long-term monitoring data and how they are used.
8. Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/Department of Commerce (DOC) authority. Included should be a strategy to

address those influences in order to achieve both FMP and FEP objectives.

The eight FEP actions are elaborated below:

- 1. Delineate the geographic extent of the ecosystem(s) that occur(s) within Council authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, and “zone” the area for alternative uses.**

The ecosystems supporting fisheries in the United States vary markedly (Apollonio 1994), and the way in which fisheries are managed within them will vary according to their individual characteristics. Managers must be able to geographically delineate the systems under their authority, and have a scientific understanding of the structure, function, and processes that occur within their respective ecosystems, and between their systems and others. This delineation should include both ecological and human/institutional components and their interactions. This includes the extent of our knowledge of climate, how climate affects the physical and biological oceanography of the system, and how, in turn, these affect food web structure and dynamics.

Councils should use information from FEPs to develop zone-based management regimes. In a zoning approach, geographic areas within an ecosystem would be reserved for prescribed uses. For example, use of gears which are demonstrated to have an adverse effect on EFH could be limited to prescribed areas. Currently, FMPs are required to describe and mitigate gear effects on EFH, but FEPs should go further, not only identifying where habitat impacts occur, but also identifying specific zones where certain gears should be restricted. A zone-based approach could also limit fishing activities in areas where potential negative trophic impacts could occur. The North Pacific Fisheries Management Council's establishment of no-trawl zones in red king crab habitat is an example of such a measure. Zoning can also be used to limit bycatch, by restricting fishing activities in areas where high levels of bycatch are likely to occur.

A zoning approach should also include the establishment of marine protected areas. A species-specific approach to habitat protection, as currently practiced, may result in many small protected areas

with occasionally conflicting regulations that are difficult to understand and often difficult to enforce. Complete protection of relatively large portions of marine ecosystems, in the form of harvest refugia, may provide the best way to characterize habitat needs and also serve as management tools (Bohnsack and Ault 1996, Roberts 1997). Each FEP should consider and evaluate the potential benefits of harvest refugia and support research to evaluate their use.

Marine Protected Areas

Marine Protected Areas (MPAs) offer promise as a means to implement the precautionary approach and mitigate the effects of fishing in an ecosystem (Yoklavich 1998). However, the utility of the approach depends on the way MPAs are defined and established. The concept of MPAs represents a continuum, from marine wilderness areas to areas in which only a few specific activities might be restricted. We use the term to mean the entire spectrum of usage, and suggest that managers carefully define their conservation and management objectives before determining the characteristics of a given MPA.

MPAs should be representative of the larger ecosystem and, as such, would serve as experimental sites for investigating processes and mechanisms that would be operable throughout the region. MPAs must be established with the understanding that ecosystems change over time and that research results have to be evaluated relative to this natural variability as distinct from variability resulting from human exploitation of a resource. MPAs represent a form of insurance against excessive exploitation. Although we aspire to a level of understanding that would allow for strategic management of our nation's fisheries, uncertainty and indeterminacy are fundamental ecosystem characteristics. Hence, research is needed on the optimal size of MPAs, sources and sinks for new recruits, and the social and management issues required for successful implementation.

2. Develop a conceptual model of the food web.

Fisheries managers cannot control the weather or long-term physical changes in the ecosystems that produce the managed resources. They can, however, control what species are fished and the total numbers and individual sizes of resources removed. Thus,

managers should have a conceptual understanding of the food web, and should use that information in making decisions about harvest. For each species for which there is an FMP, there should be a description of both the prey species and the predators at each stage in the life cycle. Where information on certain species is not available for all life stages, managers should refer to species inhabiting similar ecological niches or their functional equivalents as the basis for defining trophic links. Following this, the FEP should contain an analysis of the anticipated impacts of the allowed harvest on predator-prey dynamics, even if data gaps force such a statement to be largely qualitative.

Ecosystem Modeling

Modeling is an essential scientific tool in developing ecosystem approaches for fishery management. Simple descriptions of prey and predator species and models of how they interrelate are good starting points but they are inadequate. What is required is a food-web based mathematical model. Such a model could examine factors that affect primary productivity and how changes in it affect the relationships that exist among all components of the ecosystem. Such a model could assist in assessing the trade-offs among harvests of fish species in different parts of the food web, how abundance of marine mammals relates to populations of its prey species, and how much of the total primary production is required to sustain ecosystem harvest. Recent models such as ECOPATH (Polovina 1984, Christensen and Pauly 1995, Pauly and Christensen 1995) have been applied and have provided insight into some fundamental ecosystem questions. ECOPATH provides a framework for summarizing natural rates of growth and consumption of marine populations. This allows small-scale studies or models (such as fish bioenergetics models or diet composition data) to be viewed in a common currency, in the context of the ecosystem as a whole.

Presently, dynamic mathematical models (e.g., ECOSIM (Walters et al. 1997)) are being developed but they have been applied only experimentally in actual fishery management situations. Using them as active parts of the FEP could facilitate model development and testing. Most importantly, models have the potential to provide managers with information about how ecosystems are likely to respond to changes in fishery management practices (Botsford et al. 1997). Like FEPs, these models will be unique to each system and its important attributes.

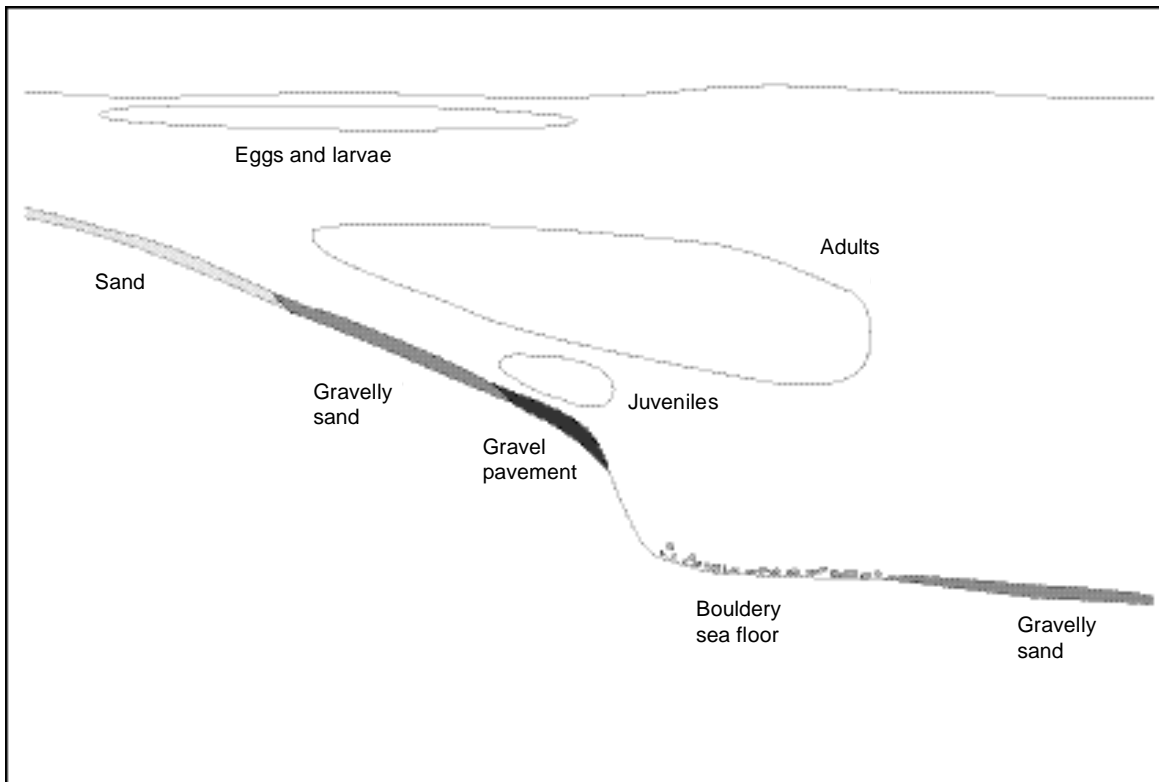


Figure 2. Life history stages of Atlantic cod versus habitat requirements as characterized for Georges Bank in the Northwest Atlantic (artwork by Dave Stanton, adapted from Lough 1989).

3. Describe the habitat needs of different life history stages for all plants and animals that represent the “significant food web” and how they are considered in conservation and management measures.

Marine organisms generally have different dietary and habitat requirements for each life cycle stage (e.g., Atlantic cod on Georges Bank; Fig. 2). Traditional management practices often limit fishing effort in an attempt to protect spawning stock while ignoring management strategies that would prevent negative effects on survivorship at each life cycle stage. In an effort to address this issue, FMPs are now required to include a description of EFH. This is probably best considered in a multiple-species context, including overlapping habitats of suites of species with similar life cycles that occupy similar habitats as well as their prey. Thus, each Council should include EFH considerations within the FEP, using the ecosystem approach to describe such habitat based on the EFH descriptions from existing FMPs.

4. Calculate total removals—including incidental mortality—and show how they relate to standing biomass, production, optimum yield, natural mortality and trophic structure.

Ecosystem overfishing occurs when fishing directly or indirectly results in a reduction of ecosystem health. Direct impacts on target species include changes in the total population status, age structure, and sex ratio within the population. Indirect impacts can occur on component species or on ecosystem health. Pauly et al. (1998) describe trophic effects of fishing which yield apparently nonlinear, unanticipated results with potential negative effects on sustainability. Thus, a measure of total removals of a target species should include fish landed and fish caught and released (with some determination of mortality rates of released fish), predation at each life history stage, and loss through incidental capture.

Mortality associated with bycatch can produce significant biological losses and ecological shifts in community structure within ecosystems (Alverson et al. 1994). To address bycatch issues, FEPs should: 1) identify potential shifts in community structure and their consequences, and indicate how they should be mitigated; 2) identify bycatch associated with particular gear types, not just by providing a list of species, but also by identifying how bycatch in a given species changes both spatially and temporally; and 3) identify existing or potential alternative gear types which would reduce bycatch.

5. Assess how uncertainty is characterized and what kind of buffers against uncertainty are included in conservation and management actions.

The more complex an ecosystem, the greater the unpredictability. The ultimate uncertainty and risk is associated with those practices that affect ecosystem equilibrium, such as significant changes in climate or hydrology that have potentially significant global effects. Therefore management actions that aim for specific outcomes should be accompanied by the anticipated probabilities associated with achieving those outcomes. Given the variability associated with ecosystem states and the general low precision, high variance, and unknown potential for bias in fisheries data—and thus in the models used to predict outcomes—managers must recognize the high likelihood for unanticipated results. Hence, decision-makers should account for this uncertainty with the development of flexible, adaptive, and risk-averse management strategies.

FEP should identify those factors or issues which are likely to bear the greatest degree of uncertainty within that ecosystem. Stock assessment reports, prepared for each new or continuing FMP, should characterize uncertainty and indicate how that uncertainty is incorporated into the assessment. The characterization of uncertainty in stock assessments is an example of how the policy of the precautionary approach should be incorporated into the FEP, and one of the best example of insurance against unknowable ecosystem dynamics.

Although uncertainty may render management strategies that are effective in one system ineffective in another, the application of the precautionary approach is a policy which can be implemented in

any ecosystem. Because each ecosystem will have different levels of uncertainty and risk associated with it, managers must develop specific risk criteria for application of the precautionary approach within each system.

6. Develop indices of ecosystem health as targets for management.

The use of a goal such as ecosystem health to guide fishery management forces resource scientists and managers to define desired ecosystem states, typically based on historical information reflecting ecosystem structure and yield. Once this has been accomplished, management strategies can be developed to generate and maintain these healthy states. Defining a healthy ecosystem is problematic in practice, so we also recommend that managers identify “unhealthy” ecosystem states which should be avoided. For example, FEP goals could be to prevent the extinction of any ecosystem component, to maintain a specific, high mean trophic level in the ecosystem, or to maintain benthic biomass within the range of natural variability. Each Council should be charged to develop its own FEP goals and metrics based on unique ecosystem characteristics.

7. Describe available long-term monitoring data and how they are used.

Although most physical and biological databases represent relatively short periods of time and therefore do not characterize long-term variability, the amount and quality of physical data available relevant to fisheries have improved markedly in recent years (Boehlert and Schumacher 1997). These data are essential for the development of models to predict changes in oceanographic conditions. Biological baseline data often are difficult to evaluate, given the current impacts of fisheries on marine ecosystems and the largely unpredictable outcomes of these impacts. However, reasonable estimates of preexploitation conditions can be made in some cases (Pauly 1995).

Each FEP should include a prioritized long-term monitoring plan, designed to allow the assessment of the changing states of ecosystem health relative to established baseline conditions. This will be facilitated through the implementation of the research recommendations. As discussed by Christensen et al. (1996), monitoring programs should include ways to determine whether

***Aquaculture and Stock Enhancement:
Are Cautions being Heeded?***

With declining fish stocks, there is growing pressure to artificially boost harvests, either through aquaculture in coastal waters or through stock enhancement. The potential benefits of aquaculture include: increased production of cultured fish which can contribute to food and economic security without placing additional pressure on wild stocks. In addition, stock enhancement may help rebuild or sustain depleted wild stocks.

However, many existing aquaculture programs have developed without attention to their impacts on marine ecosystems (Naylor et al. 1998). Salmon culture and ocean ranching provide good examples. Hatcheries have led to manifold problems, including interbreeding between native and non-native stocks (Lannan et al. 1989), decreases in genetic biodiversity (Ryman et al. 1995), introduced species problems, and threats to carrying capacity, even in the open ocean (Ogura and Ito 1994). Early calls to genetically “upgrade the wild stocks” (Moav et al. 1978) to improve production have given way to attention to the “usually negative” genetic impacts of aquaculture (Beveridge et al. 1994). Wilcove et al. (1992) captured this sentiment, stating “Introduced genes can be as harmful as introduced species, especially when hatchery-bred fish compete with wild populations.”

Dramatic examples of human manipulation of coastal ecosystems are provided in Japan, where coastal fisheries have been maintained at a near constant level by increasing mariculture production and stock enhancement while natural production has declined (Morikawa 1994). Aside from potential genetic effects as noted above, high intensity coastal aquaculture decreases public access to the coastal ocean for recreation and other pursuits. Marine fish culture can also lead to additional pollution and wastes. Excess feed, feces and other organic matter from fish farms can accumulate in the benthos and result in a substantial alteration of the benthic community. (Wu 1995, Henderson and Ross 1995, Hansen 1994). In addition, some prophylactic chemicals and drugs used in fish culture have unknown impacts on marine ecosystems. Clearly, both stock enhancement and marine aquaculture must be approached carefully to maximize their benefits while ensuring the health of natural ecosystems and the continued production of wild stocks (Travis et al. 1998).

management actions effectively protect ecosystem function. Thus, these programs must be empirically sound and supported by rigorous statistical sampling that avoids bias. While the probability of accomplishing this is low—because replication is often unrealistic and sample sizes are, of necessity, quite small—it does not justify avoidance of establishing long-term monitoring programs (Walters 1986). In particular, the issue of cumulative impacts cannot be addressed without baseline data. Monitoring programs are essential to the success of fisheries management, particularly if we are to discern effects due to fishery policies from those due to other factors.

8. Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/DOC authority. Included should be a strategy to address those influences in order to achieve both FMP and FEP objectives.

In many cases the preponderance of the ecosystem relevant to a particular fishery is under the jurisdiction of the Councils and DOC, but in many cases significant portions of the ecosystem will be outside of that jurisdiction. Examples include salmon, where inland water and habitat issues are paramount and under the jurisdiction of other Federal, State, local and tribal authorities; highly migratory species, where significant parts of the ecosystem are under the jurisdiction of different nations; or ecosystems as extensive as the Gulf of Mexico, where general water quality is critically affected by inflow from ecosystems as broad as the Mississippi River drainage area. Some elements of the ecosystem may be outside of Council/DOC jurisdiction; human constituents may move in and out of Council/DOC jurisdiction and many institutions other than the Councils/DOC may share authority over parts of the ecosystem.

Accounting for the effects of these external influences in the FEP is a two-stage process. First, Councils must identify the most significant elements which are outside Council/DOC authority. This list should include the most significant external effects on ecosystem health. Second, Councils should develop a strategic approach to mitigate each of the major impacts. This approach could include the development of agreements with other agencies to address significant ecosystem impacts, or increased research on ecosystem functions or processes which

are affected by outside influences, and which may require mitigation.

***Institutional and Human Ecologies—
The Case of Pacific Coast Salmon***

The ecology of a Pacific coast salmon fishery includes not only the ocean environment but the rivers in which the fish spawn and the terrestrial habitat related to those rivers. The human ecology of that salmon fishery includes not only the commercial, tribal and recreational fishermen, but also their ancillary businesses and industries. There are also the businesses and industries which have direct effects on the ocean and the coastal riverine habitats (oil and gas, logging, hydroelectric power, development and construction, agriculture and other water diverters) and the citizens who are concerned about the salmon and their habitat even though they do not directly interact with the fish.

The institutional ecology of this salmon fishery includes NMFS, other Federal and State fishery agencies, Native American tribes, and all those institutions which govern the behavior of all of the constituent groups of the human ecology. In fact, 37 Federal agencies, in 9 executive level departments, have some authority over activities affecting marine fisheries and their habitat (Hinman and Safina 1992). Not only is it important to recognize the critical role of this broader set of institutions, but also the role of information, education, and involvement of all of the individuals and groups within the broader set of human constituents whose behaviors are governed by those institutions.

MEASURES TO IMPLEMENT FEPS

The following are general recommendations to ensure effective development and implementation of FEPS:

1. Encourage the Councils to apply ecosystem Principles, Goals and Policies to ongoing activities.

In preparation for FEP implementation, Councils should begin to apply the ecosystem Principles, Goals and Policies to the conservation and management measures of existing and future FMPs. Three actions are particularly important; specifically, each FMP's conservation and management measures should:

- **Consider predator-prey interactions affected by fishing allowed under the FMP.**

Optimum yields should be set considering ecological factors and the integrity of the ecosystem, and total allowable catches should be justified with respect to total ecosystem biomass, production and interspecies relationships.

- **Consider bycatch taken during allowed fishing operations and the impacts such removals have on the affected species and the ecosystem as a whole, in terms of food web interactions and community structure.**

FMPs should identify bycatch taken by gear types and should not just provide a list of species, but describe how bycatch changes temporally and spatially in a given fishery. Management actions should consider the implications of such removals and their consequences. FMPs should identify and consider existing or potential alternative gear types or fishing practices which could reduce such bycatch.

- **Minimize impacts of fisheries operations on EFH identified within the FEP.**

Gear effects on habitat can be considerable. Gear used to harvest a particular species may directly or indirectly affect other species—managed or unmanaged—within the ecosystem. FMPs should not only identify such impacts but should also identify existing or potential alternative gear types or fishing patterns, such as area closures, which could alleviate these impacts.

2. Provide training to Council members and staff.

To facilitate an ecosystem approach and to aid the development and implementation of FEPS, NMFS should provide all Council members with basic instruction in ecological principles. Further, training materials should be made available to the fishing industry, environmental organizations and other interested parties.

3. Prepare guidelines for FEPS.

The Secretary of Commerce should charge NMFS and the Councils with establishing guidelines

for FEP development, including an amendment process. NMFS and the Councils should conduct a deliberative process—similar to the process of developing National Standards Guidelines—to ensure that FEPs are realistic and adaptive.

4. Develop demonstration FEPs.

Choose one or more of the Councils to develop a demonstration FEP. Convene a workshop involving all Councils and other relevant participants which would help develop useful demonstration FEPs.

Encourage all Councils to develop framework FEPs, consisting of such information as can be collected with little additional effort, to facilitate rapid implementation of the full FEP when required by the next MSFCMA reauthorization.

5. Provide oversight to ensure development of and compliance with FEPs.

To ensure compliance with the development of FEPs, the Secretary of Commerce should establish a review panel for FEP implementation oversight. Implicit in this action is the establishment of a timetable for development of a draft FEP, its review by the panel, and any necessary revisions before the draft FEP becomes a basis for policy.

6. Enact legislation requiring FEPs.

To provide NMFS and the Councils with the mandated responsibility of designing and implementing FEPs, Congress should require full FEP implementation in the next reauthorization of the MSFCMA.

**RESEARCH REQUIRED
TO SUPPORT MANAGEMENT**

Our identification of the Principles and associated management Policies reflects a vast amount of scientific knowledge about marine ecosystems and their relationship to humankind. This knowledge is the result of more than 125 years of scientific investment. Yet, the current state of scientific knowledge is not sufficient to fully implement the Principles and Policies. To more fully benefit from the application of the Principles and Policies, there is an urgent need for a better understanding of ecosystem processes in general, and

about the state and dynamics of specific ecosystems.

The Panel did not attempt to develop an exhaustive set of research recommendations. That is better left to more specialized groups of scientists. Instead, we highlighted three research themes based on several criteria. First, we selected themes that were clearly related to the Principles and the Policies that form the basis of an ecosystem approach to fisheries management. Second, we placed a priority on identification of new research directions, compared to current research programs that support fisheries management. These new research directions are not recommended as alternatives to the current research programs, rather they are an additional requirement. Third, we highlighted themes for which NMFS has a unique responsibility.

The three recommended research themes are: 1) determine the ecosystem effects of fishing, 2) monitor trends and dynamics of marine ecosystems, and 3) explore ecosystem-based approaches to governance. Each of the themes is briefly described and discussed below.

1. Determine the ecosystem effects of fishing.

The effects of fishing on the species that are landed are generally understood, although the data that are necessary to assess specific stocks of fish are sometimes minimal. It is well known that the effect of fishing on a “target species” can be severe, with abundance reduced by a factor of 10 or more. Fishing is a form of directional selection on fished species that may alter not only population characteristics (i.e., age structure), but also the genetic makeup of the population. Research on genetic changes from fishing is appropriate. It is also known that fishing can have significant effects on nontarget species and, potentially, on marine ecosystems as a whole. These effects occur as a result of bycatch and discarding of non-target species (including marine mammals, reptiles and birds), trophic linkages between target and non-target species, and alteration of habitat caused by fishing gear. All three of these effects need to be studied. The research should consider how fishing changes ecosystems (i.e., abundance and diversity of species, food web dynamics, amount of various habitat types, and the functional significance of changes). An important element of this research will be to explore the utility of quantitative ecosystem health indices as a tool for managers. The research should also

include consideration of strategies for applying the precautionary approach in light of uncertainty about ecosystem effects of fishing, and mitigation of undesirable effects. One particularly promising approach for risk-averse management is the establishment of marine protected areas and through traditional fisheries management techniques like time/area closures.

2. Monitor trends and dynamics in marine ecosystems (ECOWATCH).

We recommend the initiation of a significant new ecosystem monitoring program. We refer to the program as “ECOWATCH” because it will enable scientists and policy makers to observe natural and human-caused changes in marine ecosystems in a comprehensive manner. Target fish species are routinely monitored using landings data and resource surveys that apply standardized sampling methods. But even for some important exploited species, landings data and/or resource survey data are limited. Data on other components of marine ecosystems are even more limited, although there are some valuable time series of plankton data for a few ecosystems and for some marine mammal populations. For these reasons, ECOWATCH should be scientifically designed to provide data to improve existing models (i.e., stock assessments), but also for input for future ecosystem models. Research on ecosystem models based on current concepts of important ecosystem linkages is a useful application of ECOWATCH monitoring data.

We recommend substantial expansion of existing programs that collect data on trends and dynamics of marine ecosystems and which characterize the biological and physical relationships pertinent to ecosystem-based management. This expansion is needed to fill gaps in current data collection programs for some target species where data are limited, and systematically observe how other components of ecosystems vary. There are several reasons to observe marine ecosystems holistically. Such observations are needed to determine and understand indirect effects of fishing within marine ecosystems. In a sense, these observations are a form of ecosystem insurance. Because we cannot currently predict all of the ecosystem effects of fishing, we should be watching for evidence of such changes so that it is possible to react if the changes are adverse or positive. Ecosystem observations are also needed to distinguish human caused changes from natural

changes. Large spatial and temporal scale (over ocean basins and decades) changes in ecosystems, called regime shifts, are known to occur. Routine monitoring and analysis of key ecosystem variables are needed in order to detect regime shifts and, if possible, to forecast them.

We envision that ECOWATCH will assess the productive capacity of marine ecosystems, including data on fish, shellfish, primary production, plankton, benthic communities (impacts on fishing sites versus control sites), marine mammals, birds, and physical and chemical factors. It will be necessary to make a major investment in new technology to make ECOWATCH feasible. It will be necessary to employ several different sampling “vehicles” including research vessels; dockside and sea sampling of fisheries; remote sensing from satellites, aircraft, and buoys; submersibles and autonomous underwater vehicles. It will be essential to develop modern data management systems so that variables can be related to each other and so that information is accessible. Models need to be developed to assimilate data and produce information products that enhance our ability to evaluate and make conscious decisions regarding marine ecosystems.

3. Explore ecosystem-based approaches to governance.

Many of today’s fishery problems result from failed governance systems. One of the major shortcomings of past and most present governance systems is that they do not create incentives for humans to be prudent predators (i.e., efficient in the uses of natural resources and concerned about long-term conservation). A related problem is that members of the fishing industry and the concerned public often feel alienated from the institutions that govern fisheries. The challenge of achieving effective governance from an ecosystem perspective is even greater. From such a perspective, incentives for efficiency and conservation must apply to indirect effects of fishing on segments of society that are not directly concerned with fisheries, and to other industry sectors that indirectly affect fisheries. A broad array of stakeholders should have the opportunity to participate in the system of governance.

We envision a multifaceted research program including: 1) research on the social and economic importance of fisheries, and of other ecosystem uses

that affect fisheries, to better understand social objectives, motivations for behavior, and options for creating effective incentive systems; 2) case studies and comparative studies (with other industry sectors) to identify factors that determine success or failure of governance systems; and 3) management experiments to test approaches for involving stakeholders in governance systems and for making decisions when faced with multiple objectives (i.e., from different societal perspectives and across sectors).

While NMFS clearly has lead responsibility for these themes, the research strategies should be developed and implemented as National, interagency programs, involving academic as well as government scientists. Because the ecosystem Principles apply globally, the U.S. should participate in, and initiate when necessary, international programs that further fisheries management objectives. A significant enhancement in resources (e.g., funding, staff, fishery research vessels) will be required if these research recommendations are to be fulfilled.

SECTION FIVE: SUMMARY AND CONCLUSIONS

Recognition of major problems in U.S. fisheries prompted Congress to legislate the Sustainable Fisheries Act (SFA) in 1996. This amendment strengthened the MSFCMA and gave new direction to NMFS and the Councils to halt overfishing, develop recovery plans for overfished fisheries, avoid and reduce bycatch mortality, identify and protect EFH, investigate ways to reduce fishing capacity, and implement numerous other conservation measures. These represent the beginnings of an ecosystem approach to fishery management. Rapid response and hard work by NMFS, the Councils, fishing industries, environmental groups and other interested parties will produce change that eventually will result in marked improvements in the status and management of our fisheries resources. Still, there is more to be done.

The appointment of the NMFS Ecosystem Principles Advisory Panel is a key provision of the SFA. Congress called for an assessment of the extent to which ecosystem principles are being applied in fishery conservation, management and research and for recommendations on how to use them further to improve management. Our review of the use of ecosystem principles finds some positive indications, but much room for further application. The fisheries ecosystem science being conducted is of high quality, but the types of research and assessments, and the geographic coverage are extremely limited and inadequate to inform fishery management. Where scientific information on fisheries ecosystems is produced, it is often used in the management process. However, it is inadequate relative to the scope of the problems and the geographic scale of our Nation's marine fisheries.

At present, NMFS and the Councils often are using the best available science to manage stocks on a single species or species-complex basis. If fishery management is to further incorporate ecosystem principles, Congress must provide a specific mandate to NMFS and the Councils to do so and must fund the scientific infrastructure required to support the decision-making process. Requiring Councils to prepare FEPs provides a mechanism to focus and

inform fishery management, to measure progress toward implementation of ecosystem-based fishery management, to identify research needs and ultimately to insure healthy and productive ecosystems.

U.S. fisheries under an ecosystem-based management system are likely to be quite different than today's fisheries. New management tools will be employed including share-based systems. Fisheries and gear types that have significant adverse impacts on other ecosystem components may be modified or phased out and other types of fisheries and gears may replace them. In some cases, fish stocks may have to be exploited at lower harvest levels than presently indicated in order to sustain other ecosystem components. Some areas that are now fished may become fisheries reserves where harvests are restricted to protect a spawning stock or other sensitive life-history stages; this may result in changes to traditional fishing practices. The short-term consequences of such changes, which may be painful, must be balanced against future benefits in the form of sustainable fisheries and fishing communities.

The next ten years are critical for the future of U.S. fisheries. Already, important changes are underway as a result of the SFA, and the next round of legislation/reauthorization of the MSFCMA should provide additional impetus for reform. Implementation of an ecosystem-based approach will take time and there will be trials and errors. A great deal of education about this new approach will be required, and all involved must be prepared to learn. The two hardest lessons are likely to be shifting the burden of proof to the fishery to demonstrate that the ecosystem will not be damaged by fishing, and to develop a truly precautionary approach to fishery management. The learning curve will be steep for all involved; society as a whole, will be increasingly challenged to help define ecosystem health and the limits of acceptable change in marine ecosystems, while still allowing sustainable fishing practices.

GLOSSARY

ALLOWABLE BIOLOGICAL CATCH—Catch that can be taken in a specific year that achieves the biological objectives, or avoids the biological constraints, of fishery management. Such objectives and constraints are usually set in terms of stock sizes that must be maintained and/or fishing mortality rates that shall not be exceeded. Estimates of allowable biological catch should be based on the best scientific advice available.

BURDEN OF PROOF—The responsibility to demonstrate that a fishing activity will or will not lead to overfishing or negative effects on the ecosystem.

BYCATCH—Unintentional catch; i.e., catch that occurs incidentally in a fishery that intends to catch fish with other characteristics (e.g., size, species).

CARRYING CAPACITY—The numbers or biomass of resources that can be supported by an ecosystem.

CONSERVATION AND MANAGEMENT—The rules, regulations, conditions, methods, and other measures (A) which are required and useful to rebuild, restore, or maintain, any fishery resource and the marine environment; and (B) which are designed to ensure that: (i) a supply of food and other products may be taken, and that recreational benefits may be obtained, on a continuing basis; (ii) irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and (iii) there will be a multiplicity of options available with respect to future uses of these resources (NMFS 1996).

DISCARDS—A portion of what is caught and returned to the sea unused. Discards may be either alive or dead. There are many types of discards, such as economic discards (when a portion of the catch that it is not economically rational to land is discarded), regulatory discards (when discarding occurs because of a prohibition on retaining some of the catch), highgrade discards (discarding of the portion of the catch with a lower value than the portion retained in order to comply with regulations that limit how much catch can be retained). Highgrading is a form of regulatory discarding.

ECOSYSTEM-BASED FISHERY MANAGEMENT—Fishery management actions aimed at conserving the structure and function of marine ecosystems, in addition to conserving the fishery resource.

ESSENTIAL FISH HABITAT—Those waters and substrate necessary for fish to spawn, breed, feed and grow to maturity (NMFS 1996).

FISH—Defined herein as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds (NMFS 1996).

FISHERY—(A) One or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational and economics characteristics; and (B) any fishing for such stocks (NMFS 1996).

FISHING—Any activity which can reasonably be expected to result in the catching, taking or harvesting of fish; or any operations at sea in support of, or in preparation for such activities.

FISHING MORTALITY—A measurement of the rate of mortality of fish in a population caused by fishing.

FISH STOCK—A species, subspecies, geographical grouping, or other grouping of fish that is managed as a unit (NMFS 1996).

MAXIMUM SUSTAINABLE YIELD—A management goal specifying the largest long-term average catch or yield (in terms of weight of fish) that can be taken, continuously (sustained) from a stock or stock complex under prevailing ecological and environmental conditions, without reducing the size of the population.

OPTIMUM YIELD—(A) The amount of fish which will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any

relevant economic, social, or ecological factor; and (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery (NMFS 1996).

OVERFISHING—Fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield on a continuing basis (NMFS 1996).

PRIMARY PRODUCTION—Creation of organic matter by plants through photosynthesis (using inorganic carbon, nutrients and an external energy source) to form the base of the food chain.

RECRUITMENT—A measure of the weight or number of fish which enter a defined portion of the stock such as fishable stock (those fish above the minimum legal size) or spawning stock (those fish which are sexually mature).

REGIME SHIFT—Major changes in levels of productivity and reorganization of ecological relationships over vast oceanic regions which could be caused by various sources including climate variability or overfishing.

RESILIENCE—The ability of a population or ecosystem to withstand change and to recover from stress (natural or anthropogenic).

SIGNIFICANT FOOD WEB—A predator/prey interaction that is important to either the predator or prey population.

STOCK ASSESSMENT—An evaluation of a stock in terms of abundance and fishing mortality levels and trends, and relative to fishery management objectives and constraints if they have been specified.

SURPLUS PRODUCTION—Total weight of fish that can be removed by fishing without changing the size of the population. It is calculated as the sum of the growth in weight of individuals in a population, plus the addition of biomass from new recruits, minus the biomass of mortality of animals lost to natural mortality, during a defined period (usually one year).

TARGET SPECIES—Those fish explicitly sought by fishermen to meet social and economic needs. Their catch are the direct consequence of targeted fishing effort. **NON-TARGET SPECIES** include all others.

TOTAL ALLOWABLE CATCH—The annual catch from a stock that is allowed according to fishery management regulations.

TROPHIC WEB—The network that represents the predator/prey interactions of an ecosystem.

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APPENDIX A: CHARTER—NATIONAL MARINE FISHERIES SERVICE ECOSYSTEM PRINCIPLES ADVISORY PANEL

The Charter was provided to the Panel as initial guidance from NMFS. It was subsequently modified after Panel review.

INTRODUCTION

Section 406 of the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) as amended through 1996 (Appendix B) requires the Secretary of Commerce to establish a Panel to provide advice to the Secretary and Congress on ways to incorporate ecosystem principles in fisheries conservation and management activities. The need for such a Panel has arisen from the perceived failure of traditional management approaches to ensure sustainable fisheries. Yields of many marine fisheries worldwide have declined in recent years; in the U.S., 42% of fish stocks are considered overutilized. The causes of these declines have been complex, and include overharvesting of target and non-target species, habitat alteration and loss, pollution and natural environmental change. Stocks in this condition are not able to provide the same sustained economic and social benefits as those in healthy fisheries.

A basic premise of ecosystem-based management is that the relationship between living marine resources and the ecosystem within which they exist must be well understood. This requires a more comprehensive approach to fisheries research than is necessary for traditional single-species management approaches, although single-species stock assessments have become increasingly sophisticated and some now incorporate environmental parameters. Successful implementation of ecosystem-based management will require consideration of, *inter alia*, essential habitat requirements, hydrography, trophic relationships and physical and biological processes. An important element of the Panel's duties will be to determine what information is essential to the task of ecosystem-based fisheries conservation and

management, and how that information should be collected.

Managers must also understand the complex linkages between natural ecosystems and the economic, social and political dynamics of human systems. Humans are integral components of ecosystems and their interests, values and motivations must be understood and factored into resource management decisions. Information on human systems is as important as that from natural systems and must be included in any ecosystem research and management efforts.

Efficient use of existing information and information flow to management are important topics for Panel consideration. In developing an ecosystem approach to research and management, it is important to recognize that a great deal is already known about marine ecosystems, but that this information is not consistently applied in current management efforts. This is, in large part, because there is no agreed upon method or process for applying it. Therefore, emphasis must be placed not only on what new information is required, but also on how to apply existing information effectively. In addition, it must be recognized that both science and management are ongoing processes, and that mechanisms are required to incorporate new scientific, social, cultural, economic and institutional information into the management process as it becomes available. This may require managers to be trained in ecosystem approaches, so that valuable new information will be recognized and utilized where appropriate.

The complicated legislative and institutional framework that currently regulates resource management decision making poses a significant challenge to the implementation of ecosystem-based fisheries conservation and management. Although the MSFCMA is the principal legislation governing U.S. marine fisheries, other Federal legislation including the Marine Mammal Protection Act and

the Endangered Species Act, as well as State laws and international agreements, provide for the conservation and management of marine resources. This geographic, legislative and institutional fragmentation of conservation and management responsibilities is not consistent with ecosystem principles, which ignore human boundaries and jurisdictions. It also indicates the need for an 'institutional ecology' and a 'legislative ecology' which parallel more closely the natural ecosystem. Coordination of these legislative and institutional responsibilities across jurisdictional lines, as well as the appropriate involvement of all stakeholders in the decision making process, will be a significant task in implementing ecosystem-based management.

The U.S. lacks a single and unifying legislative mandate or policy governing the use of resources from marine ecosystems. Consequently, decisions on resource management within marine ecosystems often are in conflict with one another. For example, it is axiomatic that fishery yields cannot be maximized for all species simultaneously. Likewise, the goal of protecting all marine mammals within an ecosystem may not be consistent with the goal of sustaining maximum fisheries yields, and vice versa. From the outset, resource managers must determine what values are placed on a marine ecosystem and its components, and which goods and services are expected to be produced from each ecosystem. The recommendations of this Panel regarding the development of such policies will be an important step towards improved fisheries conservation and management.

Numerous panels, committees and task forces have been constituted in the past to consider how ecosystem approaches should be applied to natural resource management issues. Many solid recommendations have emerged from these efforts, however few appear to be implemented in fisheries management, as evidenced by Congress' mandate for this Panel. While the reasons for this failure are probably multiple, an underlying cause may be that

many of the recommendations have been more theoretical than practical, and have provided the practicing manager with little in the way of implementable management tools. Unlike these previous efforts, it is fully intended that the NMFS Ecosystem Principles Advisory Panel will develop specific, practical and implementable recommendations for the research, conservation and management of living marine resources, along with longer term goals and directions.

PURPOSE

The Panel's purpose is to advise NMFS and Congress on the application of ecosystem principles in fisheries conservation and management and research activities.

TERMS OF REFERENCE

The Panel will:

- 1. Conduct an analysis of the extent to which ecosystem principles are being applied in fishery¹ conservation and management² activities, including research activities. The analysis should include the following:**

Conservation and management issues

A review of the extent to which ecosystem principles are being applied in: 1) the development of fishery management plans by the Councils; 2) the development of advice by NMFS to the Councils; and 3) other regulatory and rule-making activities of NMFS.

An identification and analysis of cases in which ecosystem principles have been successfully applied in fisheries conservation and management activities.

Research issues

A review of the status of ecosystem science

¹The term "fishery" means — (A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational and economics characteristics; and (B) any fishing for such stocks.

²The term "conservation and management" refers to all the rules, regulations, conditions, methods, and other measures (A) which are required and useful to rebuild, restore, or maintain, any fishery resource and the marine environment; and (B) which are designed to ensure that:

- (i) a supply of food and other products may be taken, and that recreational benefits may be obtained, on a continuing basis;
- (ii) irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and
- (iii) there will be a multiplicity of options available with respect to future uses of these resources.

within NOAA and other entities involved with research in the marine environment (e.g., academic institutions, other Federal and State agencies).

An analysis of whether current research efforts within these agencies and institutions are adequate to support fisheries ecosystem conservation and management.

- 2. Propose a specific, prioritized course of actions that the Secretary of Commerce, Congress and NMFS should undertake to expand the application of ecosystem principles in fishery conservation and management. For example, the following issues might be considered:**

Conservation and management issues

What specific, practical actions can be taken to apply ecosystem principles in fisheries conservation and management activities in the near term, before more complete information is available on ecosystem structure and function?

What barriers (scientific, social, institutional, economic, administrative, legislative) exist to the application of ecosystem principles in U.S. fisheries conservation and management activities? What solutions can be proposed?

Should changes be made to the Council structure or mission to better apply ecosystem principles in conservation and management activities? If so, what should the changes be?

Does the U.S. need additional legislation, or changes to current legislation, to improve the scientific and regulatory infrastructure to support ecosystem-based conservation and management?

Research issues

Which research topics should be priorities for the development of a long-term information base to support marine ecosystem management?

How can agencies and institutions involved in marine and fisheries science collaborate more effectively to take advantage of complementary research efforts, and synergize results from a broader ecosystem perspective?

What are the most meaningful time and space scales for marine ecosystem research which will directly support conservation and management efforts?

Is sufficient information available to determine the value of harvest refugia in fisheries ecosystem management? If not, what additional information is required?

- 3. Produce a report to Congress by October 1998 which includes the above information, plus any other information as may be appropriate.**

The principal focus of the analyses in Section 1 above should be on conservation and management and research activities conducted within the U.S., including those marine ecosystems and their resources which are shared by the U.S. and other countries (e.g., transboundary stocks). However, the Panel should consider pertinent examples from other areas of the world where ecosystem approaches have been used. The Panel should focus on research, conservation and management activities which pertain to ecosystems or species under the jurisdiction of the MSFCMA.

Panel Membership

According to MSFCMA Section 406, the Advisory Panel shall consist of not more than 20 individuals and include:

Individuals with expertise in the structures, functions and physical and biological characteristics of ecosystems; and

Representatives from the Regional Fishery Management Councils, States, fishing industry, conservation organizations or others with expertise in the management of marine resources.

Nominations for panelists were solicited from the National Academy of Sciences, Councils, States, fishing industry and conservation organizations, as well as other appropriate regional and national stakeholders. The Panel membership is balanced geographically, so that regional issues can be addressed.

Travel Costs

Travel expenses for the panelists to attend panel

meetings will be paid by the government at prevailing government rates.

Format and Panel Duration

The Panel will convene three two-day meetings in September 1997, November-December 1997, and February-March 1998. Additional meetings or conference calls may be held as required. The Panel may be requested to continue to advise NMFS on ecosystem issues after October 1998 if such advice is required.

All meetings will be open to the public, and each meeting will include a specific opportunity for public input. Members of the public wishing to make presentations or statements at the meetings must notify the NMFS Office of Science and Technology at least two weeks in advance of the meeting date, which will be published in the Register.

APPENDIX B: MSFCMA SECTION 406 FISHERIES SYSTEMS RESEARCH

(a) ESTABLISHMENT OF PANEL.—Not later than 180 days after the enactment of the Sustainable Fisheries Act, the Secretary shall establish an advisory panel under this Act to develop recommendations to expand the application of ecosystem principles in fishery conservation and management activities.

(b) PANEL MEMBERSHIP.—The advisory panel shall consist of not more than 20 individuals and include—

(1) individuals with expertise in the structures, functions, and physical and biological characteristics of ecosystems; and

(2) representatives from the Councils, States, fishing industry, conservation organizations, or others with expertise in the management of marine resources.

(c) RECOMMENDATIONS.—Prior to selecting advisory panel members, the Secretary shall, with respect to panel members described in subsection (b)(1), solicit recommendations from the National Academy of Sciences.

(d) ECOSYSTEM REPORT.—Within two years of the date of enactment of this Act, the Secretary shall submit to the Congress a completed report of the panel established under this section, which shall include—

(1) an analysis of the extent to which ecosystem principles are being applied in fishery conservation and management activities, including research activities;

(2) proposed actions by the Secretary and by the Congress that should be undertaken to expand the application of ecosystem principles in fishery conservation and management; and

(3) such other information as may be appropriate.

(e) PROCEDURAL MATTER.—The procedural matters under section 302(j) with respect to advisory panels shall apply to the Fisheries Ecosystem Management advisory panel..

APPENDIX C: MEETING PARTICIPANTS

First Meeting—September 9 & 10, 1997 Washington, DC

Presenters:

Dave Allison
Allison Associates

Larry Buckley
NMFS, Northeast Fisheries Science Center

David Evans
NMFS, Deputy Assistant Administrator

Karen Garrison
Natural Resources Defense Council

Craig Harrison
Pacific Seabird Group

Don Leedy
NMFS, Office of Sustainable Fisheries

Pat Livingston
NMFS, Alaska Fisheries Science Center

Jeff Polovina
NMFS, Southwest Fisheries Science Center

Mike Schiewe
NMFS, Northwest Fisheries Science Center

Jim Thomas
NMFS, Office of Habitat Protection

Nancy Thompson
NMFS, Southeast Fisheries Science Center

Guests:

Roger Griffis
NOAA, Office of Policy and Strategic Planning

Kate Wing
Staff, Senate Commerce Committee

Tom Eagle
NMFS, Office of Protected Resources

Second Meeting—December 15 & 16, 1997 Seattle, Washington

Presenters:

John Gauvin
Executive Director, Groundfish Forum

Chuck Fowler
NMFS, National Marine Mammal Lab

Lowell Fritz
NMFS, Alaska Fisheries Science Center

Peter Fricke
NMFS, Office of Sustainable Fisheries

Rod Fujita
Environmental Defense Fund

Tom Okey
Center for Marine Conservation

Ken Stump

Dave Witherell
North Pacific Fishery Management Council

Guests:

Kerim Aydin
University of Washington

Jim Balsiger
Director, NMFS Alaska Fisheries Science
Center

Ed Casillas
NMFS, Northwest Fisheries Science Center

Tracy Collier
NMFS Alaska Fisheries Science Center

John Fell
University of Washington

Bill Hines
NMFS, Alaska Region

Loh-Lee Low
NMFS, Alaska Fisheries Science Center

Clarence Pautzke
Executive Director, North Pacific Fisheries
Management Council

Mike Schiewe
NMFS, Northwest Fisheries Science Center

John Stein
NMFS, Northwest Fisheries Science Center

Usha Varanasi
Director, NMFS Northwest Fisheries Science
Center

Kate Wing
Senate Commerce Committee

**Third Meeting—February 26 & 27, 1998
Key Largo, Florida**

Presenters:

Kimberly Davis
Center for Marine Conservation

Graeme Parks
Marine Resources Assessment Group Americas

Alexander Stone
Reefkeeper International

Guests:

Tom Eagle
NMFS, Office of Protected Resources

Chuck Fowler
NMFS, National Marine Mammal Lab

William Fox, Jr.
Director, NMFS Office of Science and
Technology

Eduardo Martinez
NMFS, Southeast Fisheries Science Center

APPENDIX I.

ECOLOGY OF
THE NORTHEAST CONTINENTAL SHELF



Ecology of the Northeast Continental Shelf

Toward an Ecosystem Approach to Fisheries Management



Northeast Fisheries Science Center and Northeast Regional Office, National Marine Fisheries Service

foreword

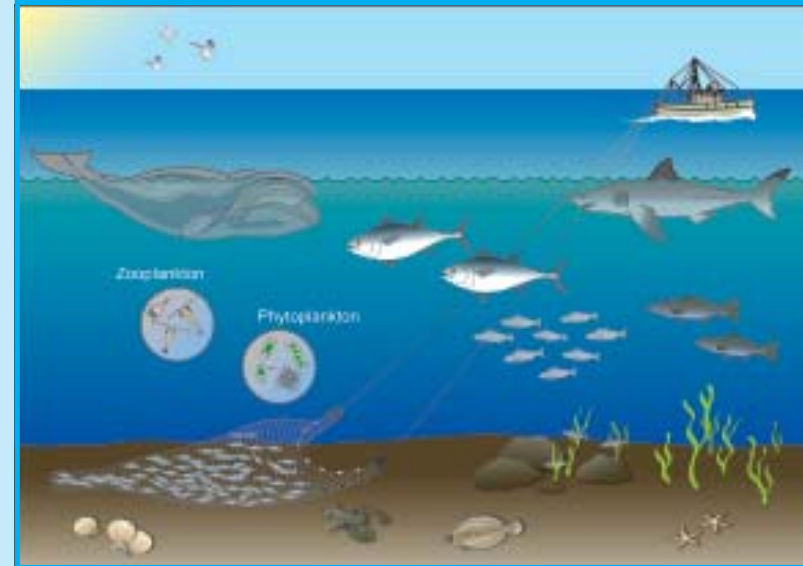
Around the world, many coastal nations are dealing with changes in marine fish and shellfish stocks as well as other sea life owing to alteration of critical habitats, over-use of ocean resources, bycatch, and the effects of climate variability. Thinking of the ocean and its life as an ecosystem provides a more realistic view of the underlying causes and effects of changes in living marine resources. Managing our use of the ocean's resources, including fisheries, on an ecosystem basis is becoming more possible as we learn how an ocean system works. Managing from an ecosystem perspective allows us to consider the effects of multiple factors and their interactions. In addition to fishing, other activities that might be included are coastal development, pollution, shipping, and oil and gas extraction.

In this booklet we describe the general concept of ecosystem-based management, the types of information available for the Northeast Continental shelf, and how we gather this information. To understand the ecosystem we need to consider factors such as climate and oceanography, habitat requirements, the biology of the system from the microscopic plants (or phytoplankton) at the base of the food web to the top predators (including humans), and the connections among all of these parts. We address each of these elements in turn to provide some of the background information that will be necessary to move toward an ecosystem approach to management.

What is an Ecosystem?

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

Ecosystems are both complex and continuously changing. Humans and their institutions are integral parts of the ecosystem. Fish harvesters meet an important societal need by providing food from the sea. The ecosystems that produce seafood must be cared for both because of their intrinsic importance and to ensure this sustainable source of food for humans.



Fisheries ecosystems are complex and include tiny plants and animals at the base of the food web (phytoplankton and zooplankton) all the way up to top fish predators, marine mammals and sea birds. Humans are an integral part of the ecosystem.

What is an Ecosystem Approach to Management?

The recently released U.S. Ocean Action Plan strongly endorses the development of an Ecosystem Approach to Management. The action plan builds on the recommendations of the U.S. Commission on Ocean Policy which noted:

“U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including human and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.”

- An Ecosystems-Based Management Strategy should be:**
- collaborative
 - incremental
 - adaptive
 - geographically specific
 - account for ecosystem knowledge and uncertainty
 - consider multiple external factors
 - balance diverse societal objectives

Because of the importance of geographical considerations in ecosystem approaches to management, in our descriptions we have emphasized spatial patterns and processes for different elements of the ecosystem to help guide these decisions.

Developing Ecosystem-Based Fishery Management in the Northeastern U.S.

Fisheries management off the Northeastern U.S. has usually, but not exclusively, focused on individual species. In fact, some elements of an ecosystem approach were implemented on the Northeast Continental Shelf more than 30 years ago by the International Commission for Northwest Atlantic Fisheries (ICNAF) based on research at the Northeast Fisheries Center.

ICNAF was an international treaty organization that governed fishing in international waters outside the territorial seas of most of the North Atlantic countries until the mid-1970s, when 200-mile limits were established by most of its member nations. In 1972, ICNAF put its “two tier” management system in place. This system recognized that there was an overall level of productivity and sustainable yield for the ecosystem as whole which depended on the inter-relationships among the parts. The upper tier set management targets based on this system-wide productivity. Next, management targets were set for individual species with the requirement of not exceeding the overall system targets. Under these groundbreaking programs, recovery of a number of depleted groundfish stocks was initiated by the late 1970s.

The Time is Right

Important building blocks for an ecosystem approach to management now exist within our current management structures. These include provisions for protecting essential fish habitat, reducing bycatch, and elements related to overall conservation goals under the Sustainable Fisheries Act and for protecting non-target species under the Marine Mammal Protection Act and the Endangered Species Act.

By drawing on the lessons of the past showing the importance of biological interactions and bycatch, and combining them with the ecosystem management elements now in place, we can make substantial progress toward defining an ecosystem approach to fishery management on the Northeast continental shelf. Because the properties of an ecosystem are different than those of its parts, this approach will necessarily differ from single-species based management. It will require us to consider tradeoffs in management — for example between forage fish and their predators – but past experience shows it can be done.

The development of a full ecosystem approach to fisheries management in this area will require a dialogue among all interested parties in order to define specific objectives. Tapping the ecosystem knowledge of different groups is essential to help specify goals, to evaluate the current state of the system, and to explore the options for management. Choosing the right management tools with wide support among all parties will be critical.

Table of Contents

- foreword 2
- monitoring the ecosystem 4
- ecosystem drivers 6
- fueling the ecosystem 10
- habitat and benthos 12
- life in the water column 14
- fish communities 16
- food habits 18
- protected resources 20
- the steps ahead 22



monitoring the ecosystem

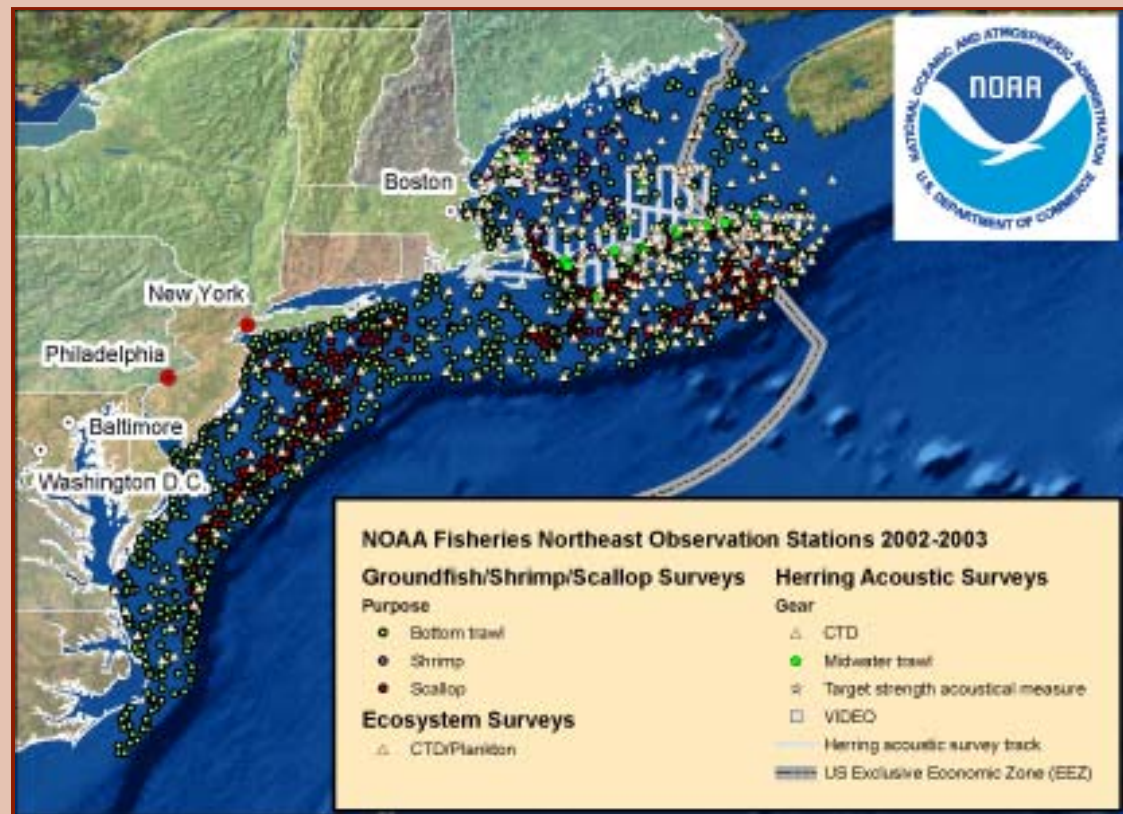
Understanding the changes in marine ecosystems in response to natural and human-related factors requires a broad-based monitoring program drawing on many different instruments and sampling systems. It must encompass the physics, chemistry and biology of the seas as well as the human dimension. Essential elements of an integrated ocean observing system have been in place for many decades on the Northeast Continental Shelf. New elements are continually coming on line with the establishment of ocean observatories, and the development of regional ocean-observing system partnerships throughout the region. The later sections of this booklet depend critically on information derived from these observing system components.

Ecosystem analyses at the Northeast Fisheries Science Center have drawn on a broad spectrum of individual monitoring programs targeted at different parts of the system. These include the use of satellite observations that provide continuous and broad-scale coverage of sea surface temperature and phytoplankton production, annual or semiannual surveys to provide snapshots of change in different components of the system over time, and programs designed to track human activities by measuring how much fish and shellfish are caught and where fishing occurs.

Bottom trawl surveys in this region are among the largest-scale and longest-running programs of their type in the world. They have provided an invaluable way of tracking change. To date, nearly 30,000 stations have been sampled, from Cape Hatteras to the Gulf of Maine, in spring and autumn. These surveys were conceived from the start as part of a broad-based ecosystem

monitoring program. Changes in the abundance and size composition of all species captured by the gear have been monitored, and basic ecological information on their food habits has been collected. The diets of over half a million individual fish, representing more than 100 predator species, have been examined to provide insights into the food web. Information on other factors ranging from the incidence of disease to basic oceanographic measurements are also collected at the same time.

Monitoring other parts of the ecosystem requires other sampling tools. Special survey programs for shellfish are carried out for this purpose. These

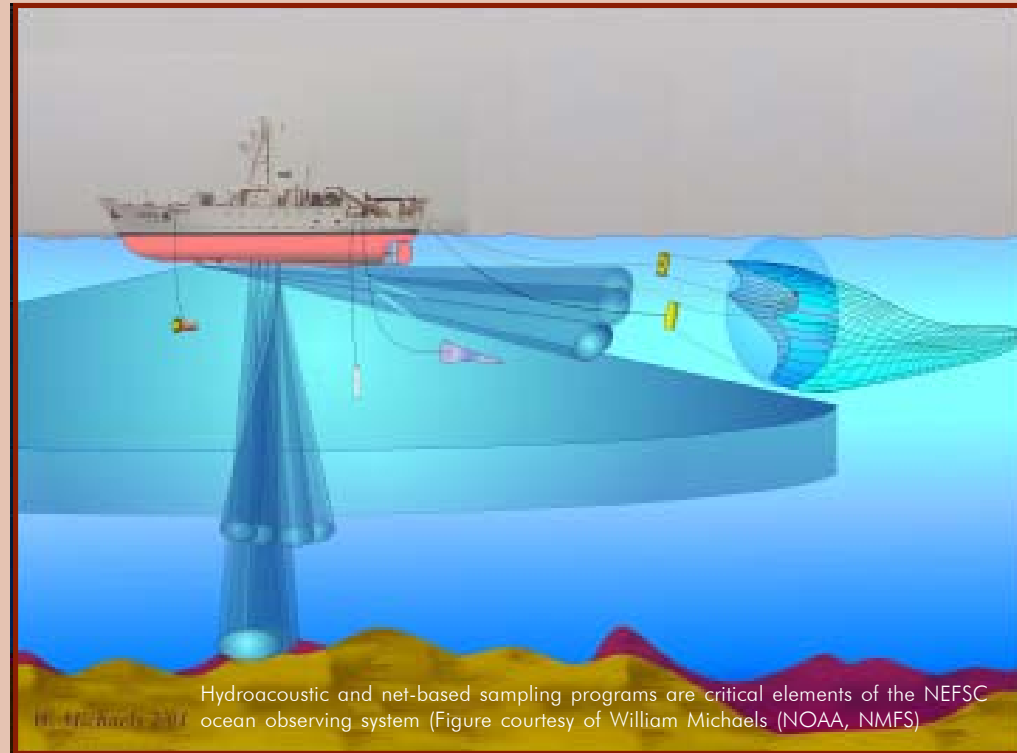


Sampling locations for NEFSC shipboard ocean observing system elements for fish, shellfish and plankton. Not shown are extensive survey programs for marine mammals and sea turtles. Figure courtesy of Tim Haverland (NOAA, NMFS).

too collect a broad range of ecological information on bottom-dwelling species.

In addition to trawls, fish communities are also monitored using echosounders. These hydroacoustic surveys typically focus on schooling fishes such as herring, but many other applications are now being explored. These include mapping the seafloor itself to determine the distribution of different habitat types.

Piecing together the ecological inter-relationships among the various parts of the ecosystem requires information on changes in phytoplankton and the small drifting animals (zooplankton) that serve as food for fish and other species. Longstanding programs to monitor zooplankton have been carried out with over 25,000 stations sampled seasonally since 1977 using plankton nets. A device called the Continuous Plankton Recorder



Hydroacoustic and net-based sampling programs are critical elements of the NEFSC ocean observing system (Figure courtesy of William Michaels (NOAA, NMFS))

Elements of the Northeast Fisheries Science Center Observing System:

- Satellite Oceanography
- Oceanographic Moorings and Buoys
- Plankton Sampling Program
- Continuous Plankton Recorder Program
- Bottom-Trawl Surveys
- Hydroacoustic Surveys
- Sea Scallop Surveys
- Surfclam-Ocean Quahog Surveys
- Northern Shrimp Surveys
- Marine Mammal Surveys
- Apex Predator Surveys
- Sea Turtle Surveys
- Cooperative Industry Surveys and Research
- Fishery Observers

(CPR) has also been used. One of the longest running such program involves commercial tankers that tow CPRs along standard shipping routes, providing critical information on changes in the available food supply. New acoustic and optical tools and sampling devices are coming on line to assist in this effort.

Sampling programs designed to monitor changes in marine mammals, turtles, sea birds and top predators such as sharks, tunas, and billfish provide key insights into the ecosystem as a whole while also allowing special attention to threatened and endangered species that require particular protection.

Finally information on the role of humans in the ecosystem comes from catch reports supplied by fishers and interviews with them and by scientific observers placed on fishing vessels. The willingness of fishers to share this information is a vital component of our overall efforts to monitor change in the ecosystem. Fishers also play an important role through their involvement in cooperative research programs where their ecosystem knowledge is invaluable in designing and carrying out monitoring programs and special studies.

ecosystem drivers

Climate

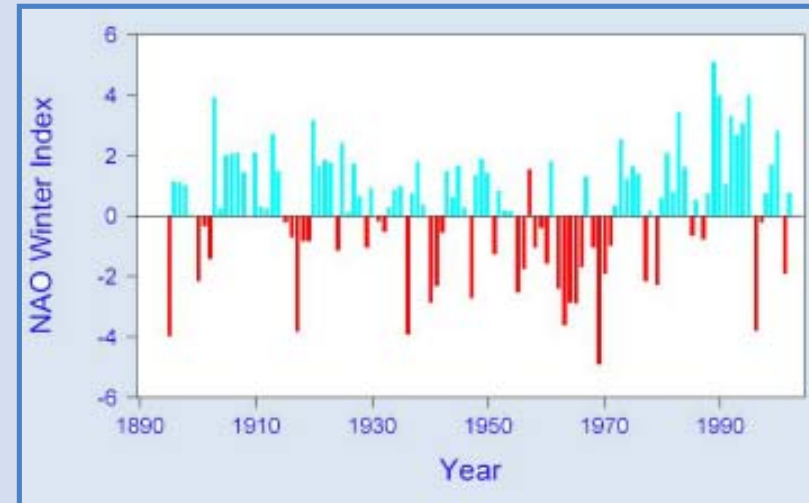
The North Atlantic Oscillation

Climate and weather patterns over the North Atlantic are strongly influenced by the relative strengths of two large-scale atmospheric pressure cells – the Icelandic Low and a high pressure system generally centered over the in the eastern Atlantic. A deepening of the Icelandic Low is accompanied by a strengthening of the Azores High and vice versa. This see-saw pattern is called the North Atlantic Oscillation (NAO) and a simple index of its state is given by the difference in sea level pressure between the Azores and Iceland in winter (December- February).

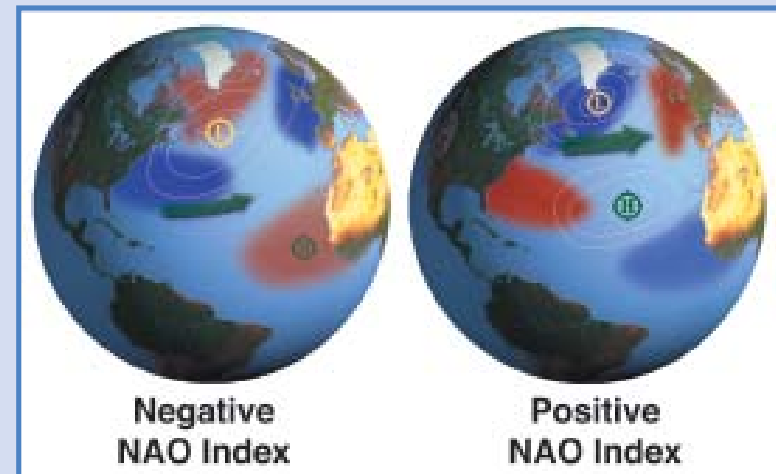
When the NAO index is high, we see an increase in westerly winds, and in precipitation over southeastern Canada, the eastern seaboard of the United States, and northwestern Europe. We also see increased storm activity tracking toward Europe. Water temperatures are markedly low off Labrador and northern Newfoundland, and warm off the United States. Conversely, when the NAO index is low, we have decreased storminess, and drier conditions over southeastern Canada, the eastern United States, and northwestern Europe. Water temperatures are warmer off Labrador and Newfoundland, but cooler off the eastern United States. These changes in the state of the North Atlantic Oscillation tend to persist over many years.

Over the last several decades, the NAO has primarily been in a positive state (strong high pressure over the Azores). We have experienced warm water temperatures during this period, particularly in nearshore areas. This temperature increase closely tracks the change in the NAO index. For example, the NAO index and water temperatures measured at Woods Hole over the last 30 years are high correlated.

When the NAO is in a positive state, the transport of Labrador-Subarctic Slope Water (LSSW) is relatively low, and it does not reach our area. When the NAO is in a negative state however, the LSSW penetrates to the Mid-Atlantic



The winter North Atlantic Oscillation Index (sea level pressure difference between the Azores and Iceland during December-February)



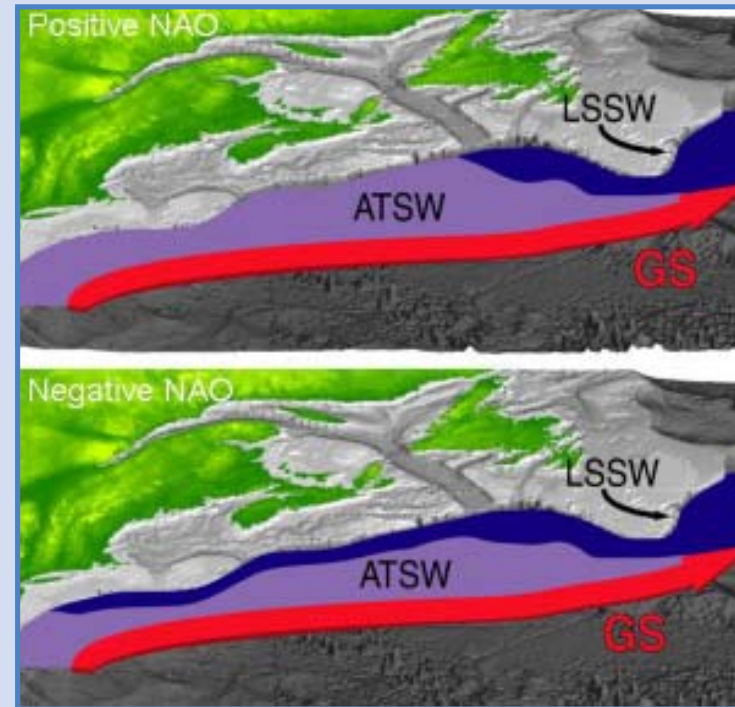
Atmospheric pressure cells and temperature patterns over the North Atlantic representing conditions when the North Atlantic Oscillation is in positive and negative phases. Areas shaded red indicate warmer than average water temperatures; those shaded blue experience cooler than average water temperatures. The arrows indicate the strength of westerly winds.

Why it Matters - When Climate Varies

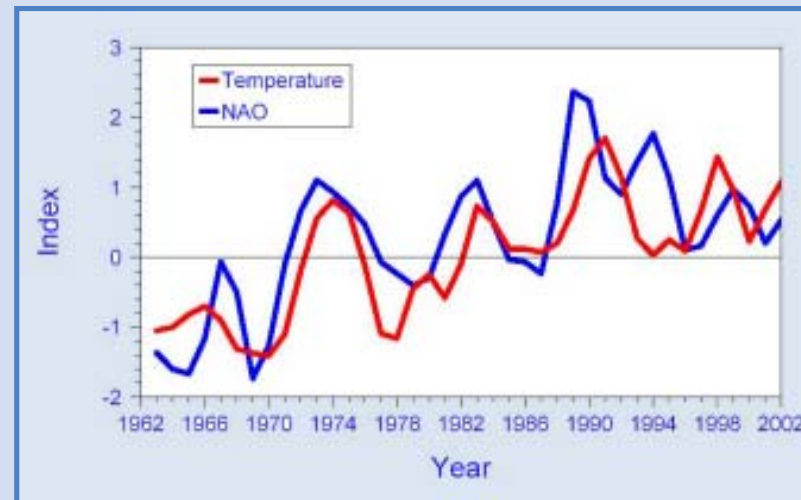
Changes in climate can affect marine ecosystem structure and function in a number of ways. First, changes in atmospheric temperatures affect water temperatures as well. Second, changes in precipitation and runoff from land affect the saltiness (salinity) of the water. Third, alteration in the strength and direction of winds affects ocean currents and also the mixing of the water column. These factors in turn directly affect the basic oceanography of the area. The fact that we see changes in the North Atlantic Oscillation that tend to persist for a decade or more means that we can potentially experience changes in the basic hydrography of the system and management strategies may require adjustment if we experience extended periods of altered system productivity.



Bight, displacing Atlantic Temperate Slope Water (ATSW) further offshore. The NAO index was low during the mid-1950s to early 1970s and we have seen two major drops in the NAO index over the last decade. These resulted in the penetration of cool, fresh, low nutrient Labrador Subarctic water off the eastern United States after a lag of about 18 months – the time it takes for the LSSW to reach our area from northern Canadian waters.



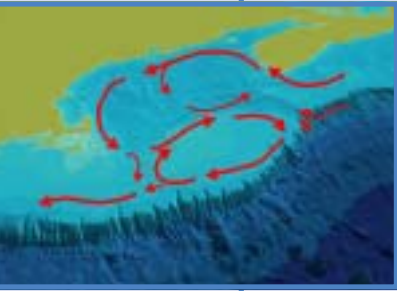
Water mass positions during positive and negative phases of the North Atlantic Oscillation including the Gulf Stream (GS), Labrador-Subarctic Slope Water (LSSW) and Atlantic Temperate Slope Water (ATSW) components



Relationship between the North Atlantic Oscillation index and water temperature at Woods Hole (both series smoothed using a low pass filter)

ecosystem drivers

Oceanography



Mean surface circulation in the Gulf of Maine, Georges Bank and northern Mid-Atlantic Bight

The oceanography of the Northeast Continental Shelf is shaped by a number of factors including the flow of water from Canada into our region, the influence of major river systems, tidal forces, and the earth's rotation. Hydrographic characteristics such as temperature patterns and oceanographic features such as current circulation and the position of frontal zones affect every aspect of the ecology of the system, including the distribution patterns of species at all levels of the food web, the basic biology of individual species, and dispersal and migration pathways among other considerations.

Water Sources and Circulation

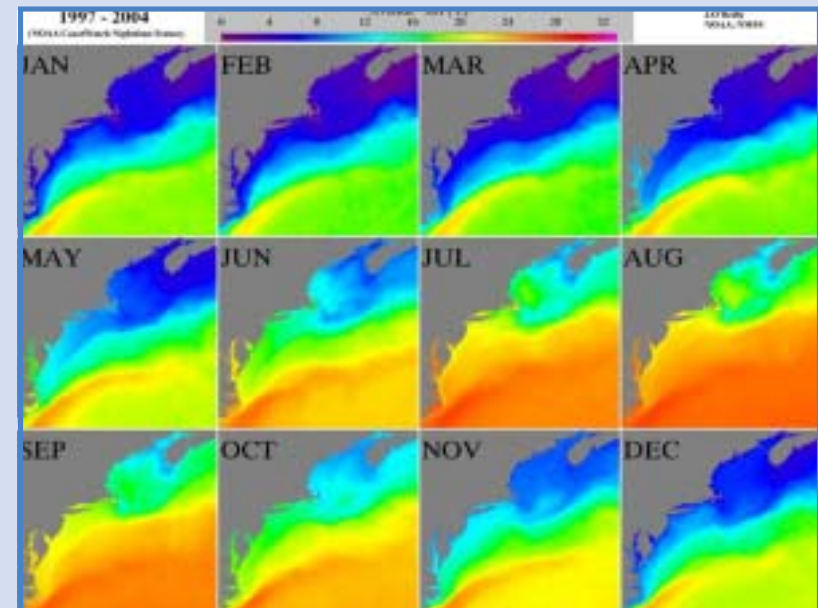
Water enters the Gulf of Maine over the Scotian Shelf and through the deep Northeast Channel, where it forms a general counterclockwise circulation pattern. Smaller-scale circulation patterns may form over several of the features of the Gulf of Maine including some of its deep-water basins. Some of this water exits the gulf through the Great South Channel to the south, while some continues to the northwest where it flows onto Georges Bank in a clockwise circulation gyre. The flow in the mid-Atlantic Bight is generally southwesterly, although it is variable and may reverse direction at times.

Major river systems flowing into the Gulf of Maine and into the Mid-Atlantic Bight have important consequences for flow patterns. The counterclockwise flow in the Gulf of Maine is due in large measure to tides and the effect of five major rivers that flow into it. The outflow of the Delaware Bay, Chesapeake Bay, and Pamlico Sound estuaries have major influence on the circulation in the Mid-Atlantic Bight. Freshwater inputs onto the Northeast Continental Shelf not only influence currents but also the layering (or stratification) of the water column when surface waters are less dense than bottom waters.

The Gulf Stream exerts important influences on the shelf, particularly through the formation of meanders and eddies. Warm core rings – meanders that separate from the Gulf Stream and form a clockwise rotation pattern – can draw large volumes of water off the shelf, along with the small animals (including fish larvae) in that water.

Water Temperature

Geographical and seasonal differences in water temperature on the northeast shelf are pronounced, with important implications for the species inhabiting different sections of the shelf. For example, the fish communities of the Mid-Atlantic Bight are dominated by sub-tropical and temperate species, while the much cooler Gulf of Maine-Georges Bank region supports a temperate and cold water fish community.



Average monthly sea surface temperature patterns on the Northeast Continental shelf and adjacent slope-basin areas from satellite imagery (warmer colors indicate higher temperature levels)

Why it Matters -

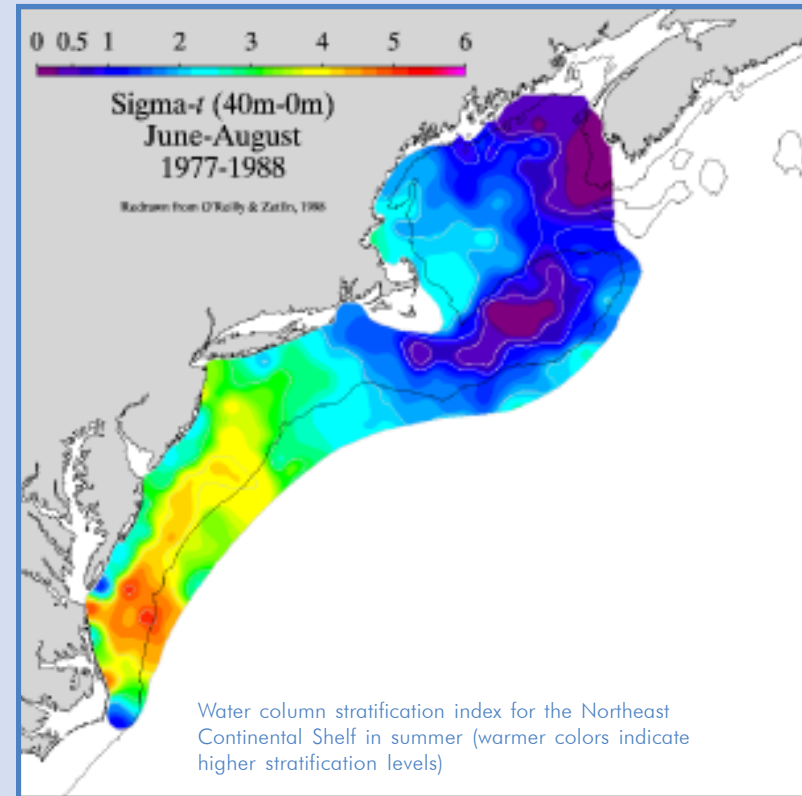
Oceanography Sets the Stage

We have seen that there are distinctive circulation features that define broad oceanographic domains on the shelf. In addition, there are distinctive differences in factors such as temperature and stratification that also differ spatially. Persistent trends in climate forcing have been observed and these are linked to some aspects of the hydrography of the region. The increase in sea water temperatures has affected the distribution of some species, with a northward shift for some southern species. Increased temperatures also increase the strength of stratification, affecting turnover of nutrients and the possibility of anoxic events in some areas. Changes in temperature and wind fields can also affect the position of frontal zones and influence circulation patterns. These factors set the stage for the ecology of the area and fundamental features of the biotic community.

Stratification

Seasonal changes in temperature and the salinity on the shelf strongly control stratification—the layering within the water column. Basically, water that is colder and saltier is more dense than warmer, fresher water and forms the lower layer. Less dense water sits on top unless mixed by winds and tides. Stratification affects the turn-over of nutrients that support the base of the food web. Once this stratification becomes established each year (in late spring-early summer), the mixing of nutrient-rich bottom water is impeded, and nutrients are rapidly depleted in surface waters in some areas.

Strong geographical differences in stratification in summer are evident on the northeast shelf. With the rapid increase in water temperatures in the central to southern Mid-Atlantic Bight, and the input of fresh water from the major estuaries, this area is strongly stratified. This can have important effects on oxygen levels in this region, since the turn-over of bottom waters is critical in replenishing the oxygen supply. In years of strong stratification, oxygen depletion has been observed, particularly in the mid-Atlantic region, leading



to high mortality of bottom-dwelling animals and changes in the distribution patterns of more mobile animals. In contrast, the shallow waters on the central crest of Georges Bank remain well-mixed throughout the year, because of very strong tidal forces and the influence of winds. Intermediate levels of stratification are found in the northern Mid-Atlantic Bight and in the western Gulf of Maine.

Frontal Zones

Other important hydrographic features on the shelf with direct implications for its ecology include frontal zones — areas of sharp discontinuities in water mass characteristics. Areas where water masses driven by tidal forces converge are often important feeding locations for many species because small plankton prey items are often concentrated there by physical forces. Similarly, a frontal zone develops between the cooler, fresher water over the continental shelf and the warmer, saltier water over the continental slope. The shelf-slope front also tends to be an area where predators concentrate seeking their prey. These include marine mammals and the top fish predators.



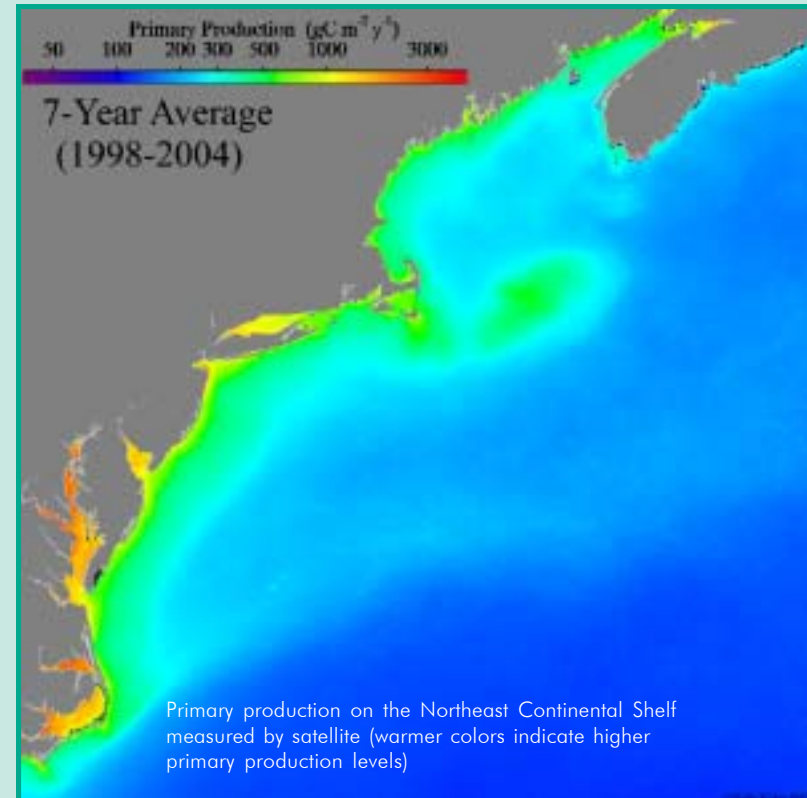
fueling the ecosystem

Phytoplankton: The Base of the Food Web

Ultimately, how much fish and shellfish can grow in a given area depends on the amount of energy fueling the base of the food web. Energy from sunlight is ‘captured’ by plants and converted into plant tissue which, in turn, serves as food for many species. On the continental shelf, phytoplankton are responsible for this ‘primary production’. In shallow waters where sunlight reaches the bottom, larger plants, including seaweeds and sea grasses, are also important primary producers. Regional differences in primary production are evident on the Northeast continental shelf. The highest levels are found on Georges Bank and in the immediate nearshore areas (particularly in the Mid-Atlantic Bight) and in the major estuaries where nutrients from land (such as nitrogen and phosphorus) essentially fertilize the sea water.

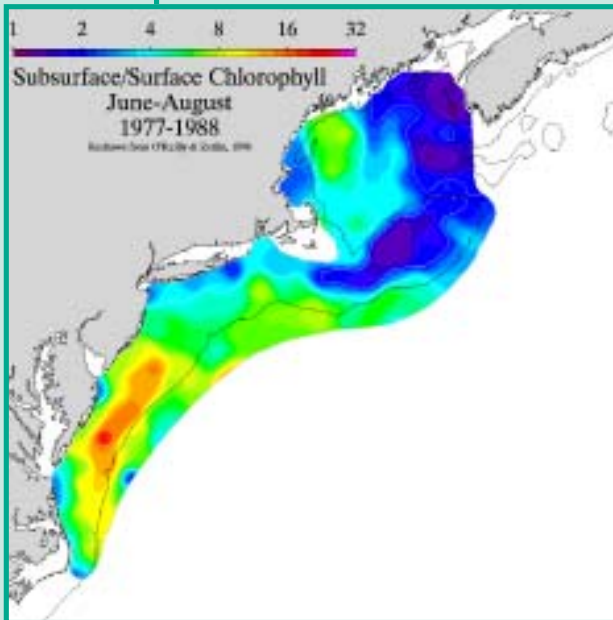
The primary production levels in the deep-water areas of the Gulf of Maine are the lowest observed on the Northeast shelf. Intermediate levels are found on the mid-shelf region of the Mid-Atlantic Bight, and in coastal areas of the Gulf of Maine.

On the shelf itself, primary production is strongly influenced by oceanographic processes, which govern the availability of nutrients. The central crest of Georges Bank stands out as an example of these processes. Nutrient-rich bottom water reaches the Bank through upwelling and other mechanisms, and the strong tidal mixing in the

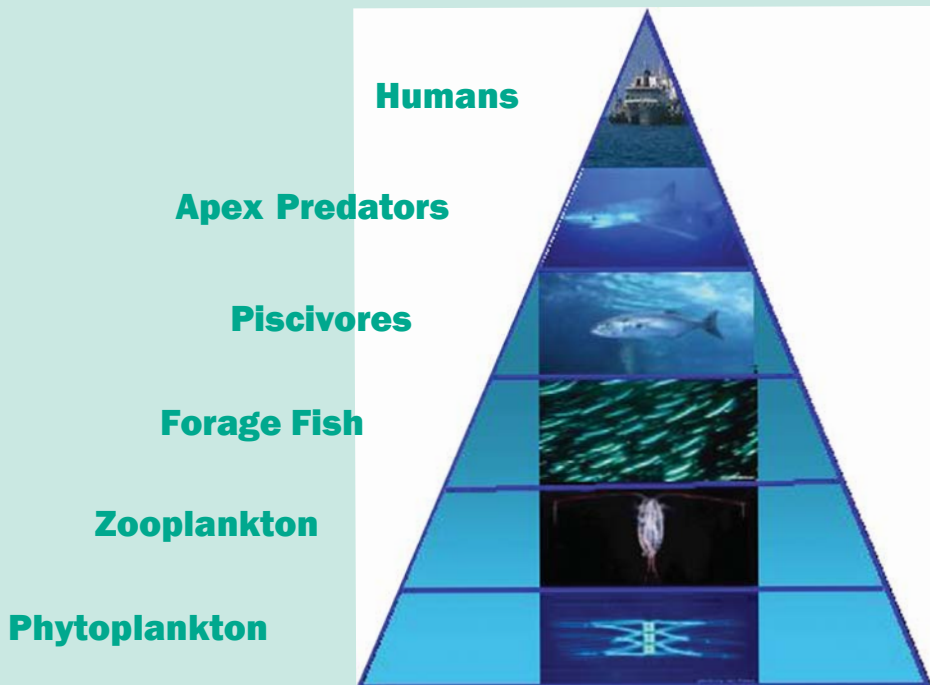


shallow central region of the Bank ensures that the nutrients can be distributed throughout the water column.

During stratified conditions, bacteria become an important factor. As noted earlier, stratification limits the nutrient exchange from bottom-waters. However, bacterial activity releases nutrients from dead plants and other material. This recycling of nutrients dominates the primary production processes at this point, and involves a fundamentally different pathway for energy flow and a very different community of primary producers.



Ratio of surface to subsurface chlorophyll, the plant pigment used in converting sunlight to plant material



Trophic pyramid for a typical continental shelf system

Why it Matters - Bottom-up Effects

We have seen distinctive geographical differences in basic ecosystem characteristics on the Northeast shelf involving the base of the food web. The differences are related to the basic oceanography of the region involving the renewal of nutrients and factors such as nutrient runoff in the nearshore areas. As we define subareas for ecosystem management on the Northeast shelf, these considerations will become particularly important. Because we can expect different levels of overall productivity in different regions, our expectations for sustainable catches for the different areas must be scaled accordingly.

Energy Flow

Think of the flow of energy through an ecosystem as an energy pyramid. The amount of energy is greatest at the base of the food web where the primary producers turn sunlight into plant life. Energy is transferred through successive steps called trophic levels. The amount of energy available at each step is progressively less, because the transfer is not completely efficient and because of other losses from the system. Energy remaining at the top of food web ultimately controls the production of living marine resources found there.

Secondary producers rely on phytoplankton for food. Tiny crustaceans and other animals called zooplankton graze on the phytoplankton, turning plant tissue into animal material. Shellfish such as scallops and clams also feed on phytoplankton, filtering these microscopic plants from the water.

The zooplankton are fed upon by a number of different species, including schooling fishes such as herring and mackerel, but also by some types of whales. Fish species like cod, silver hake, bluefish, and dogfish in turn prey on the schooling fish and similar species. These so-called piscivores (fish eaters) are prey to yet higher level predators such as sharks, tuna and billfish.

Humans, of course, prey on a number of these trophic levels. We also compete with other predators for these food items. As both predators and competitors, we can have both direct and indirect effects on the food web. The direct effects involve the removal of prey items; the indirect ones include unintentional alteration of the basic structure of the food web, and modifying the relative balance of natural predators and their prey and by other means.

The reality of how an ecosystem works of course is more complicated than a simple energy pyramid. Instead of a food chain with direct pathways, we have a complex food web with many connections. Understanding these interactions is critical in developing ecosystem approaches to management.

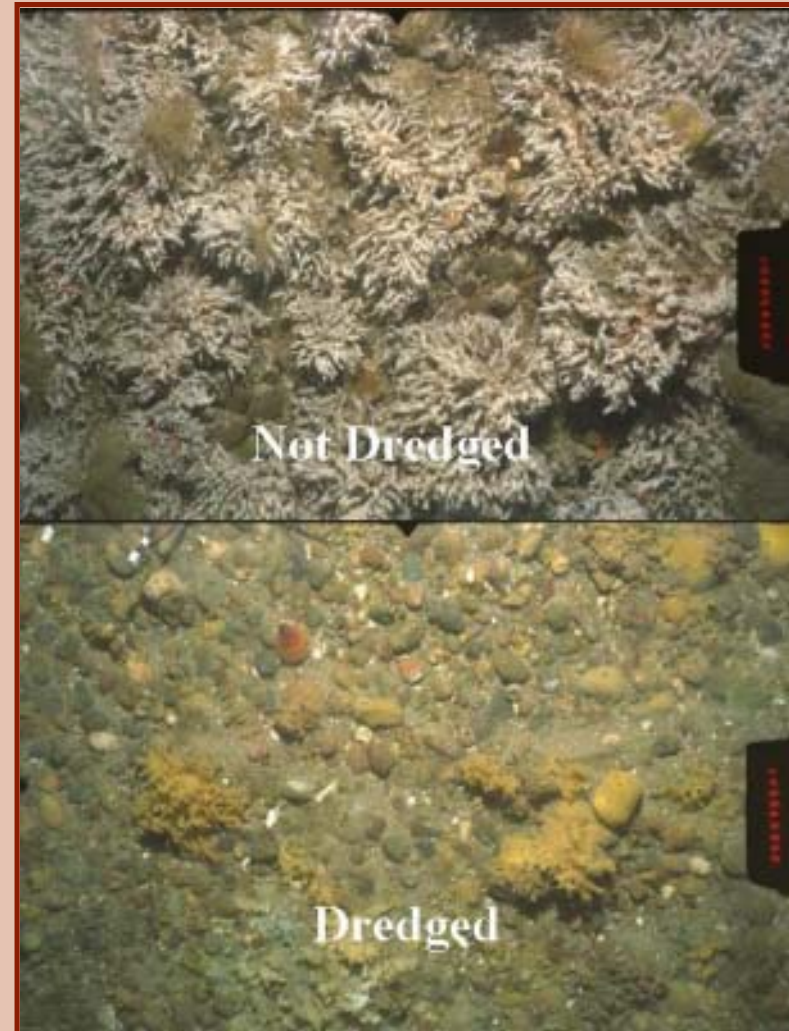
habitat and benthos

Sea-bed habitats comprise a complex mosaic of bottom features and associated animal communities. Often, habitats are “biogenic, that is, formed by the animals themselves – for example, reefs formed by hard and soft corals. These may also provide shelter for other species, including fish. Areas that are structurally complex as a result of geological features or biogenic structures often support highly diverse biological communities. Some of these habitats are also particularly vulnerable to disturbance by natural forces and human activities. It is for this latter reason that habitat protection has assumed an important role in current fishery management.

Habitat protection is a cornerstone in the development of ecosystem approaches to fishery management. The ecosystem approach is inherently geographically specific, and therefore naturally linked to considerations of habitat and local seascapes. The specification of “habitat areas of particular concern” under current management measures shows how fine-scale information on habitat and associated biological communities can be used to protect critical areas.

Life on the Bottom

The animals that live on the bottom or in the sediments are called benthos. As with the other ecosystem components we have looked at so far, there are



Differences in bottom communities in an area subject to dredging and an area with no dredging

distinctive geographical differences in the distribution of the benthos. The biomass (total weight of all species) per unit area is lowest in the central Gulf of Maine and on the continental slope. It is relatively high on Georges Bank,

Why it Matters - Carrying Capacity and Habitat

The interest in defining essential fish habitat in the Sustainable Fisheries Act centers on the role that habitat plays in the productivity of living marine resources. Habitats provide food and shelter for many species and therefore directly affect their productivity. If we lose habitat, the ability of the ecosystem to support these animals is diminished. The so-called carrying capacity of the environment depends on the availability of appropriate habitat, among other factors. The response of the population to regulatory changes may depend strongly on the habitat. If the habitat has been damaged, then the recovery of a depleted resource species could strongly depend on whether recovery of the habitat is possible and on its rate of recovery.

There is also a clear connection between the benthos and other parts of the system. For example, some species that spend much of their lives in the water column make excursions to the seafloor to feed on bottom-dwelling animals. We, therefore, have a coupling between the productivity of the benthos and of species that prey on benthic animals.



the Mid-Atlantic Shelf region and the immediate nearshore region of the Gulf of Maine. This distribution of benthos largely reflects the food supply that reaches the bottom. Benthic production is curtailed in deep waters, strongly influenced by energy inputs into these areas.

Many benthic animals support important commercial and recreational fisheries. In fact, many of these species are among the most valuable resources in the region. Clams, oysters, scallops and other molluscs as well as lobsters, crabs, and sea urchins are all economically valuable benthic species. Many of these species have undergone wide fluctuations in abundance over the last several decades with potentially important effects on the ecosystem structure as a whole.



Deep-water coral communities are thought to be highly vulnerable to disturbance by human activities

Essential Fish Habitat

Recognition of the critical role of habitat is reflected in the specification of the Essential Fish Habitat (EFH) requirement of the Sustainable Fisheries Act. Identification and protection of EFH is required under the Act. EFH is defined as:

"...those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity. For the purposes of interpreting the definition of essential fish habitat, "waters" include aquatic areas and the associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the ecosystem.



life in the water column

While many species live most or all of their lives on or near the seafloor, a rich community of animals spends their lives in the water column itself. This is called the pelagic part of the ecosystem. Planktonic species, schooling pelagic fishes, marine mammals, sea turtles and top predators inhabit an environment primarily defined by current systems, frontal zones, and other oceanographic structures. These ever-changing features of the physical geography of the sea are every bit as important to the ecosystem as a whole as are seabed habitats.

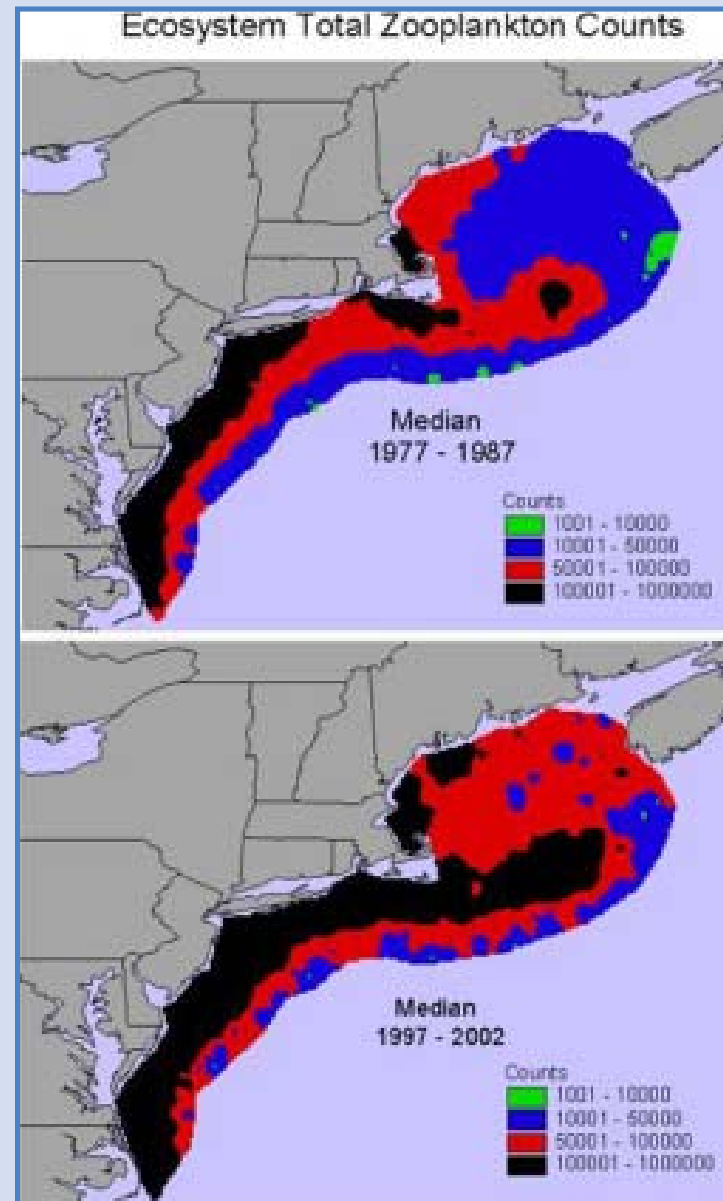
Zooplankton

As with the phytoplankton, we see distinct geographical patterns in the distribution of zooplankton species. These patterns mirror the distribution of primary production to a significant degree. The highest zooplankton counts are found in the nearshore regions of the mid-Atlantic Bight and on the central crest of Georges Bank. The lowest counts occur in the Gulf of Maine and on the shelf edge in general. We have observed changes over time in the structure of the diverse communities inhabiting the water column. For example, a generally increasing trend in overall zooplankton abundance has been observed on the Northeast Shelf since the mid-1980s.

Changes in the relative abundance of different zooplankton species over time have also been observed, with certain groups favoring warmer water temperatures now dominating the system. In areas such as the North Sea, it has been suggested that changes in the composition of plankton communities are linked to recruitment success of species such as cod, since larval cod prey on zooplankton.

Food and Survival

In recent years, we have also seen shifts in the timing of when key zooplankton species populations start to peak during the year. The small crustacean *Calanus finmarchicus* is one of the most important species in the planktonic copepod community throughout the North Atlantic. The period



Spatial distribution patterns of zooplankton numbers over two time periods 1977-1987 and 1997-2002



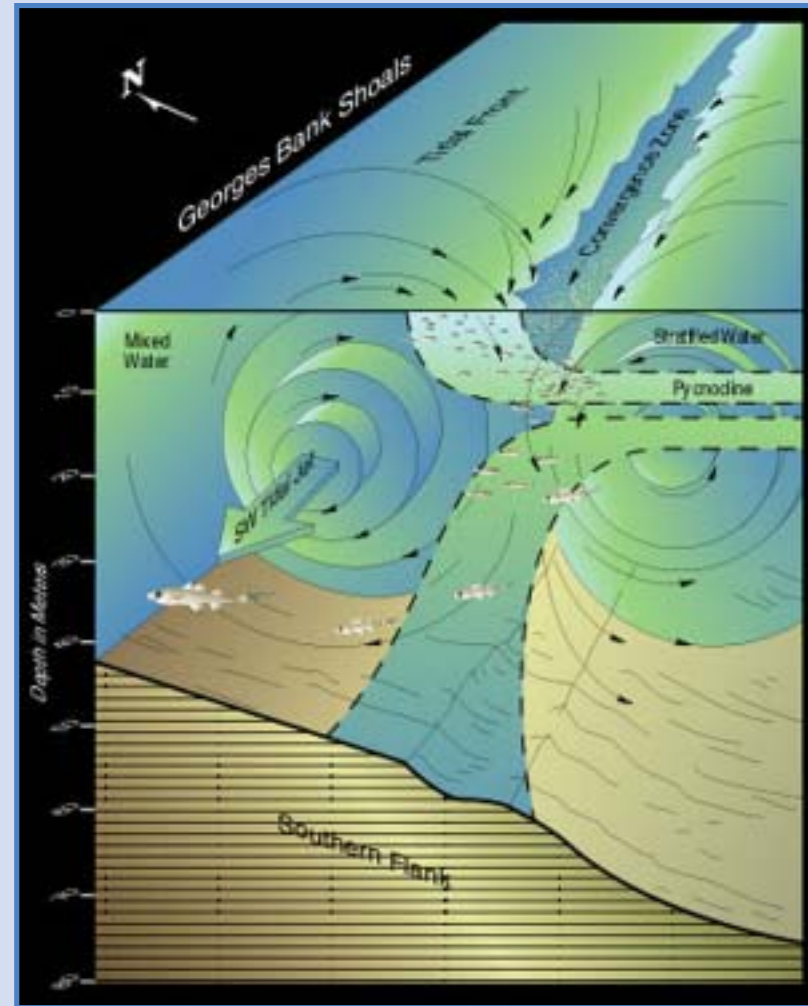
Apex predators such as bluefin tuna are key members of the pelagic ecosystem

Why it Matters - A Bridge Between Large and Small

Understanding events in the water column is key to determining changes in the survival of young fish – recruitment – and also important transfer of energy between different parts of the system. Zooplankton are a bridge to larger animals in the system from fish to whales. Factors affecting their abundance can make the difference between good and poor survival for these groups. Again, oceanographic features figure prominently in defining the pelagic ecosystem, emphasizing the importance of understanding the system in its entirety from physics to biology and on to the human dimension.

of peak abundance of this species in the Gulf of Maine and on the Scotian shelf has shifted to earlier in the spring, and lasts longer than has been typical in the past.

These changes can have direct effects on fish populations. The number of very young fish surviving in the water column varies tremendously from year to year as a result of a large number of physical and biological factors. A storm or a warm core ring can sweep young fish off the shelf, they may be eaten, or adequate food may not be present. All these are examples of natural factors that affect survival rates. If an adequate food supply is available for growth of fish larvae, the chance of their survival is increased. Conversely, a poor match in space and time between the larvae and their zooplankton food can mean starvation for the young fish.



Representation of tidal mixing front on Georges Bank. Frontal zones are areas of high concentration of plankton and fish

Living at the Front

As we have noted, many species forage in oceanographic structures such as frontal zones where their prey are concentrated. For example large shoals of herring are often found at tidal mixing fronts where high densities of their zooplankton prey are found. In turn, fishing activities are often concentrated in these areas to capitalize on these natural associations between predators and their prey for commercially important species.

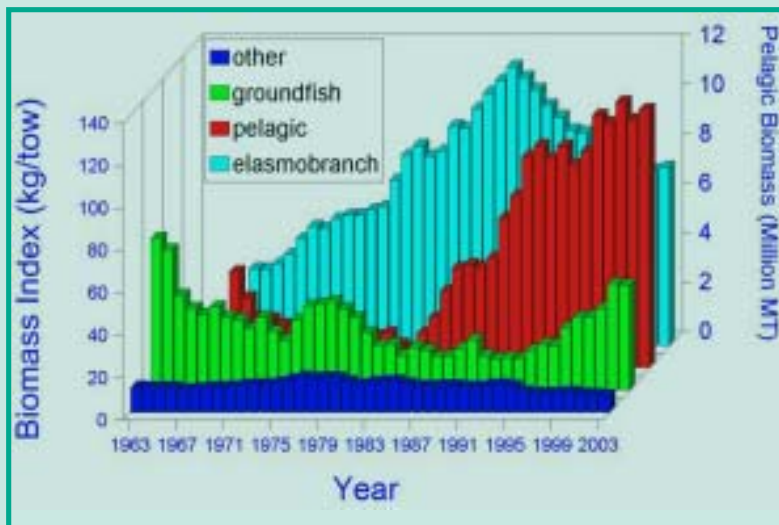


fish communities

Both fish harvesters and researchers recognize that there are a number of areas where fish species consistently occur together. We find that there are recognizable fish communities found in the Gulf of Maine, Scotian Shelf, Georges Bank, the Northern Mid-Atlantic Bight, Southern Mid-Atlantic Bight, on the edge of the continental shelf, and in the transition zone between the Gulf of Maine and Georges Bank. Finer subdivisions can be identified within each region, but the broad-scale patterns provide important insights into fish community structure.

Biodiversity

We can also see that there are geographical regions with higher numbers of species (or species richness). For example, an examination of research vessel trawl catches shows that certain areas support more fish species than others, and that these sites tend to be related to topographic features such as sharp depth gradients. If we measure the average number of species caught in trawl surveys over time, we see a generally stable overall pattern for the shelf as a whole. However, when we examine subareas, some differences emerge. For



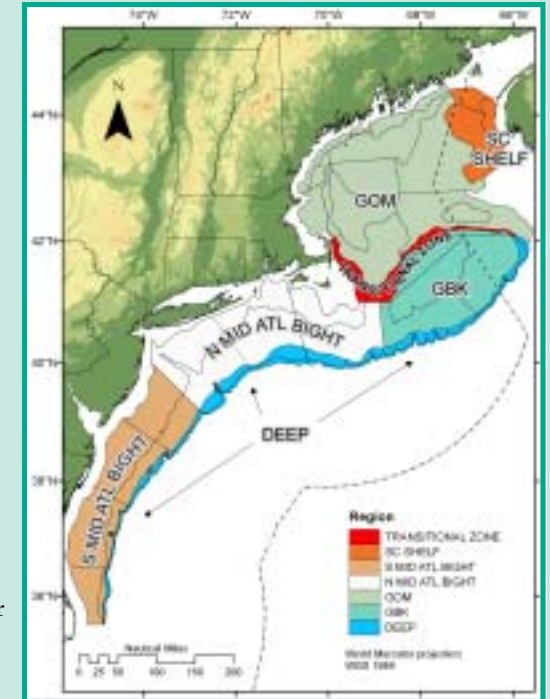
The relative abundance of different groups of fishes on the Northeast Continental Shelf has shown dramatic fluctuations over the last forty years

example, on Georges Bank, we see an increase in the number of species caught over the last decade – in part reflecting an increase in more southern species found on the bank.

Trends in Species Groups

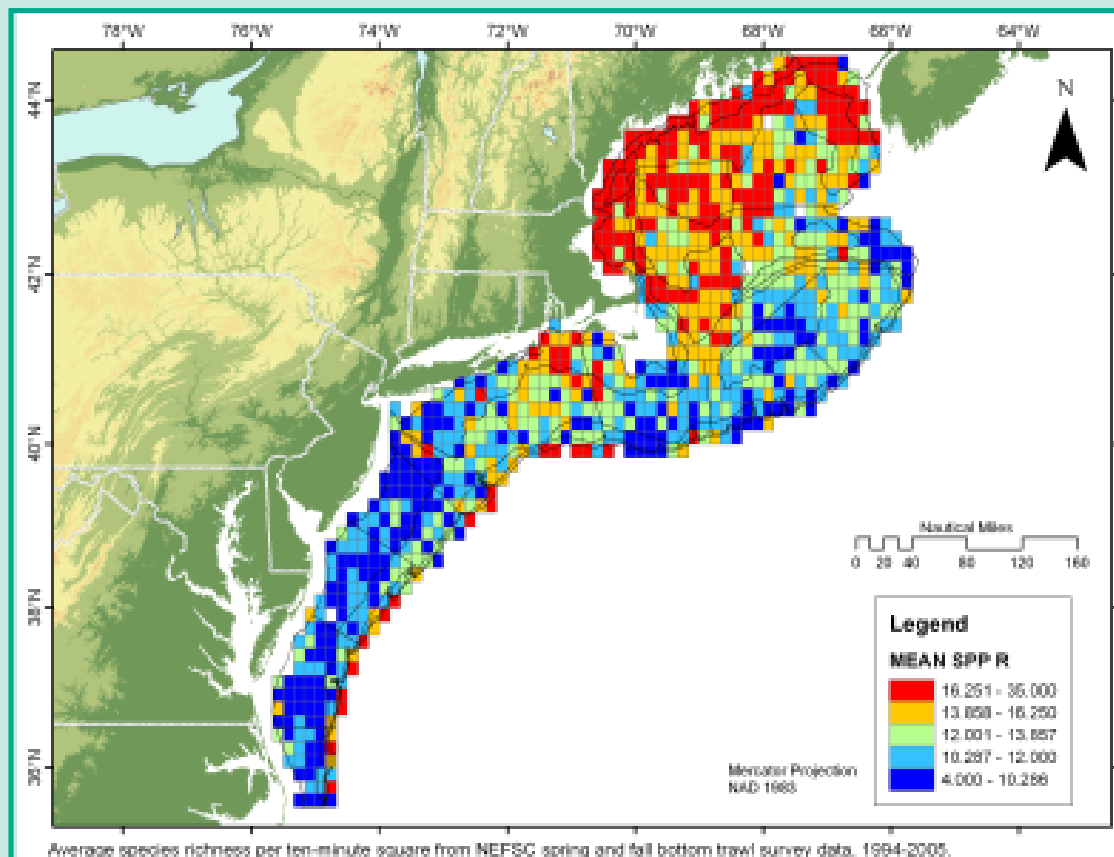
Dramatic changes in the relative abundance of different species groups have been observed over time. During the early 1960s, the abundance of northeastern groundfish species began a period of sharp decline as a result of overexploitation. Under a number of new management actions starting in 1994, some stocks have started to improve. These actions included the establishment of large-scale closed areas, restrictions on the days-at-sea allowed for each vessel, and gear regulations such as increased mesh-size. Small pelagic fishes, notably herring and mackerel, also declined in the region under intensive exploitation by the distant water fleets in the 1960s. These species have since undergone a tremendous increase in abundance. During the period of decline for groundfish, a large-scale increase in abundance of certain elasmobranchs (dogfish and some skates) was observed.

Although the exact mechanisms underlying this increase have not been determined, one suggestion is that overall declines in abundance in certain



Analysis of NEFSC bottom trawl survey data indicates that groupings of fish occur in well-defined regions. The major areas identified all consistently show distinct assemblages of fish

parts of the ecosystem have resulted in the release of food and/or space that the dogfish and skates could then use. These small elasmobranchs began to decline starting in the mid- to late 1980s as fishing pressure on these species increased. Because elasmobranchs produce many fewer young than most other fish, and they tend to become mature at older ages, they are vulnerable to overexploitation. These changes in the composition of the fish communities and the relative importance of different species groups raise questions about whether the changes are reversible if we reduce overall fishing pressure or whether more direct manipulations might be needed. In some cases, the shifting patterns of fishing pressure on different groups over time may have strongly influenced patterns of decline and recovery.



The average number of species caught in NEFSC bottom trawl stations averaged over all seasons indicates some distinctive patterns indicating higher species richness along depth gradients and other features

Why Does it Matter? - Fish Scales

When we look at things from an ecosystem perspective, different types of scales are important relative to a view that focuses on one species at a time. For example, the spatial scales of relevance may become the areas where identifiable groups (or assemblages) of species occur rather than the distribution patterns of an individual species. Or areas that have particularly high numbers of species may be of special interest. At another level, we tend to see that the overall abundance of whole groups of fish species tends to be much more stable than any one of the species making up the group. Some aspects of ecosystem-based fishery management will tend to focus on these different levels of organization and different scales.



food habits

Predator-prey interactions are an essential component of ecosystem structure and function. The flow of energy through an ecosystem depends on the interaction between predators and their prey. Preserving a balance between these ecosystem components is therefore essential.

Who Eats Whom?

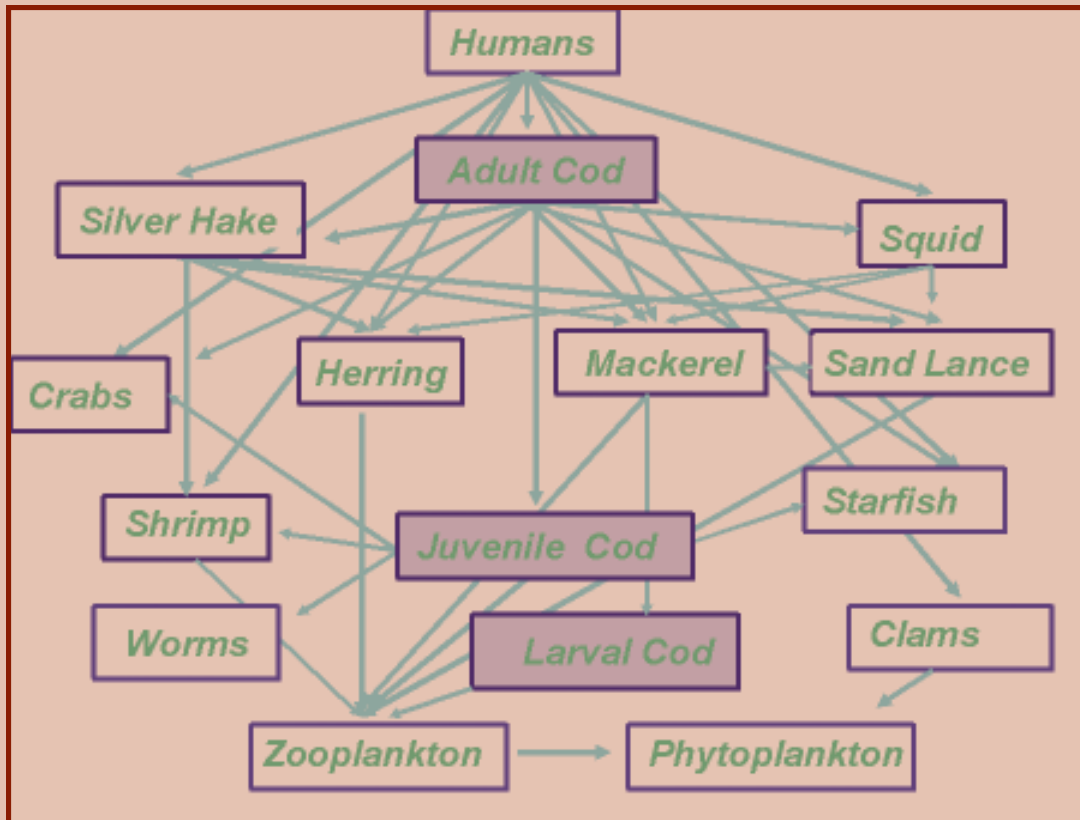
Looking at the diets of fish reveals a complex web of interactions among many parts of the system. Even examining a small part of the food web

illustrates the large number of linkages possible. For fish, which grow in size over a thousandfold over their lifetime, the progression in the food

items they consume is remarkable. As they grow, their diets shift dramatically, so that over the lifespan, a large network of interactions develops. For example, cod begin feeding on zooplankton as larvae and then as juveniles



feed on an assortment of larger zooplankton species as well as benthic animals. As adults, they feed on these food items but also become increasingly dependent on fish and squid in their diet. Among these prey are many commercially important species including hakes, herring, and mackerel among others. We see that throughout the lifespan of cod, connections are forged with the planktonic and benthic ecosystems both, highlighting the need to understand the system as a whole as we consider the factors affecting cod.



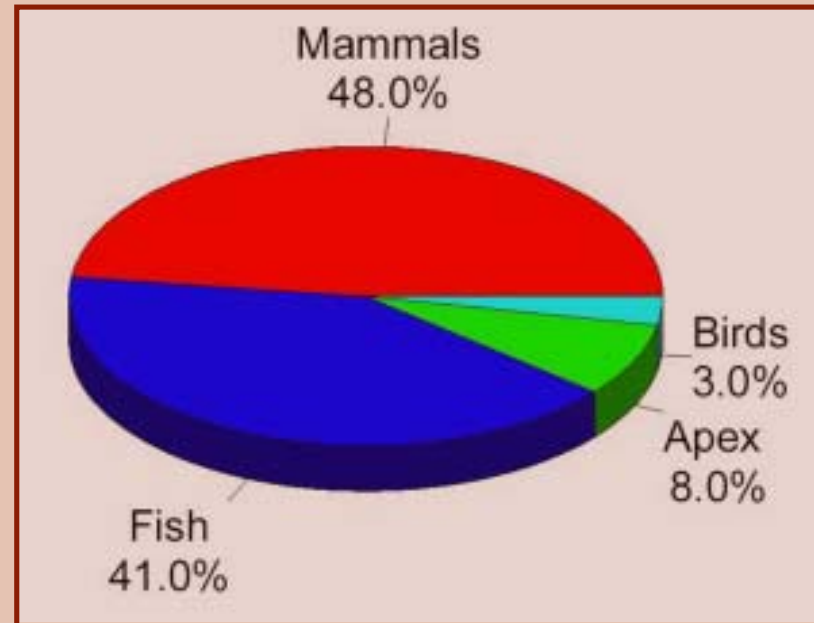
Forage Fish: The Herring Example

Fish that are consumed by a broad spectrum of predators are called “forage” fish. Natural predators such as other fish, marine mammals and seabirds often eat more forage fish than humans catch. For forage species such as Atlantic herring, the amount consumed by predators is now substantially higher than the harvest itself. The amount of herring consumed by natural predators has increased as the abundance of this species has increased. Many predators are

The food web involving cod on the Northeast continental shelf. Cod prey on a wide variety of benthic and pelagic animals, including many that are commercially important

*Why it Matters -
It's a Fish Eat Fish World*

Recognition of the importance of predator-prey interactions among exploited populations will require tradeoffs in management strategies in an ecosystem context. Depending on the strength of the predator-prey interaction, management actions that affect the predator may have indirect effects on the prey and vice versa. Therefore ecosystem-based fishery management will require an additional set of considerations in establishing objectives for management. For species linked by predator-prey interactions, it will not be possible to have all at high levels of abundance.

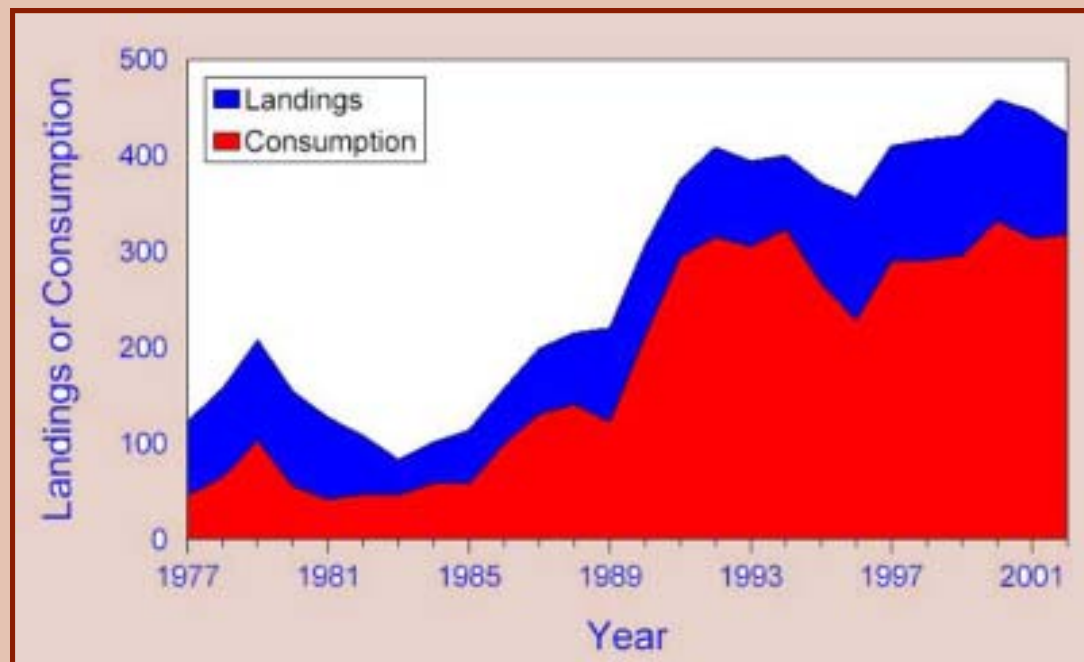


Fish and marine mammals consume the highest proportions of sea herring with lesser amounts taken by apex predators (sharks and billfish) and seabirds



opportunistic and will feed on the most abundant prey items they encounter. In recent years, marine mammals and fish consumed roughly equal amounts of herring, with far lower consumption by seabirds and apex predators such as tunas and billfish. We have also seen the relative importance of different predator groups change with time. For example, in the early 1990s, the dominant natural predators of herring were other fish, accounting for 70% of the natural predation and consuming nearly three times the herring eaten by marine mammals.

Because forage species such as herring are so important as prey, consideration of ecosystem approaches to fishery management will entail an evaluation of the food requirements of these predators to maintain a balanced ecosystem.



Atlantic herring are important prey for a large number of fish, marine mammal, and seabird species. The amount of herring consumed by these predators has increased as the abundance of herring has increased and it is now larger than the amount taken by the commercial fishery

protected resources

Special considerations are required for species that are threatened or endangered by human activities. Legal mandates and authorities for protection of these species fall primarily under the Marine Mammal Protection Act, the Endangered Species Act, and other pieces of legislation including the Magnuson-Stevens Fishery Conservation and Management Act.

Marine Mammals

Marine mammal species listed as endangered that occur on the Northeast Shelf include the blue, humpback, north Atlantic right, fin, sei and sperm whales. The status of the western North Atlantic right whale is of particular concern. This population is thought to number only about 300 individuals. They are highly susceptible to both collisions with ships and entanglement in fixed fishing gear, resulting in serious injuries and deaths. Current efforts to reduce these risks include sighting surveys for whales during times when they are congregated, wide dissemination of whale locations to mariners, seasonal closure of areas to some fishing gear, deployment of disentanglement teams, and support for researchers working on new gear and sensing technologies that could further reduce these risks.

Other marine mammal species have increased markedly. For example, harbor seals increased dramatically over the last decade with potentially important implications for the ecosystem. Harbor seals prey on fish species and in some areas, conflict has arisen over the predation by seals on commercially important fish species.

Sea Turtles

Five species of threatened or endangered sea turtles can be found on the Northeast Continental shelf including green, hawksbill, Kemp's ridley, leatherback, and loggerhead turtles. Threats to sea turtles include disruption of nesting sites, incidental capture in fishing gear, and ship collisions. The latter two impacts are of concern for species occurring on the Northeast Continental Shelf.

The distribution of sea turtles follows well-defined oceanographic features, namely fronts associated with the Gulf Stream. These fronts are also important habitat for large pelagic fishes, and there are consistent spatial patterns of incidental takes of sea turtles in the longline fishery off the edge of the shelf.

These takes have been substantially reduced both through closures and development of modified hooks.

Observations of incidental takes of non-target and protected resource species in commercial fisheries in 2002 showed that sea birds composed the largest fraction of captures in terms of numbers, followed by sea turtles and dolphins. Whales accounted for the smallest fraction. Strategies for reducing incidental capture of each of these groups remains a principal focus of research at the interface between fisheries and conservation biology of protected species.



North Atlantic right whales are critically endangered

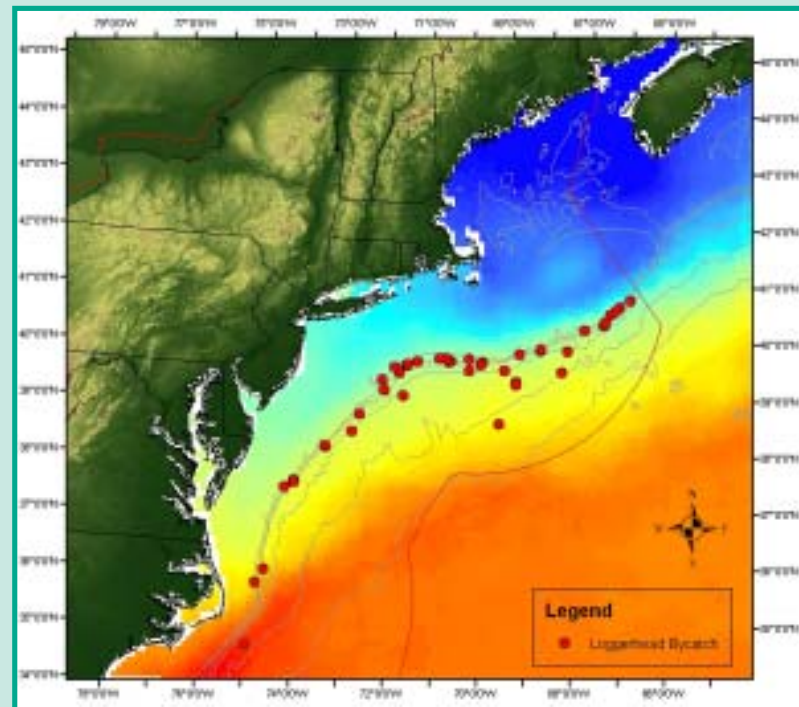
Why it Matters - More than Warm and Fuzzy

Threatened and endangered species are important in their own right. However, they also play an important role in ecosystem structure and function. We have seen that these species play a wide range of roles in the ecosystem.

Because of the large-scale reduction in many of these species, disruption of the balance in the hierarchical ecosystem structure is a primary source of concern. Even if these species are not top level predators, they exert other forms of influence on the ecosystems. For example, many travel extensive distances in the course of their annual migration and movement cycles and they can bridge a number of ecosystems or ecosystem subareas.



Sea turtles that occur on the Northeast Continental Shelf are also threatened or endangered

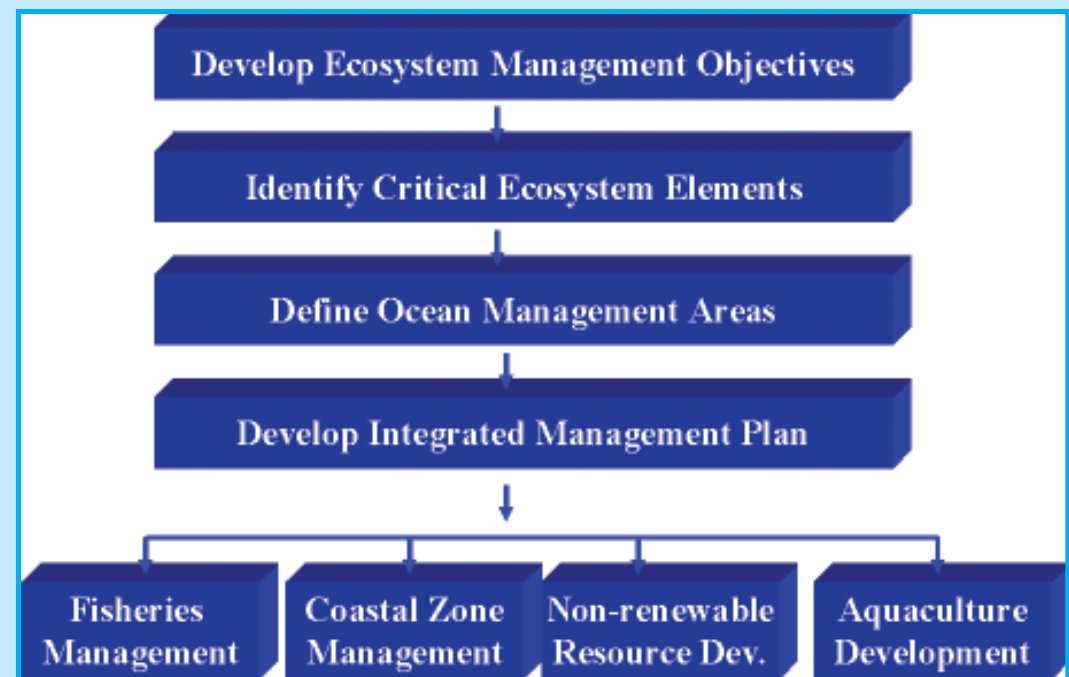


Sea turtles that are incidentally taken in longline sets along the edge of the continental shelf in association with distinctive oceanographic features

the steps ahead

The development of an ecosystem approach to fisheries management, as one component of an overall ecosystem-based management strategy, will entail a collaborative effort among different stakeholder groups. Progress will be substantially enhanced through the development of Fishery Ecosystem Plans (FEPs). A FEP provides background information on the ecology of the system to guide the development of management strategies. As suggested by the NMFS Ecosystem Principles Advisory Panel, constructing an FEP involves the following actions:

- Delineate the geographical extent of the ecosystems(s) that occur(s) within Council authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, and 'zone' the area for alternative uses
- Develop a conceptual model of the food web
- Describe the habitat needs of different life history stages for all plants and animals that represent the 'significant food web' and how they are considered in conservation and management measures
- Calculate total removals – including incidental mortality – and show how they relate to standing biomass, production, optimum yields, natural mortality, and trophic structure
- Assess how uncertainty is characterized and what kind of buffers are included in conservation and management actions
- Develop indices of ecosystem health as targets for management
- Describe available long term monitoring data and how they are used



Steps in developing an Ecosystem-Based Management Program



- Assess the ecological, human and institutional elements of the ecosystem which most significantly affect fisheries and are outside Council/Department of Commerce authority. Included should be a strategy to address those influences in order to achieve both FMP and FEP objectives

We have touched on a number of these elements as a prelude to the dialogue to follow. An extensive information base on the ecology of the Northeast Shelf is available. This, coupled with the ecosystem knowledge of fish harvesters and others, provides an important stepping-stone to developing an ecosystem-based management strategy. It will also be necessary to integrate information for the continental shelf with that for the immediate coastal and estuarine areas, to develop a fuller picture of ecosystem influences from the watershed to the edge of the shelf.

Eight Ecosystems Principles

The National Marine Fisheries Service Ecosystem Principles Advisory Panel developed the following list of dominant ecosystem characteristics:

1. The ability to predict ecosystem behavior is limited
2. Ecosystems have real thresholds and limits which, when exceeded, can effect major ecosystem restructuring
3. Once thresholds and limits have been exceeded, changes can be irreversible
4. Diversity is important to ecosystem functioning
5. Multiple scales interact within and among ecosystems
6. Components of ecosystems are linked
7. Ecosystem boundaries are open
8. Ecosystems change over time





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APPENDIX J.

AMENDMENT 9
SQUID/MACKEREL/BUTTERFISH
Table of Contents
and Cumulative Impacts

3.0 TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY.....	I
2.0	LIST OF ACRONYMS.....	XII
3.0	TABLE OF CONTENTS.....	XIII
3.1	LIST OF TABLES.....	XVI
3.2	LIST OF FIGURES.....	XXI
3.2	LIST OF FIGURES.....	XXI
4.0	INTRODUCTION AND BACKGROUND.....	I
4.1	PURPOSE AND NEED FOR ACTION.....	1
4.2	HISTORY OF FMP DEVELOPMENT.....	5
4.3	MANAGEMENT OBJECTIVES.....	6
4.4	MANAGEMENT UNIT.....	6
5.0	MANAGEMENT ALTERNATIVES.....	7
5.1	MULTI-YEAR SPECIFICATIONS FOR ALL SPECIES MANAGED UNDER THE FMP.....	7
5.2	EXPIRATION OF THE MORATORIUM ON ENTRY TO THE DIRECTED ILLEX FISHERY.....	8
5.3	REVISED BIOLOGICAL REFERENCE POINTS FOR LOLIGO PEALEII.....	9
5.4	DESIGNATION OF EFH FOR LOLIGO EGGS.....	10
5.5	AREA CLOSURES TO REDUCE GEAR IMPACTS ON EFH.....	11
5.6	LOLIGO MINIMUM MESH SIZE REQUIREMENTS.....	15
5.7	EXEMPTIONS FROM LOLIGO MINIMUM MESH REQUIREMENTS FOR ILLEX VESSELS.....	17
5.8	LOLIGO POSSESSION LIMIT FOR THE DIRECTED ILLEX FISHERY DURING CLOSURE OF THE DIRECTED LOLIGO FISHERY.....	18
5.9	REQUIREMENT FOR ELECTRONIC DAILY REPORTING IN THE DIRECTED ILLEX FISHERY.....	20
5.10	SEASONAL GEAR RESTRICTED AREAS (GRAs) TO REDUCE BUTTERFISH DISCARDS.....	20
5.11	ALTERNATIVE GEARS AND GEAR MODIFICATIONS.....	22
6.0	DESCRIPTION OF THE AFFECTED ENVIRONMENT.....	34
6.1	DESCRIPTION OF THE MANAGED RESOURCES.....	39
6.1.1	Atlantic mackerel stock.....	40
6.1.2	Illex stock.....	47
6.1.3	Loligo stock.....	52
6.1.4	Butterfish stock.....	62
6.2	NON-TARGET SPECIES.....	73
6.3	HABITAT (INCLUDING ESSENTIAL FISH HABITAT ASSESSMENT).....	76
6.3.1	Description and Identification of EFH.....	80
6.3.2	Fishing Activities that May Adversely Affect EFH.....	83
6.3.3	Evaluation of Gear Impacts.....	86
6.3.4	Essential Fish Habitat Assessment.....	89
6.4	ENDANGERED AND PROTECTED SPECIES.....	137
6.4.1	Description of species of concern which are protected under MMPA.....	140
6.4.2	Description of Turtle Species with Documented Interactions with the SMB Fisheries.....	144
6.5	HUMAN COMMUNITIES.....	149
6.5.1	Key Ports and Communities.....	154
6.5.2	Economic Environment.....	170
7.0	ANALYSIS OF THE IMPACTS OF THE ALTERNATIVES.....	202
7.1.1	Alternatives for the Allowance of Multi-Year Quota Specifications.....	217
7.1.2	Measures to Address Overcapacity in the Directed Illex Fishery.....	218
7.1.3	Revised Biological Reference Points for Loligo pealeii.....	218

7.1.4	<i>Designation of EFH for Loligo pealeii eggs</i>	219
7.1.5	<i>Area closures to reduce gear impacts on EFH</i>	220
7.1.6	<i>Loligo minimum mesh size requirements</i>	225
7.1.7	<i>Exemptions from Loligo minimum mesh requirements for Illex vessels</i>	229
7.1.8	<i>Loligo possession limit for the directed Illex fishery during closure of the directed Loligo fishery</i>	230
7.1.9	<i>Electronic daily reporting requirement for the directed Illex fishery</i>	234
7.1.10	<i>Implementation of seasonal gear restricted areas (GRAs) to reduce butterflyfish discards</i> ...	235
7.2	IMPACTS ON NON-TARGET SPECIES	236
7.2.1	<i>Alternatives for the Allowance of Multi-Year Quota Specifications</i>	237
7.2.2	<i>Measures to Address Overcapacity in the Directed Illex Fishery</i>	237
7.2.3	<i>Revised Biological Reference Points for Loligo pealeii</i>	238
7.2.4	<i>Designation of EFH for Loligo pealeii eggs</i>	238
7.2.5	<i>Area closures to reduce gear impacts on EFH</i>	239
7.2.6	<i>Loligo minimum mesh size requirements</i>	242
7.2.7	<i>Exemptions from Loligo minimum mesh requirements for Illex vessels</i>	242
7.2.8	<i>Loligo possession limit for the directed Illex fishery during closure of the directed Loligo fishery</i>	243
7.2.9	<i>Electronic daily reporting requirement for the directed Illex fishery</i>	243
7.2.10	<i>Implementation of seasonal gear restricted areas (GRAs) to reduce butterflyfish discards</i> 244	
7.3	IMPACTS ON HABITAT (INCLUDING EFH)	244
7.3.1	<i>Alternatives for the Allowance of Multi-Year Quota Specifications</i>	245
7.3.2	<i>Measures to Address Overcapacity in the Directed Illex Fishery</i>	245
7.3.3	<i>Revised Biological Reference Points for Loligo pealeii</i>	245
7.3.4	<i>Designation of EFH for Loligo pealeii eggs</i>	246
7.3.5	<i>Area closures to reduce gear impacts on EFH</i>	246
7.3.6	<i>Loligo minimum mesh size requirements</i>	249
7.3.7	<i>Exemptions from Loligo minimum mesh requirements for Illex vessels</i>	250
7.3.8	<i>Loligo possession limit for the directed Illex fishery during closure of the directed Loligo fishery</i>	250
7.3.9	<i>Electronic daily reporting requirement for the directed Illex fishery</i>	251
7.3.10	<i>Implementation of seasonal gear restricted areas (GRAs) to reduce butterflyfish discards</i> ...	251
7.4	IMPACTS ON PROTECTED RESOURCES	252
7.4.1	<i>Alternatives for the Allowance of Multi-Year Quota Specifications</i>	257
7.4.2	<i>Measures to Address Overcapacity in the Directed Illex Fishery</i>	257
7.4.3	<i>Revised Biological Reference Points for Loligo pealeii</i>	258
7.4.4	<i>Designation of EFH for Loligo pealeii eggs</i>	258
7.4.5	<i>Area closures to reduce gear impacts on EFH</i>	259
7.4.6	<i>Loligo minimum mesh size requirements</i>	260
7.4.7	<i>Exemptions from Loligo minimum mesh requirements for Illex vessels</i>	260
7.4.8	<i>Loligo possession limit for the directed Illex fishery during closure of the directed Loligo fishery</i>	261
7.4.9	<i>Electronic daily reporting requirement for the directed Illex fishery</i>	261
7.4.10	<i>Implementation of seasonal gear restricted areas (GRAs) to reduce butterflyfish discards</i> ...	262
7.5	SOCIAL AND ECONOMIC IMPACTS	263
7.5.1	<i>Alternatives for the Allowance of Multi-Year Quota Specifications</i>	263
7.5.2	<i>Measures to Address Overcapacity in the Directed Illex Fishery</i>	263
7.5.3	<i>Revised Biological Reference Points for Loligo pealeii</i>	265
7.5.4	<i>Designation of EFH for Loligo pealeii eggs</i>	266
7.5.5	<i>Area closures to reduce gear impacts on EFH</i>	266
7.5.6	<i>Loligo minimum mesh size requirements</i>	275
7.5.7	<i>Exemptions from Loligo minimum mesh requirements for Illex vessels</i>	276
7.5.8	<i>Loligo possession limit for the directed Illex fishery during closure of the directed Loligo fishery</i>	277
7.5.9	<i>Electronic daily reporting requirement for the directed Illex fishery</i>	278

7.5.10	Implementation of seasonal gear restricted areas (GRAs) to reduce butterfish discards..	279
8.0	CUMULATIVE EFFECTS ASSESSMENT.....	290
8.1	SIGNIFICANT CUMULATIVE EFFECTS ISSUES ASSOCIATED WITH THE PROPOSED ACTION AND ASSESSMENT GOALS	291
8.2	GEOGRAPHIC BOUNDARIES.....	291
8.3	TEMPORAL BOUNDARIES.....	291
8.4	OTHER ACTIONS AFFECTING THE RESOURCES, ECOSYSTEMS, AND HUMAN COMMUNITIES OF CONCERN	292
8.5	RESOURCES, ECOSYSTEMS, AND HUMAN COMMUNITIES IDENTIFIED IN SCOPING IN TERMS OF THEIR RESPONSE TO CHANGE AND CAPACITY TO WITHSTAND STRESSES.....	298
8.6	STRESSES AFFECTING THE RESOURCES, ECOSYSTEMS, AND HUMAN COMMUNITIES AND THEIR RELATION TO REGULATORY THRESHOLDS.....	298
8.7	BASELINE CONDITION FOR THE RESOURCES, ECOSYSTEMS, AND HUMAN COMMUNITIES	301
8.8	CAUSE-AND-EFFECT RELATIONSHIPS BETWEEN HUMAN ACTIVITIES AND RESOURCES, ECOSYSTEMS, AND HUMAN COMMUNITIES	302
8.9	MAGNITUDE AND SIGNIFICANCE OF CUMULATIVE EFFECTS.....	302
8.10	MODIFIED AND/OR AND ADDITION ALTERNATIVES THAT AVOID, MINIMIZE, OR MITIGATE SIGNIFICANT CUMULATIVE EFFECTS.	305
8.11	MONITORING THE CUMULATIVE EFFECTS OF THE SELECTED ALTERNATIVE(S) AND ADAPTING MANAGEMENT	305
9.0	CONSISTENCY WITH THE MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT (MSFCMA)	307
9.1	NATIONAL STANDARDS	307
9.2	OTHER REQUIRED PROVISIONS OF THE MAGNUSON-STEVENSON ACT	308
10.0	RELATIONSHIP TO OTHER APPLICABLE LAW.....	310
10.1	NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)	310
10.1.1	Introduction	310
10.1.2	Determination of Significance	310
10.1.3	List of Preparers	310
10.2	MARINE MAMMAL PROTECTION ACT (MMPA).....	310
10.3	ENDANGERED SPECIES ACT (ESA).....	310
10.4	COASTAL ZONE MANAGEMENT ACT.....	310
10.5	ADMINISTRATIVE PROCEDURES ACT.....	311
10.6	DATA QUALITY ACT.....	311
10.7	PAPERWORK REDUCTION ACT	311
10.8	IMPACTS RELATIVE TO FEDERALISM/E.O. 13132.....	311
10.9	ENVIRONMENTAL JUSTICE/E.O. 12898	311
10.10	REGULATORY FLEXIBILITY ACT/E.O. 12866.....	311
10.11	DETERMINATION OF SIGNIFICANCE UNDER E.O. 12866.....	311
10.12	INITIAL REGULATORY FLEXIBILITY ANALYSIS	311
11.0	LITERATURE CITED	312

8.0 Cumulative Effects Assessment

A cumulative effects analysis (CEA) is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of CEA is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but rather, the intent is to focus on those effects that are truly meaningful. This section serves to examine the potential direct and indirect effects of the alternatives in Amendment 9 together with past, present, and reasonably foreseeable future actions that affect the SMB environment. It may be noted that the predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in comparison to the analysis of the effects of individual actions given in Section 7.0.

The analysis presented here is based on the CEQ's 11-step CEA process that is described in their 1997 report, "Considering Cumulative Effects under the National Environmental Policy Act" (CEQ 1997). These eleven steps are itemized below:

The CEQ's eleven step CEA process. Taken from Table 1-5 in CEQ (1997).

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope for the analysis.
3. Establish the timeframe for the analysis.
4. Identify other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify and add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative(s) and adapt management.

To a great extent, the descriptions and analyses presented in previous sections of this document have contributed to the completion of most of these steps, however; the purpose of this CEA is to point out directly how these steps have been accomplished within the development of Amendment 9 and its accompanying EIS.

8.1 Significant cumulative effects issues associated with the proposed action and assessment goals

In Section 6.0 (Description of the Affected Environment) the valued ecosystem components (VECs) that exist within the SMB fishery environment are identified and the basis for their selection is established. This is associated with the completion of Step 1 in the CEQ's 11-Step process. The VECs are listed below.

- 6. Managed Resources { Atlantic mackerel stock
Illex stock
Loligo stock
Atlantic butterfish stock
- 7. Non-target species
- 8. Habitat including EFH for the managed resources and non-target species
- 9. Endangered and other protected resources
- 10. Human Communities

8.2 Geographic boundaries

The analysis of impacts focuses primarily on actions related to the harvest of the managed resources. Therefore, the geographic area used to define the core geographic scope for *managed resources*, *non-target species*, *habitat*, and *endangered and protected species* was the area within which the majority of harvest effort for the managed resources occurs (Figure 11 in Section 6.0). For *human communities*, the core geographic boundaries are defined as those U.S. fishing communities directly involved in the harvest of the managed resources. These communities were found to occur in coastal states from Maine to North Carolina.

8.3 Temporal boundaries

The temporal scope of past and present actions for *managed resources*, *non-target species*, *habitat* and *human communities* is primarily focused on actions that have occurred after FMP implementation (1979). For *endangered and other protected species*, the scope of past and present actions is on a species-by-species basis (Section 6.4) and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. The temporal scope of future actions for all five VECs, which includes the measures proposed by this amendment, extends five years into the future. This period was chosen because the dynamic nature of resource management and lack of information

on projects that may occur in the future makes it difficult to predict impacts beyond this timeframe with any certainty.

8.4 Other actions affecting the resources, ecosystems, and human communities of concern

Table 97, below relates to CEQ Step 4 which calls for consideration of *other* actions, i.e., actions other than those being considered in this document. As with Table 70 in Section 7.0, qualitative terms are used in summarizing these impacts. These actions are presented in chronological order, and codes indicate whether an action relates to the past (**P**), present (**Pr**), or reasonably foreseeable future (**RFF**). When any of these abbreviations occur together, it indicates that some past actions are still relevant to the present and/or future.

Note that most of the (*other*) actions that are listed in Table 97 come from *fishery-related activities* (e.g., Federal fishery management actions). These activities have fairly straight-forward linkages to the VECs, and are, in large part, taken to improve the condition of one or more VECs. The statutory basis for Federal fisheries management is the Magnuson-Stevens Act. That act, as amended by the SFA in 1996, promotes long-term positive impacts on the environment through National Standards included in the Act. To the degree to which this regulatory regime is complied with, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should generally be associated with positive long term outcomes. Constraining fishing effort through regulatory actions can often have negative short term socio-economic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, and as such, should, in the long-term, promote positive on effects on human communities, especially those that are economically dependent upon the managed resource.

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to the all of the identified VECs. Human induced non-fishing activities tend to be concentrated in nearshore areas. Examples of these activities include, but are not limited to agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities.

Table 97. Impacts of Past, Present and Reasonably Foreseeable Future Actions on the five VECs.

These actions do not include those under consideration in this Amendment.

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
^P Prosecution of the SMB fisheries by foreign fleets in the area that would become the U.S. EEZ (prior to implementation of the MSA)	Foreign fishing pressure peaked in the 1960s and slowly declined until passage of the MSA and implementation of the FMPs	Direct High Negative Foreign fishing depleted Atl. Mackerel stock below biomass threshold	Potentially Direct High Negative Limited information on discarding, but fishing effort was very high	Potentially Direct High Negative Limited information on discarding, but fishing effort was very high	Potentially Direct High Negative Limited information on protected resource encounters, but fishing effort was very high	Potentially Indirect Negative Revenue from fishing benefited foreign businesses
^P Original FMPs (3) implemented (1978 and 1979)	Established management of the SMB fisheries	Indirect Positive Regulatory tool available to rebuild and manage stocks	Indirect Positive Reduced fishing effort	Indirect Positive Reduced fishing effort	Indirect Positive Reduced fishing effort	Indirect Positive Benefited domestic businesses
^{P, Pr} Original FMPs merged (1983)	Consolidated management of the SMB fisheries under one FMP	No Impact Administrative procedure	No Impact Administrative procedure	No Impact Administrative procedure	No Impact Administrative procedure	No Impact Administrative procedure
^{P, Pr} Amendment 2 to the SMB FMP (1986)	Revised squid bycatch TALFF allowances	Indirect Positive Reduced squid mortality	Indirect Positive Reduced fishing effort	Indirect Positive Reduced fishing effort	Indirect Positive Reduced fishing effort	Indirect Positive Benefited domestic businesses
^P Amendment 3 to the SMB FMP (1991)	Established overfishing definitions for all four species	Indirect Positive Provided basis for sustainable management	Indirect Low Positive Reduced fishing effort	Indirect Low Positive Reduced fishing effort	Indirect Low Positive Reduced fishing effort	Indirect Positive Increased probability of long term sustainability
^P Amendment 4 to the SMB FMP (1991)	Limited activity of directed foreign fishing and JV transfers to foreign vessels	Indirect Low Positive Reduced fishing effort	Indirect Low Positive Reduced fishing effort	Indirect Low Positive Reduced fishing effort	Indirect Low Positive Reduced fishing effort	Indirect Positive Benefited domestic businesses

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr Amendment 5 to the SMB FMP (1996)	Eliminated foreign fisheries for squids and butterfish	Potentially Indirect Positive Reduced fishing effort	Potentially Indirect Positive Reduced fishing effort	Potentially Indirect Positive Reduced fishing effort	Potentially Indirect Positive Reduced fishing effort	Indirect Positive Benefited domestic businesses
	Implemented limited access for squids and butterfish	Indirect Positive Constrained fishing effort	Indirect Positive Constrained fishing effort	Indirect Positive Constrained fishing effort	Indirect Positive Constrained fishing effort	Indirect Positive Reduced overcapacity
	Expanded management unit for all four species	No Impact Administrative	No Impact Administrative	No Impact Administrative	No Impact Administrative	No Impact Administrative
	Establish <i>Loligo</i> minimum mesh size (included exemption for <i>Illex</i> fishery)	Positive Increased butterfish escapement	Direct Positive Increased finfish escapement	Unknown Changes in fishing effort unknown	Unknown Changes in fishing effort unknown	Indirect Low Negative Cost of modifying gear
P, Pr Amendment 8 to the SMB FMP (1998)	Brought FMP into compliance with new and revised National Standards	Indirect Positive Improved regulatory tool for ensuring sustainability	Indirect Positive Strengthened mandate to reduce bycatch	Indirect Positive Strengthened mandate to protect habitat	Indirect Positive	Indirect Positive (long term)
P, Pr Summer Flounder, Scup and Black Sea Bass Specifications (2000)	Established scup small mesh gear restricted areas	Potentially Indirect Positive Reduced fishing effort locally	Potentially Indirect Positive Reduced fishing effort locally	Potentially Indirect Positive Reduced fishing effort locally	Potentially Indirect Positive Reduced fishing effort locally	Indirect Negative Reduced availability of resource for some participants
P, Pr Framework 2 to the SMB FMP (2002)	Extended moratorium on entry into limited access <i>Illex</i> fishery	Indirect Positive Constrain harvest capacity	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Potentially Indirect Positive Prevented increases in capacity
P Framework 3 to the SMB FMP (2003)	Extended by one year moratorium on entry into limited access <i>Illex</i> fishery	Indirect Positive Constrain harvest capacity	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Potentially Indirect Positive Prevented increases in capacity
P, Pr Framework 4 to the SMB FMP (2004)	Extended by five years moratorium on entry into limited access <i>Illex</i> fishery	Indirect Positive Constrain harvest capacity	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Potentially Indirect Positive Prevented increases in capacity

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
^{RFFA} Amendment 10 to the SMB FMP (~2007)	Establish limited access Atlantic mackerel fishery	Indirect Positive Constrain harvest capacity	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Indirect Positive Constrain fishing effort	Unknown Pending economic analysis
^{RFFA} Amendment 14 to the Summer Flounder, Scup and BSB FMP (~2008)	Consideration of summer flounder commercial state and commercial/recreational allocation	Unknown Pending analysis	Unknown Pending analysis	Unknown Pending analysis	Unknown Pending analysis	Unknown Pending analysis
P, Pr, ^{RFFA} Agriculture runoff	Nutrients applied to agriculture land are introduced into aquatic systems	Indirect Negative Reduced habitat quality	Indirect Negative Reduced habitat quality	Direct Negative Reduced habitat quality	Indirect Negative Reduced habitat quality	Indirect Negative Reduced habitat quality negatively affects resource viability
P, Pr, ^{RFFA} Port maintenance	Dredging of wetlands, coastal, port and harbor areas for port maintenance	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects
P, Pr, ^{RFFA} Offshore disposal of dredged materials	Disposal of dredged materials	Indirect Negative Reduced habitat quality	Indirect Negative Reduced habitat quality	Direct Negative Reduced habitat quality	Indirect Negative Reduced habitat quality	Indirect Negative Reduced habitat quality negatively affects resource viability
P, Pr, ^{RFFA} Beach nourishment	Offshore mining of sand for beaches	Indirect Negative Localized decreases in habitat quality	Indirect Negative Localized decreases in habitat quality	Direct Negative Reduced habitat quality	Indirect Negative Localized decreases in habitat quality	Mixed Positive for mining companies, possibly negative for fisheries
	Placement of sand to nourish beach shorelines	Indirect Negative Localized decreases in habitat quality	Indirect Negative Localized decreases in habitat quality	Direct Negative Reduced habitat quality	Indirect Negative Localized decreases in habitat quality	Positive Beachgoers generally like sand
P, Pr, ^{RFFA} Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	Indirect Negative Localized decreases in habitat quality	Indirect Negative Localized decreases in habitat quality	Direct Negative Reduced habitat quality	Indirect Negative Localized decreases in habitat quality	Mixed Positive for some interests, potential displacement for others

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr, RFFA Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Potentially Direct Negative Reduced habitat quality	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects
RFFA Deep Sea Coral and Sponge Protection Act (currently proposed)	Pending legislation that would protect corals and sponges, possibly through canyon area closures	Potentially Indirect Positive May decrease availability to harvest	Potentially Indirect Positive May decrease susceptibility to capture	Direct Positive Increased protection of certain habitat types	Potentially Indirect Positive May decrease susceptibility to capture	Potentially Indirect Negative May decrease access to resource
RFFA National Offshore Aquaculture Act of 2005 (currently proposed)	Proposed bill that would grant DOC authority to issue permits for offshore aquaculture in Federal waters	Potentially Indirect Negative Localized decreases in habitat quality possible	Potentially Indirect Negative Localized decreases in habitat quality possible	Direct Negative Localized decreases in habitat quality possible	Potentially Indirect Negative Localized decreases in habitat quality possible	Unknown Costs/benefits remain unanalyzed
RFFA Offshore Wind Energy Facilities (w/in 5 years)	Construction of wind turbines to harness electrical power (Several facilities proposed from ME through NC, including off the coast of NY/NJ and VA)	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Potentially Direct Negative Localized decreases in habitat quality possible	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
^{RFFA} Liquefied Natural Gas (LNG) terminals (w/in 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore (Several LNG terminals are proposed, including RI, NY, NJ and DE)	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects	Potentially Direct Negative Localized decreases in habitat quality possible	Unknown Dependent on mitigation effects	Unknown Dependent on mitigation effects
^{RFFA} Convene Atlantic Trawl Gear Take Reduction Team (2006)	Recommend measures to reduce mortality and injury to the common dolphin and long fin pilot whale	Indirect Positive Will improve data quality for monitoring total removals	Indirect Positive Reducing availability of gear could reduce bycatch	Indirect Positive Reducing availability of gear could reduce gear impacts	Indirect Positive Reducing availability of gear could reduce encounters	Indirect Negative Reducing availability of gear could reduce revenues
^{RFFA} Develop Standardized Bycatch Reporting Methodology (2006/2007)	Recommend measures to monitor bycatch in SMB fisheries that will achieve an acceptable level of precision and accuracy	Indirect Positive Will improve data quality for monitoring total removals of managed resources	Indirect Positive Will improve data quality for monitoring removals of non-target species	Neutral Will not affect distribution of effort	Indirect Positive Will increase observer coverage	Potentially Indirect Negative May impose an inconvenience on vessel operations
^{RFFA} Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (w/in next 5 years)	May recommend strategies to prevent the bycatch of sea turtles in commercial fisheries operations	Indirect Positive Will improve data quality for monitoring total removals	Indirect Positive Reducing availability of gear could reduce bycatch	Indirect Positive Reducing availability of gear could reduce gear impacts	Indirect Positive Reducing availability of gear could reduce encounters	Indirect Negative Reducing availability of gear could reduce revenues

8.5 Resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses

See 8.6, below.

8.6 Stresses affecting the resources, ecosystems, and human communities and their relation to regulatory thresholds

CEQ Steps 5 and 6 were accomplished either explicitly or implicitly in this document for each VEC in Section 6.0. A tabulated summary of the information provided by accomplishing steps 5 and 6 is provided in Table 98. It is suggested that the reader refer to the appropriate subsections to obtain details regarding this information.

Table 98. Summary of information related to CEQ steps 5 and 6 that were addressed in Section 6.0.

VEC	CEQ Step 5 (Response to change and ability to withstand stress – i.e., significance criteria)	CEQ Step 6 (Stresses affecting the resources)
Managed Resource	<ul style="list-style-type: none"> • Biomass drops below threshold (e.g., $\frac{1}{2} B_{MSY}$) • Fishing mortality exceeds threshold (e.g., F_{MAX}) (these thresholds are defined for each managed resource in Section 6.1)	<ul style="list-style-type: none"> • Directed harvest • Discarding • Non-fishing activities
Non-target species	<ul style="list-style-type: none"> • Largely unquantifiable, but implementation of development of omnibus SBRM FMP should improve. 	<ul style="list-style-type: none"> • Encounters with fishing gear • Non-fishing activities
Habitat	See EFH overlap analysis – Section 6.3.4.1	<ul style="list-style-type: none"> • Encounters with fishing gear • Non-fishing activities
Protected Resources	<ul style="list-style-type: none"> • Marine mammals - mortalities exceed potential biological removal (PBR) which is defined for each species in Section 6.4. • Sea Turtles – nest counts, or estimated number of nesting females below target levels 	<ul style="list-style-type: none"> • Encounters with fishing gear • Non-fishing activities
Human Communities	In general, the significance of impacts is measured by the potential for revenue loss. The standards established under E.O. 12866 or RFA may be candidates.	<ul style="list-style-type: none"> • Short term: revenue losses from changes in current fishing practices (e.g., gear modifications, area closures). • Short term and long term: revenue losses from resource depletion

Some general categories of the various influences on the VECs are provided in Figure 99. The influences on the managed resource VEC can be extended to populations of non-target species or protected species, and vice versa. The influences on habitat quality come from a wide variety of fishing and non-fishing activities. In turn, habitat quality factors into the condition of the managed resource, non-target species, and protected resource VECs. The condition of the human communities VEC is generally associated with increases and decreases in revenue from fishing operations. Operating costs tend to increase when availability of the managed resource decreases either through scarcity or through regulatory restrictions on harvest. The availability of the managed resource also affects competition among fishing entities for resources and consumer demand. These factors influence product price which feeds back to the economic and social well-being of the human communities.

Optimizing the future condition of a given VEC can have offsetting impacts on other VECs. For example, closing areas to bottom otter trawling will directly improve habitat quality, and be expected to indirectly improve the conditions of managed resources, non-target species, and protected resources. This action, however, would negatively impact human communities dependent on revenue from otter trawling in that area, at least in the short term. Additionally, the indirect benefits to managed resources, non-target species, and protected resources may be localized, and increased bottom trawl effort in other areas may offset these benefits to some degree.

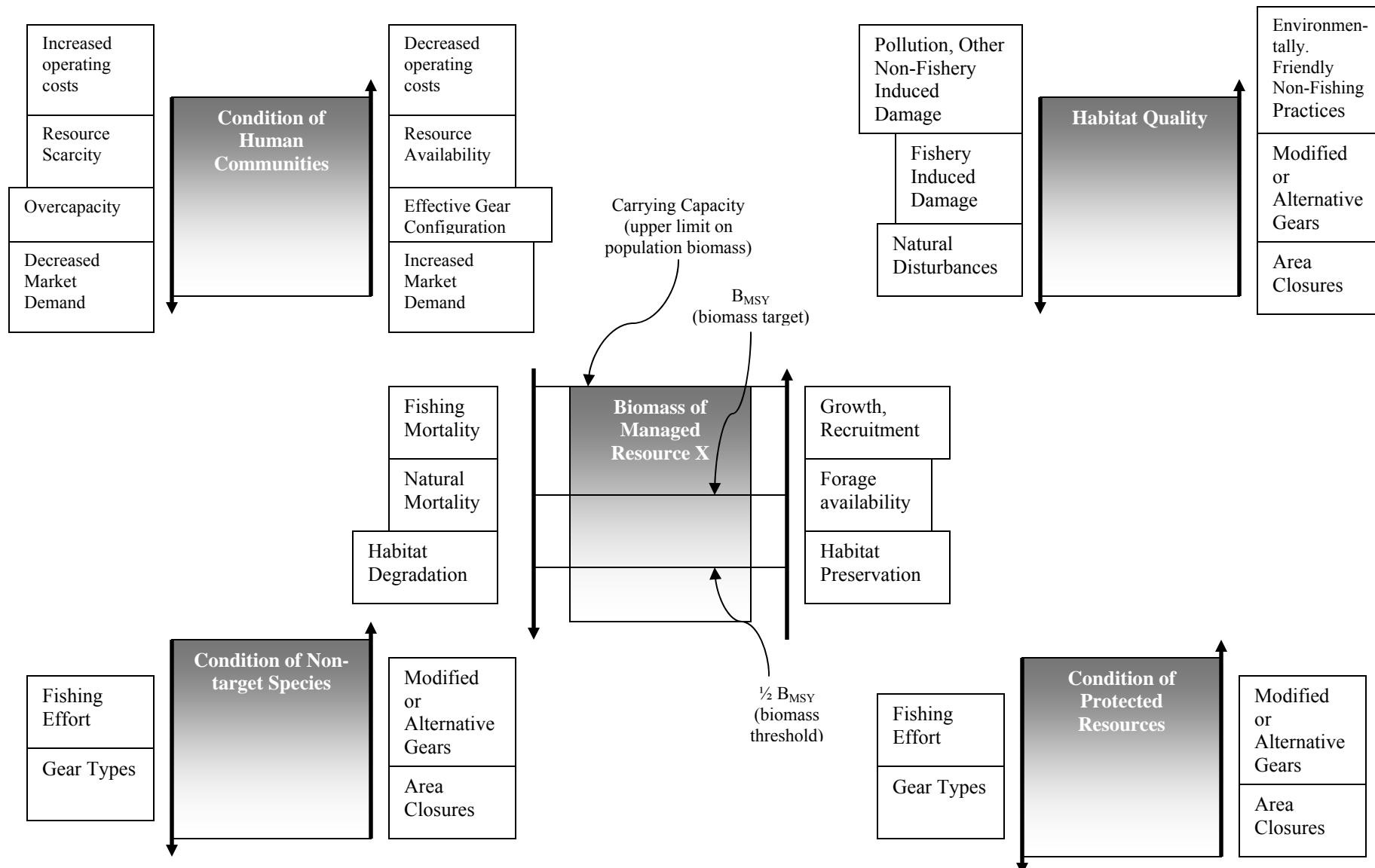


Figure 99. Examples of environmental sources of positive impacts (up arrows) and negative impacts (down arrows) for the five VECs.

8.7 Baseline condition for the resources, ecosystems, and human communities

The CEQ's step 7 calls for a characterization of the baseline conditions for the VECs. For the purposes of this CEA, the baseline condition is considered as the present condition of the VECs. Table 99 summarizes the conditions of the VECs at the present time. In general, straight-forward quantitative metrics of the baseline conditions are only available for the managed resources and protected resources. For non-target species, the constraints of data quality preclude a quantitative baseline. The conditions of the habitat and human communities VECs are complex and varied. As such, the reader should refer to the characterizations given in Sections 6.3 and 6.5, respectively.

Table 99. Baseline conditions of the VECs.

VEC		Status in 2005
Managed Resource	Atl. Mackerel	Stock size unknown, stock assessment pending this year
	<i>Illex</i>	Stock size unknown, but overfishing not occurring
	<i>Loligo</i>	Stock size unknown, but overfishing not occurring
	Butterfish	Overfished, commercial discarding a major factor
Non-target species		Quantitative characterization of bycatch in SMB fisheries is poor to unknown, with the exception of butterfish, pending development of SBRM
Habitat		Complex and variable - See Section 6.3.4.1
Protected Resources	Common dolphin	Unknown, but takes are below PBR
	White-sided dolphin	Unknown, but takes are below PBR
	Pilot whales	Unknown, but takes are below PBR
	Leatherback sea turtle	ESA classification: Endangered, number of nesting females below sustainable level
	Loggerhead sea turtle	ESA classification: Threatened, nest counts (~6,200 in 1998) below goal (12,800)
Human Communities		Complex and variable - See Section 6.5

8.8 Cause-and-effect relationships between human activities and resources, ecosystems, and human communities

CEQ's step 8 has been accomplished through the analyses of impacts presented in Section 7.0, as well as the summary of past, present, and reasonably foreseeable future actions presented in Table 97, and the relationships between the VECs illustrated in Figure 99 and its accompanying text.

8.9 Magnitude and significance of cumulative effects

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed actions, as well as past, present, and future actions must be taken into account. The significance criteria have been described above under CEQ Step 5, and in Section 6.0 of this document. Table 70 in Section 7.0 summarizes the potential impacts of the actions under consideration in this amendment. Table 97 in this section summarizes the impacts of *other* past, present, and reasonably foreseeable future actions. The total cumulative effects under consideration in this CEA come from both the actions under consideration, and the other actions.

Other actions Table 100 below attempts to summarize the total cumulative effects from other actions.

Note that for the managed resource and non-target species VECs, the expected net effect is characterized as "potentially positive". This conclusion is based on the expectation that compared to baseline conditions (i.e., present conditions) each of the VECs is expected to improve or remain in good condition within the reasonably foreseeable future (~ next 5 years).

For the habitat VEC, the net effect is characterized as "potentially neutral". This conclusion is based on the expectation that improvements in the condition of habitat will be variable, with some areas showing improvement within the temporal scope of this CEA, while improvement of other areas may be more protracted, and/or may be compromised by future non-fishing activities.

For protected resources, the net effect is characterized as "potentially neutral". This conclusion is based on the inherent latency in population growth for the protected resources known to interact with SMB fisheries. This latency is a function of low productivity rates that are typical of these long-lived species. As such, there is uncertainty in the likelihood that improvement relative to baseline conditions will be discernable within the temporal scope of this CEA.

For human communities, the net effect is characterized as "mixed neutral and potentially negative". This is because the complexity of the human communities VEC precludes the conclusion of a single overall effect. While some participants and communities are expected to be unaffected, compared to the baseline, other entities may see changes in the regulatory environment that will directly decrease harvest revenue or increase operating costs. This latter outcome would be expected if fishing effort is constrained in order to improve the conditions of any of the other VECs.

Amendment 9 actions An inherent difficulty in forecasting the cumulative effects of the actions under consideration in this amendment is that it is unknown, at present, which actions will be implemented. This is because, at the present time, the Mid-Atlantic Council has not adopted preferred alternatives. Due to this uncertainty, a more thorough analysis of the significance of the Amendment 9 actions is

still pending. For example, if Alternatives 5B and 5C (prohibition of bottom otter trawling in Head of Hudson Canyon and Tilefish HAPC, respectively), 6C (increase *Loligo* minimum mesh requirement to 2 ½ inches), 7D (discontinue exemption from *Loligo* mesh requirement for *Illex* fishery), and 10E (establish butterfish GRA2 with minimum mesh of 3 ¾ inches from Jan-Apr) are all implemented, significant negative impacts on human communities directly involved in the squid fisheries would be expected. On the other hand, if the no action alternatives 6A, 7A, and 10A are adopted, then no action would be taken to reduce butterfish discards and the condition of this overfished stock would be unlikely to improve.

Summary

Total cumulative effects Regardless of the uncertainty regarding which actions will be implemented through this amendment, it is expected that the overall long term cumulative effects should be positive for all VECs. This is because, barring some unexpected natural or human-induced catastrophe, the regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the SFA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. This document functions to identify the likely outcomes of various management alternatives. Identification of alternatives that would compromise resource sustainability should make implementation of those alternatives unlikely. Additional scrutiny of the management alternatives during the upcoming Public Hearing Process will serve to further characterize the potential costs and benefits associated with these alternatives.

Placeholder – A summary of CEA significance determination is in process. This will serve to communicate in concise, reader-friendly language the overall cumulative impacts on the VECs that are expected in consideration of the direct and indirect impacts of the alternatives under consideration in this document (Table 70), baseline conditions (Tables 99, 100) and the P, Pr, RFFA actions (Table 97, 100).

Managed Resource Impacts

Of the four species managed through this FMP, butterfish is the only one considered, at present, to be overfished. Recovery of the butterfish stock is currently being constrained by discarding through small mesh bottom otter trawl fishing, primarily in the *Loligo* fishery. Several management options exist in this amendment that could improve the condition of the butterfish stock. It is expected that at least one of these measures will be implemented. This should result in improvement of stock status in the short term. Amendment 10 to the FMP is being developed in order to directly address recovery of the butterfish stock. As such the combination of any management measure in this amendment with those taken through Amendment 10 should promote improvement and long-term sustainability of the butterfish stock and result in positive cumulative impacts.

Management measures in this amendment also have the potential to affect the status of the *Loligo* and *Illex* stocks. For the *Illex* stock, perpetuation of the moratorium on entry into the directed fishery should diminish the potential for overharvest. For *Loligo*, reasonable increases in the closure period possession limit for the *Illex* fishery is expected to decrease regulatory discarding and allow for more

accurate accounting of total removals. These actions should produce positive cumulative impacts for these stocks.

The Atlantic mackerel stock is not expected to be greatly impacted by any of the management measures in this amendment. However, the development of Amendment 11, which is currently underway, may establish a moratorium on entry into that fishery. It is unknown at present whether sustainability of the Atlantic mackerel stock is threatened by the capacity of the fleet; however, a moratorium on entry is not expected to negatively impact the stock. The quota monitoring system, already in place, is an effective tool in preventing overfishing. Continued sound management of the Atlantic mackerel stock is associated with positive cumulative impacts.

Non-target Species Impacts

Fishery encounters with non-target species, and the subsequent bycatch mortality remains a ubiquitous fishery management problem. At present, the nature and extent of non-target species discarding by the SMB fisheries, as well as many others operating in the U.S. Atlantic remains difficult to characterize. The development of an omnibus FMP that details standardized bycatch reporting methodology (SBRM) by NOAA Fisheries is expected to occur within the next year or so. Central to the development of the SBRM FMP will be improving the quality of the data used in estimating fishery discards. The long-term indirect impacts of this action should greatly improve the ability of fishery managers to develop means of reducing the impacts of current fishing practices on non-target species, and is associated with positive cumulative impacts.

Habitat Impacts

Several management alternatives exist within this amendment that could protect habitat, including EFH, from the adverse effects of fishing practices. The implementation of any or all of these management alternatives would be expected to have positive localized impacts. Additionally, temporary area closures such as the butterfish GRAs should help to reduce negative impacts on habitat in those areas. It remains unclear how much additional effort would be expended outside of any potential area closures if they were to be implemented. The negative economic impacts of area closures may provide a significant incentive to fish harder in open areas. If positive habitat impacts are generated through management actions taken through this amendment, it is expected that for some habitat types, sufficient latency in the restoration of habitat quality, even through area closures, may result in a prolonged recovery period. Additionally, the cumulative impacts of past, present and future non-fishing activities are difficult to characterize. As such, the cumulative impacts on habitat are uncertain, and may be neutral within the temporal scope of this CEA.

Protected Resource Impacts

No actions are being taken in this amendment to directly address protected resource issues within the SMB fisheries. Nevertheless several management options have the potential to indirectly improve, however slightly, the condition of the protected resource VEC. Permanent area closures, are expected to, at least locally, result in decreased fishing effort. This may reduce overall encounters with protected resources. More importantly, future actions are being developed that would directly address reducing the mortality of protected resources that have historic encounters with SMB fisheries. These

actions include the formation of the Atlantic Trawl Gear Take Reduction Team and the Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries. These actions and the current protection under MMPA and ESA are expected to result in positive cumulative impacts for these protected resources.

Human Communities Impacts

Considerable dependence on the prosecution of the SMB fisheries exists along the Atlantic Coast of the U.S. Any of the management actions being considered in this document that would increase operating costs or reduce access to a given managed resource would be expected to result in negative short term impacts on human communities. Nevertheless, the long term sustainability of the managed resources and the habitats and ecosystem processes upon which they depend is inextricably connected to the long term sustainability of each of the fisheries. As such, management measures in this amendment, such as those designed to protect habitat or encourage recovery of the butterfish stock, are also expected to promote long term sustainability of the economic and social components of fisheries. Perpetuation of the moratorium on the directed *Illex* fishery is associated with somewhat uncertain, but, for the most part, positive socio-economic impacts. Changes in the closure possession limit for *Illex* vessels could have different impacts on potentially competing sectors of the *Loligo* fishery. Total cumulative effects on human communities are difficult to characterize because of the complexity of social and economic relationships with the resources, the uncertainty in future market conditions, and the number of choices available to fishery participants. Impacts are not expected to exceed \$100 million annually on the economy (significance criteria under E.O. 12866) or \$3.5 million on small entities (significance criteria under RFA). Nevertheless, from the perspective of individual stakeholders, the threshold for significance may be much lower, and some individuals may be significantly negatively impacted in the short term. As such, cumulative effects on human communities are expected to be mixed, with potentially negative short term impacts, but potentially positive long term impacts.

8.10 Modified and/or addition alternatives that avoid, minimize, or mitigate significant cumulative effects.

This will be done through the Public Hearing Process.

8.11 Monitoring the cumulative effects of the selected alternative(s) and adapting management

Monitoring the status of the VECs is an ongoing function of Federal fisheries management. Likewise, adapting management to accommodate changes in future conditions of the VECs will be done through the development of future amendments, or framework adjustments to the FMP.

Table 100. Total cumulative effects of other past, present and reasonably foreseeable future actions.

VEC	Managed Resource	Non-target species	Habitat	Protected Resources	Human Communities
<p align="center">Total Cumulative Effects of Other Actions</p>	<ul style="list-style-type: none"> • Atl. mack, <i>Illex</i>, <i>Loligo</i>: potentially positive – significant growth in Atlantic mackerel stock occurred over the past 20 years, the squid stocks have remained stable. Control of harvest through the quota system should minimize the probability of over fishing. Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists. • Butterfish: potentially positive – stock has declined below biomass threshold, discarding remains a major problem, a recovery plan is being developed which should restore stock biomass above threshold within the temporal scope of this CEA (~5 years). Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists. 	<ul style="list-style-type: none"> • Potentially positive – non-target species discarding is likely to be problematic in many fisheries. Improvement of data collecting methods (SBRM) and future gear modifications, as needed, should improve the condition of this VEC, and for many species these improvements may occur within the temporal scope of this CEA (~5 years). Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists. 	<ul style="list-style-type: none"> • Potentially neutral –habitat damage from fishing and non-fishing activities has contributed to diminished habitat quality, compared to ideal circumstances, but past and future actions to protect habitat should improve the condition of this VEC. It is unknown whether meaningful improvements will occur within the temporal scope of this CEA (~5 years). Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists. 	<ul style="list-style-type: none"> • Potentially neutral – marine mammal and sea turtle populations have been depleted through a variety of past fishing and non-fishing actions, but past, present, and future actions to protect these resources should improve the condition of this VEC. It is unknown whether the meaningful improvements will occur within the temporal scope of this CEA (~5 years). Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists. 	<ul style="list-style-type: none"> • Mixed neutral and potentially negative– human communities have been affected in complex ways by fishing and non-fishing actions, short-term negative impacts may come about as fishing effort is constrained by future management actions in order to improve the conditions of other VECs, in the long term, beyond the temporal scope of this CEA, sustainability of the other VECs should either directly or indirectly benefit human communities. Uncertainty in the magnitude of negative impacts of future non-fishing activities also exists.