

EXPLORATION OF ECOSYSTEM- BASED FISHERY MANAGEMENT IN THE UNITED STATES

**A Draft Report by the Ecosystem Sciences
and Management Working (ESMWG) to the
NOAA Science Advisory Board**

April 15, 2014

Purpose of the Report

To assess progress toward Ecosystem-Based Fishery Management (EBFM) implementation in the US regional fisheries management council system and status and use of ecosystem science in management.

ESMWG Task

Goal: To explore the progress in implementation of Ecosystem-Based Fishery Management (EBFM) in US fisheries 1999-2012

Principal Lines of Inquiry

- 1. To assess fishery management Council region taking actions to implement EBFM**
- 2. To determine the availability and adequacy of ecosystem science in management of marine fisheries in the US**
- 3. To examine the use of ecosystem science in support of regional fishery management council actions**

Is There a Federal Mandate for EBFM?

To what extent is there a mandate to use ecosystem-based management in US fishery management?

EBFM Mandate in Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

- **Stock Assessments – Total Allowable Catch/Annual Catch Limit**
- **Essential Fish Habitat**
- **Bycatch Reduction**
- **Best Available Science and Information**

EBFM in the US – MSFCMA 1996

1999 Report to Congress by Ecosystem Principles Advisory Panel [required by 1996 MSFCMA]

- A definition of the **principles** on which EBFM is based, the **policies** required to institute EBFM and the recommendation to develop a **Fishery Ecosystem Plan** for each region
- Approach is incremental as opposed to revolutionary
- Action can commence immediately through use of existing knowledge and processes
- Ecosystem Principles Advisory Panel anticipated that there would be many ways this advice could be implemented -- thus, voluntary guidelines encourage adaptive management

EBFM in the US – MSFCMA 2006

- HR 5051 **Proposed** NOAA Fisheries to prepare Guidelines for Council consideration of EBFM through Fishery Ecosystem Plans [FEP].
- Final MSFCMA as **Enacted** 2006 requires a report by NOAA Fisheries on the State of Science for advancing the concepts and integration of ecosystem considerations in regional fishery management [Report submitted 2009].

EBFM Related Mandates - Other

- **National Environmental Policy Act
Environmental Impact Assessment
Cumulative Effects**
- **Endangered Species Act**
- **Marine Mammal Protection Act**
- **Others**

EBFM Exploration - Approach

- **ESMWG received presentations and had discussions with scientists from NMFS regional science centers and international experts**
- **Presentations and discussion with lead staff on EBFM from regional Councils**
- **Review of peer reviewed literature**
- **Review of Fishery Science Center and Council region reports and websites**

Framework for Assessment: Seek Evidence for the Following Actions

- 1. Cease overfishing and develop rebuilding plans for overfished species.**
- 2. Delineate extent of ecosystem/interactions.**
- 3. Develop a conceptual model of the foodweb**
- 4. Describe habitat needs of different life history stages of animals and plants in the “significant foodweb” and develop conservation measures**

Framework for Assessment: Seek Evidence for the Following Actions

- 5. Calculate total removals – including incidental mortality and relate them to standing biomass, production, optimum yields, natural mortality and trophic structure**
- 6. Council assessment of how uncertainty is characterized and definition of buffers against uncertainty included in management actions**
- 7. Council A) setting of ecosystem goal[s] and B) developing indices of ecosystem health as targets for management?**

Framework for Assessment: Seek Evidence for the Following Actions

- 8. Description of long term monitoring data and how they are used.**
- 9. Assessment of the ecological, human and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/NMFS jurisdiction and define a strategy to address those influences.**
- 10. Development of a Fishery Ecosystem Plan/ Fishery Management Plan employing EBFM**
- 11. Designation of a lead entity to advance EBFM in the Council process**

Framework for Assessment: Seek Evidence for the Following Actions

- 12. Ecosystem models are developed and available for use in the Council process**
- 13. Decision support tools for EBFM / trade-off analysis are employed [e.g., management strategy evaluation, risk assessments, ecosystem indicators, scenarios]**
- 14. Spatial management tools are applied [besides EFH measures above] to accomplish EBFM**
- 15. Other indicators of EBFM implementation**

NOAA Ecosystem Science

Observations

- **Science enterprise is strong – large amount of effort goes to stock assessments, EFH and other mandates; moderate amounts of effort go into evaluating modeling interactions among species and their environments—much less effort for spatial aspects of linking exploitation to community dependencies and harvest strategies**
- **A considerable amount of ecosystem research is being performed and made available to Councils, (likely more than can be used in terms of food web models and environmental drivers of productivity)**

NOAA Ecosystem Science

Observations

- **Social sciences for EBFM (in sensu coupled social-ecological systems research) is quite limited**
- **Increasing emphasis on more and more sophisticated fisheries ecosystem models**
- **A question is raised about approaches being applied in ecosystem science and habitat science across NOAA and whether these tracks can be more mutually supportive**

Council Use of Ecosystem Science

Observations

- Demand for and use of EBFM scientific information is highly variable by Council region
- As Councils develop Fishery Ecosystem Plans or Fishery Management Plans (FMP) or FMP approaches the use of EBFM science increases
- The nature of EBFM science demanded and used is [no surprise] place-based and specific to actions taken
– sum of actions = EBFM

Council Use of Ecosystem Science

Observations

- **Steep learning curve on use of modeling in management decision-making**
- **Need more assistance in developing capacity for analyzing trade-offs in management scenarios in ecosystem and socio-economic contexts**

PRINCIPAL RECOMMENDATION

- **NOAA Fisheries should perform a prioritized needs assessment of what ecosystem inputs will contribute to improving the performance of Councils.**
- **As preparation for the needs assessment a useful first step would be a major workshop for which Councils and Science Centers prepare a list of needs.**
- **Compare these lists nationally and regionally at the workshop [with invited independent ecosystem scientists and others]**
- **Prioritize lists of science needs regionally and nationally**

Recommendations on Ecosystem Science NOAA SAB

- 1. Continue and expand support to Council processes for ecosystem science**
- 2. Invest more in development of science to understand fishery management as a coupled socio-ecological System**
- 3. Headquarters can facilitate cross-region and Council interactions on EBFM science and management**
- 4. Invest in tools for assessing trade-offs [spatial and temporal] of alternative management decisions**
- 5. Assess and implement best practices for integrating ecosystem science across NOAA and with partners**

EBFM Grand Challenge Questions

- **How can we demonstrate the results of EBFM are making a difference in fisheries and protection of marine diversity? Can these be compared across ecosystems?**
- **Can/should we actively manage for different ecosystem states and maximum economic yield as opposed to maximum sustainable yield?**
- **To what extent is climate change/ocean acidification an ecosystem game changer for fisheries?**
- **How can historic ecosystem state be used to inform fishery management by Council regions?**

Summary

There is strong support for fishery management from NOAA science.

Regional fishery management Councils receive and utilize this advice

EBFM in the US fisheries is being implemented through diverse actions that are regionally appropriate

EBFM science can benefit from regional review and prioritization

There are major ecosystem science and management issues that require long term assessment

Action Requested

Comments and Questions invited on the report-Goal is to have the final report approved by the SAB and transmitted to NOAA.