

(Based on Public testimony; Scientific Consensus statement; Peterson Overview and Fluharty NOAA Advisory Board)

According to the 2005 Scientific Consensus Statement on Marine Ecosystem-Based Management, an overall expression of Mission:

[e]cosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, bio-diverse productive and resilient condition so that it can provide the wide range of services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors. Specifically, ecosystem-based management:

- emphasizes the protection of ecosystem structure, functioning, and key processes;
- is place-based in focusing on a specific ecosystem and the range of activities affecting it;
- explicitly accounts for the interconnectedness within systems, recognizing the importance of interactions between many target species or key services and other non-target species;
- acknowledges interconnectedness among systems, such as between air, land and sea; and
- Integrates ecological, social, economic, and institutional perspectives, recognizing their strong interdependences.¹

Ecosystem-based management of living resources of the oceans has made substantial progress over the past decade by: (1) establishing and showing the effectiveness of marine protected areas (Halpern 2003); (2) building ecosystem resilience and resource sustainability (Levin and Lubchenco 2008), in part by avoiding tipping points and ecosystem state changes (Scheffer et al. 2009, Travis et al. 2014); and (3) adapting management to test and, upon monitoring impacts of management actions, modify further predictive model scenarios of food web dynamics (e.g., Pauly et al. 2000).

Moreover, food web modeling has capacity to guide fisheries management to conserve seabird and marine mammal populations, while sustaining fisheries, by consideration of the important role of forage fishes and by managing their stocks accordingly in an ecosystem-based context by developing and using scientifically sound food web models (Pikitch et al. 2012).

Specifically in the context of fisheries management, implementing ecosystem-based management requires:

- 1) recognition that no fish population is independent of other species in the ecosystem;
- 2) acknowledgement of the presence of and interactions with humans; and
- 3) use of the best available models of interactions among interdependent ecosystem components to sustain fisheries and conserve all valued components of marine ecosystems.

Significant progress has been made at the Council level toward implementing ecosystem-based management approaches for fisheries. The North Pacific Fishery Management Council (NPFMC) has been a leader in implementing these approaches including developing fishery ecosystem plans, protecting forage species, basing management choices on reliable science and modeling, and implementing precautionary protection measures. These steps and others made toward ecosystem-based management are of great benefit to the conservation and management of fishery resources. Particularly in light of changing conditions in the ocean, continuing the momentum and progress toward ecosystem-based management approaches is a key to ensuring the long-term sustainability of the nation's fisheries.

¹ McLeod, K. L., et al., *Scientific Consensus Statement on Marine Ecosystem-Based Management* (2005), available at http://www.compassonline.org/science/EBM_CMSP/EBMconsensus.

One of the most significant steps managers can take to move toward ecosystem-based management is to develop and implement Fishery Ecosystem Plans. These plans, though not legally binding, should incorporate explicit principles, policies, and guidelines for ecosystem-based management to be implemented in Fishery Management Plans, including measures designed to meet the following **Goals** :

1. Protect, restore, and maintain healthy marine ecosystems, which are ecosystems in which ecological processes, habitats, trophic levels, and productive capacity are comparable to an unexploited system and the diversity of the native flora and fauna is preserved at the genetic, species, and community level;
2. Rebuild, restore, and maintain fish stocks at levels sufficient to protect, maintain, and restore food web structure and function;
3. Conserve habitats for fish and other wildlife;
4. Provide for subsistence, commercial, recreational, and non-consumptive uses of the marine environment;
5. Avoid irreversible or long-term adverse effects on fishery resources and the marine environment; and
6. Provide a legacy of healthy ecosystems for future generations.

Specifically, Fishery Ecosystem Plan should include **Objectives** of:

1. A region-specific description of the ecosystem and identification of ecosystem-based management goals and principles;
2. An assessment of the food web, that:
 - a. Identifies forage species, apex predators, and indicator species; and
 - b. Compiles information from ecosystem and food web models to inform management, to the extent they are available and reliable;
3. An assessment of marine habitats including:
 - a. Information from current management;
 - b. Specific potential risks posed by fishing and non-fishing activities; and
 - c. Identification of important ecological areas and sensitive habitat types;
4. Identification of indicators of ecosystem health and sustainable management;
5. Identification and assessment of the ecological role of target and nontarget species managed by Fishery Management Plans;
6. An assessment of cumulative impacts of proposed harvest levels across Fishery Management Plans;
7. Recommendations for using ecosystem information to inform decisions for adaptive management;
8. Identification of relevant ecological factors to be considered in determining the Optimum Yield for each species harvested under Fishery Management Plans; and
9. A description of ongoing and future recommended steps or initiatives to implement the principles and guidelines espoused above.²
10. A direct guiding relationship with the respective FMP

It is anticipated specific strategies recommendations would be developed by the Ecosystem Committee in cooperation and contributions from the Science Center and others.

² Adapted from Fluharty, et al., 1999. *Ecosystem-Based Fishery Management. A Report to Congress by the Ecosystems Principles Advisory Panel. US Department of Commerce, NOAA. NMFS Technical Report, 19, available at <http://www.nmfs.noaa.gov/sfa/EPAPrpt.pdf>.*