West Coast Forage Fish Plan
Draft Problem Statements
September 12, 2008

Definitions

Forage species – A suite of species that provide a critical link between lower and upper trophic levels. These species generally exhibit one or more of the following characteristics:

- Fish and invertebrates that are important prey for upper trophic levels (e.g. small schooling pelagic fish)
- Prey throughout much of their life-cycle
- Abundance highly influences productivity of predators
- Key species at the juvenile stage (small size, location nearshore)

Sustainable – In the context of the California Current Ecosystem, a process or state capable of being continued at a certain level for an indefinite amount of time in a highly variable environment. Sustainable management practices will:

- Recognize the ecosystem is not constant (constancy of value and statistical properties), and anticipate and prepare for its variability and associated shifts in productivity;
- Provide for resiliency and maintenance of ecosystem structure and function;
- Manage the risk of long-term loss of productivity through use of a stabilizing action to maintain ecosystem function and economic yield before adverse ecosystem changes become irreversible; and
- Minimize the length of adverse ecological periods (forage droughts) and economic periods (no fishing).

DRAFT

Recommendations for Scientific Research, Monitoring and Adaptive Management

1. Problem Statement: There are significant gaps in data and understanding of forage species ecology and biology from larval to adult stage.
2. Problem Statement: Predator requirements for forage species, such as diversity, density, and spatial-temporal availability, are not well quantified or understood across the region.
3. Problem Statement: Ecosystem models that simulate food-web interactions and population fluctuations that could be used to support evaluation of management decisions are not fully developed for the region.
4. Problem Statement: Ecosystem indicators that show when forage species and predator populations are declining due to the influence of specific human actions, along with thresholds for those indicators that identify when points of concern are being approached, are not available.
5. Problem Statement: Long-term data collection is essential to identifying ecosystem linkages and change over time, but is difficult to maintain.

6. Problem Statement: Impacts to forage species and their habitat from non-fishery human-caused threats, such as pollution and coastal development, are not well understood or quantified.
7. Problem Statement: Forage species are highly susceptible to changes in their environment and global warming may increase the variability of ocean conditions, impacting future distribution and abundance patterns of forage species.

Recommendations for Policy & Management

8. Problem Statement: The California Current Ecosystem is highly variable, due to large physical changes such as the Pacific Decadal Oscillation. Reliable long-term forecasting of future trends in population abundance of forage species and prey availability in this system is difficult, and trends may rapidly change without warning.
9. Problem Statement: The historic fishery management framework in the US includes the use of concepts and terminology, such as a focus on single species management, that do not align well with the nature of forage species population fluctuations and ecosystem interactions, which may lead to the use of unsustainable management measures.
10. Problem Statement: Decision-making tools that can identify and weigh trade-offs in ecosystem and economic benefits (and risks) of specific management choices are inadequate or unavailable.
11. Problem Statement: Natural resource management tools are generally inflexible and difficult to adjust in a short time frame.
12. Problem Statement: Fishery management support documents do not quantify or accurately account for predator needs.
13. Problem Statement: Forage species management (with some important exceptions) does not include temporal or spatial habitat needs of forage species or their predators for foraging, spawning, nesting, rearing and other life history requirements.
14. Problem Statement: Demand for forage species products that remove biomass from the ecosystem (such as fish and oil for aquaculture feeds, livestock and pet food, cosmetic additives, and health supplements) may compete with the forage needs of wildlife predators, including overfished and listed species.
15. Problem Statement: Fishery stocks being actively rebuilt rely on forage species that are being actively harvested, and the forage needs of those recovering populations are not quantified.
16. Problem Statement: Compared with other species, some forage species that are caught for commercial purposes have low economic value per pound and relatively large quantities of some species are harvested.
17. Problem Statement: Fishing gear has evolved to be highly effective, raising concerns about the potential for localized depletion and bycatch, particularly bycatch of other small pelagics.

DRAFT

18. Problem Statement: Government resource agencies face practical resource limits and are not able to meet all of the demands placed on them.

Recommendations for Industry, Marketing and Public Involvement

19. Problem Statement: Fishing communities, seafood suppliers, and other industries rely on a certain volume and steady delivery of products for economic stability. Rapid change to other fisheries is difficult and expensive, and for some, changing catch requires new permits and/or gear.
20. Problem Statement: Industries that utilize forage fish to make products such as oil and meal must meet guidelines for contaminant levels. Forage fish populations in some parts of the world are highly contaminated, creating international economic pressure for new, cleaner fisheries to develop.
21. Problem Statement: Many forage species are high in oil content which may increase the likelihood of contaminants being elevated in these species, and passed on up through the food web to people.
22. Problem Statement: The aquaculture industry relies heavily on feed comprised of fishmeal and oil. Most feed-grade forage fish fisheries are fully exploited, and fishing pressure is projected to intensify as the aquaculture industry grows by an average of 9% annually. According to the FAO, demand for fishmeal and oil is projected to surpass global supplies by the years 2020 and 2010, respectively.
23. Problem Statement: Forage species are sold on an international market and often a direct connection between where these species are caught and where they are consumed is lacking.
24. Problem Statement: Companies that provide sustainable fisheries certification for use in marketing, such as the Marine Stewardship Council and Friend of the Sea, do not employ criteria to ensure a forage fish fishery is operating in a manner that does not impact the critical ecological role that these species play in the ecosystem.
25. Problem Statement: The general public's awareness and understanding of the ecological and economic significance of forage species and their fisheries is low. This can lead to reduced public and political support for funding research and management activities.
26. Problem Statement: Public involvement in fishery management is limited by the complexity of some management systems, and information is not always readily available to or understood by the public.
27. Problem Statement: Public expectations about what management of marine species means are at times unattainable.
28. Problem Statement: Scientific precision is difficult to achieve in complex biological systems and requires significant amounts of data. Business people, managers, and others seeking reliable information can be frustrated by continual changes in management approaches that reflect evolving knowledge or circumstances.

DRAFT