Ecosystem-Based Fishery Management: A Pragmatic Approach

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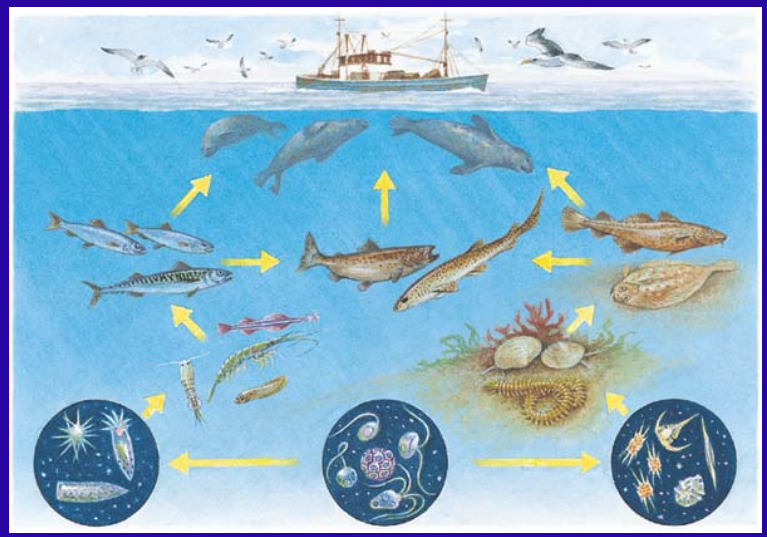
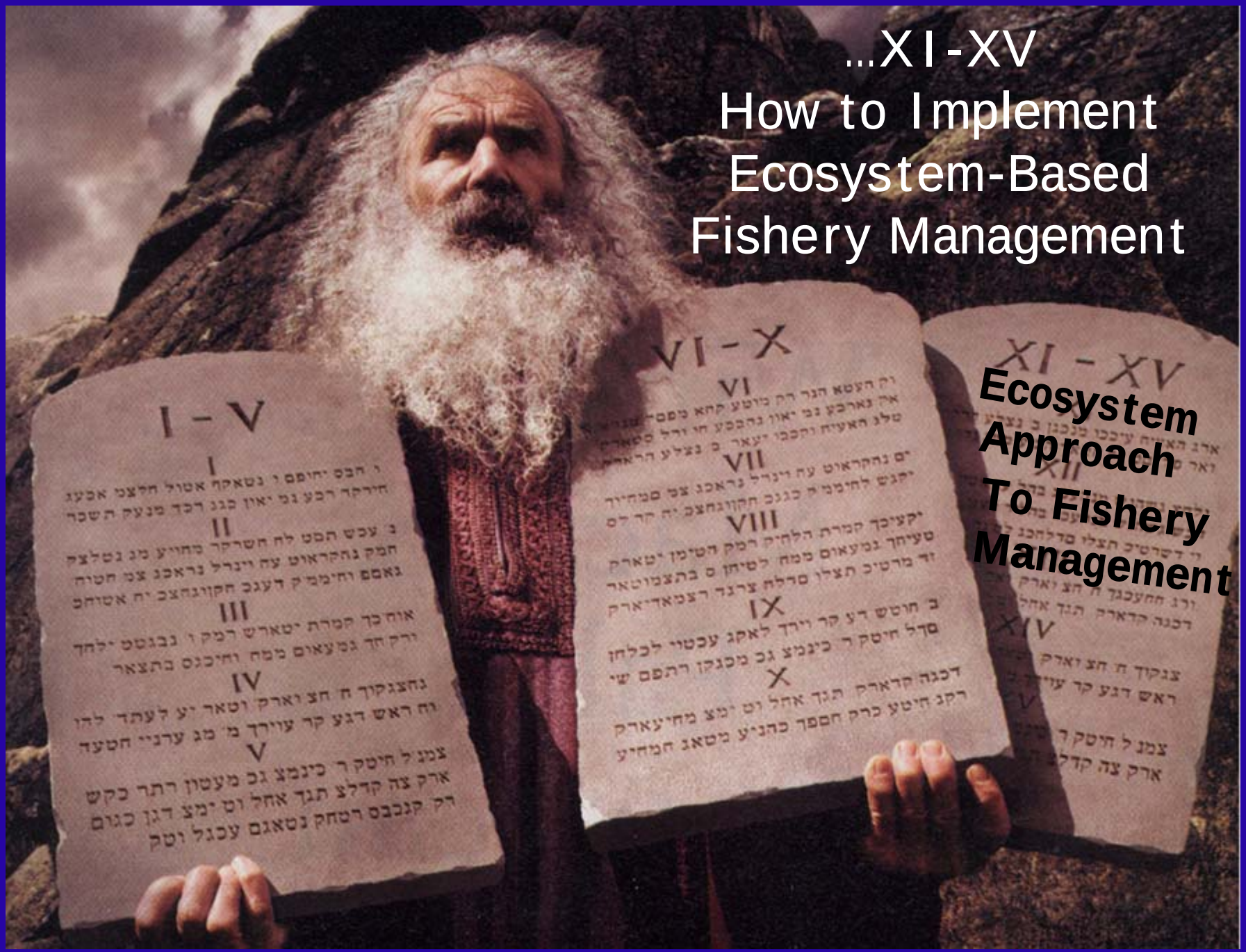
Introduction

In the U.S. there is growing national momentum to adopt an ecosystem-based approach to fishery management



- *The National Research Council Ecosystem Panel 1999*
- *NMFS Ecosystem Principles Advisory Panel 1999*
- *Pew Oceans Commission 2003*
- *Marine Fisheries Advisory Committee's (MAFAC) Ecosystem Approach Task Force 2003*
- *U.S. Commission on Ocean Policy 2004*
- *Managing our Nation's Fisheries I I conference 2005*
- *Scientific Consensus Statement on Marine Ecosystem-based Management 2005*
- *Reauthorization of MS-FCMA will likely contain EBFM provisions*

Emergence of ecosystem-based fishery management- change in focus from populations to communities and ecosystems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Ecosystem
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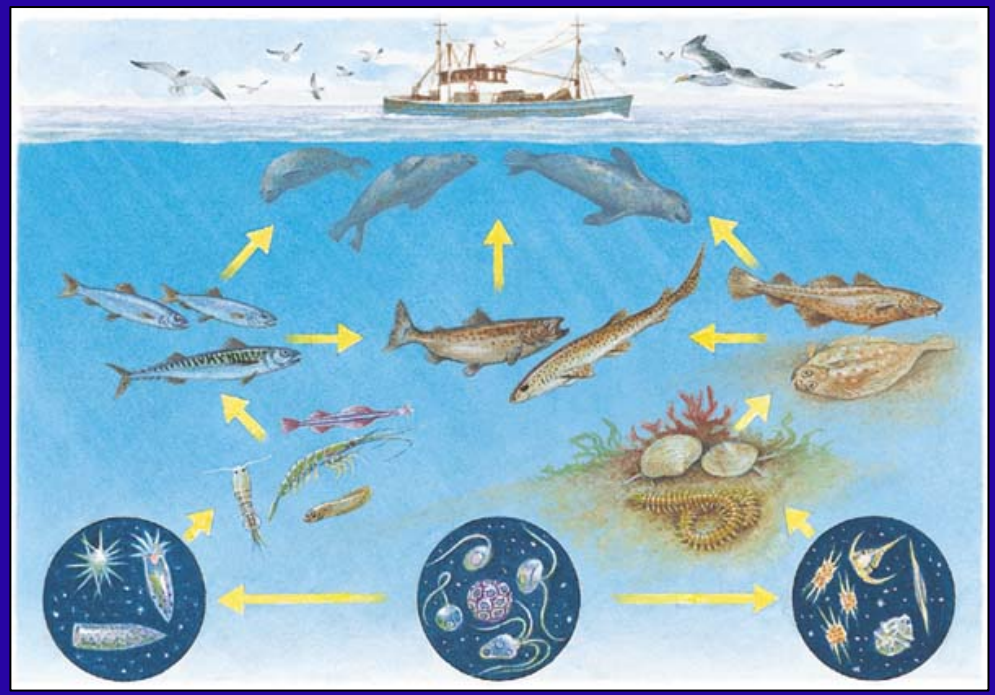
To Fishery
Management

Definition: Ecosystem-Based Fisheries Management

NMFS rosethorn rockfish

Ecosystem-based fishery management recognizes the physical, biological, economic and social interactions among the affected components of the ecosystem and attempts to manage fisheries to achieve a stipulated spectrum of societal goals, some of which may be in competition.

Research and Data Collection for Ecosystem-Based Fishery Management



- *We will need all of the elements of conventional (single species) fishery management:*
  - *-Fishery dependent sampling*
  - *-Resource surveys*
  - *-Stock structure*
  - *-Life history/demographics*
  - *-Habitat research*
  - *-Modeling and assessment*

and more.

- *The transition to EBFM will be evolutionary not revolutionary, i.e., we should incrementally add more EBFM-relevant science to the knowledge base as we transition to EBFM*

Incorporate a Broader Array of Societal Goals and Uses for Ecosystem Products and Services

Biodiversity/ecosystem resilience

Ecotourism

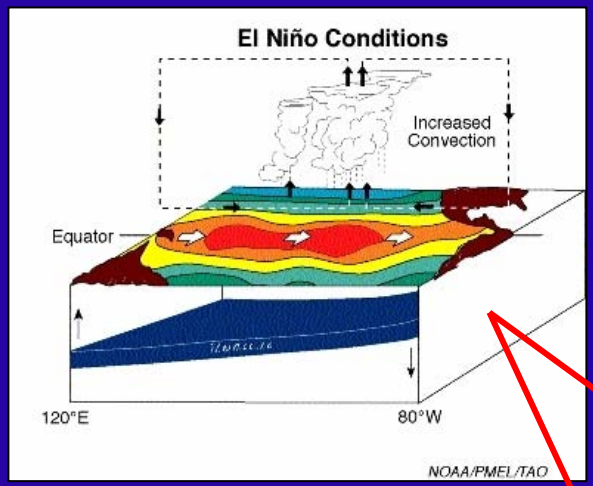
Existence values

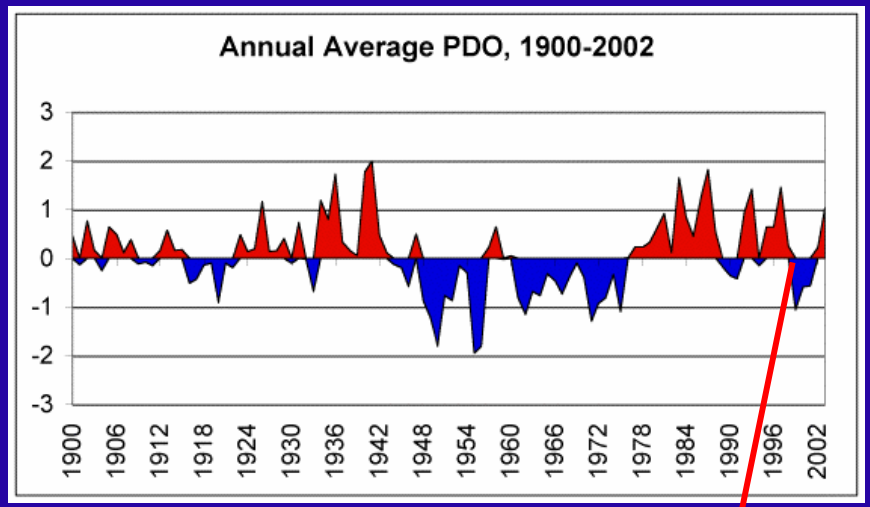
Sport fishing

Commercial harvest

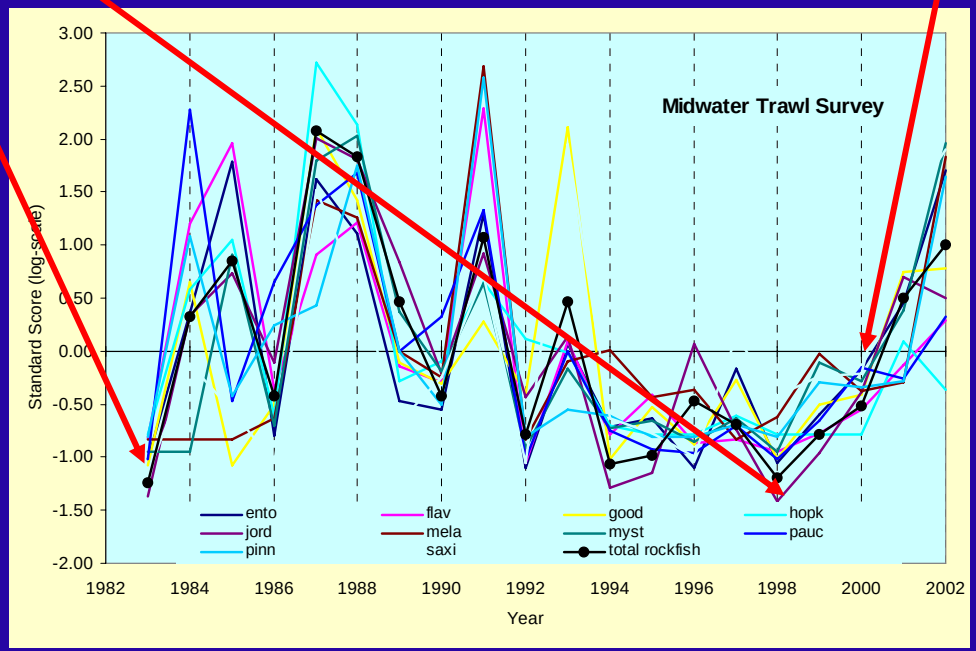
Coastal tourism

Recognize the Significance of Ocean-Climate Conditions

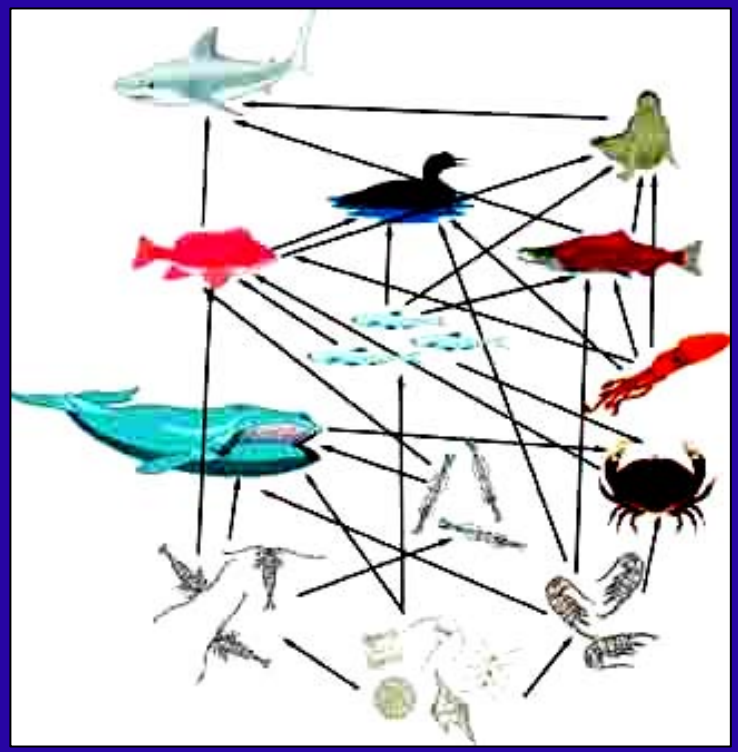




Rockfish recruitment success is related to the environment



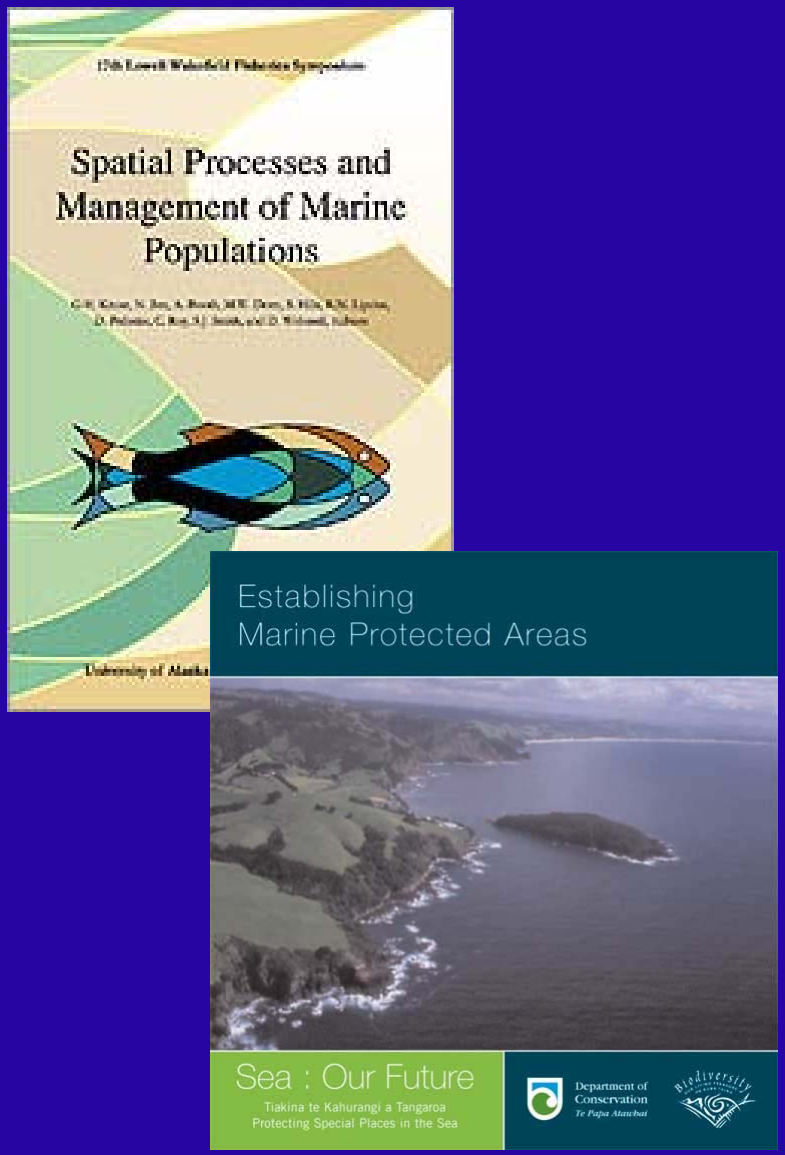
Emphasize Food-Web Interactions



- *Recognize that harvest of target species has profound impacts on ecosystem structure and function through trophic interactions*
- *Expand the predator-prey interaction focus beyond target species to include wider array of species in the ecosystem*

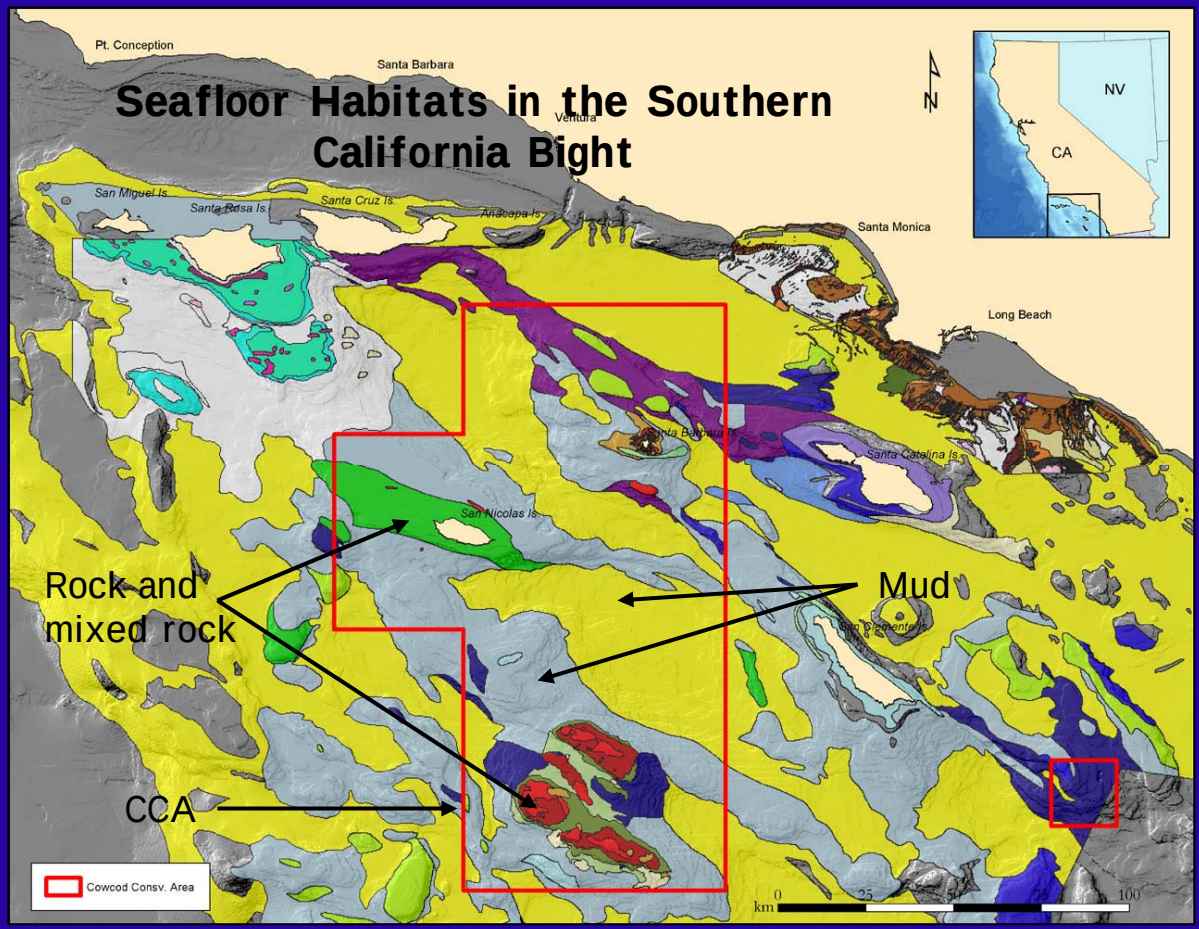
- *Resource surveys (NOAA/NMFS/NEFC and AKFSC) and dockside sampling can provide biological samples needed to develop a comprehensive predator-prey database*

Employ Spatial Representation



- *Conventional management focuses on temporal and age-structured considerations and population homogeneity*
- *Explicitly accounting for space is a practical way to move toward EBFM*
- *Central to understanding and predicting spatially explicit population dynamics and stock structure*
- *Allow more effective spatial management e.g.,MPAs and distributing harvest consistent with spatial/habitat variation in productivity and to protect life-history characteristics and biodiversity*

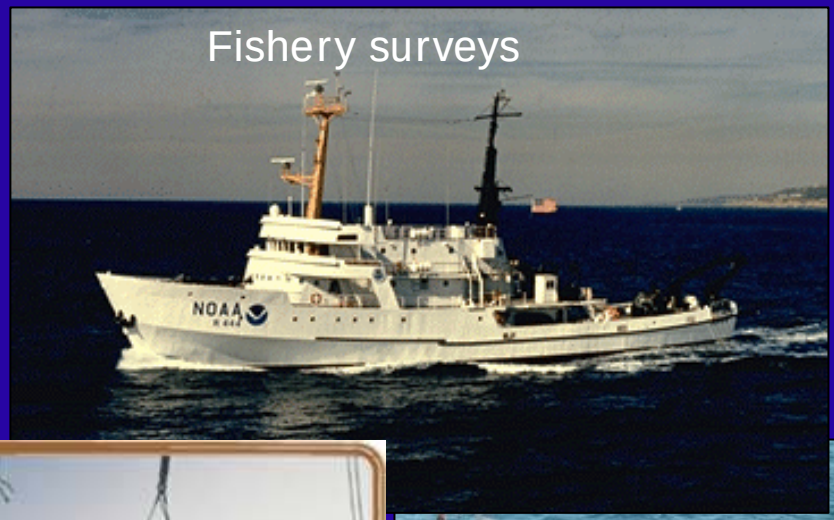
Increase and Expand Focus on Habitat



- *Essential for employing spatial representation and management*
- *Knowledge of the identity and description of essential habitat for target species is limited*
- *Knowledge of the association of demographic rates of target species with habitats is virtually non-existent*

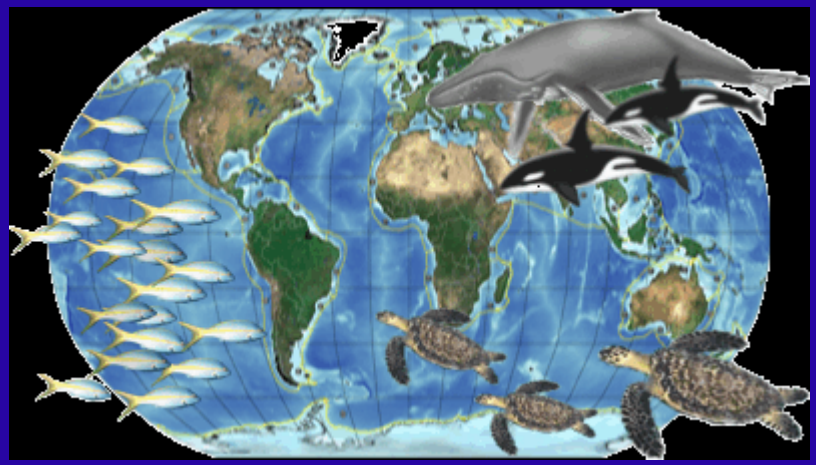
- *Habitat information for non-target species is also needed and is even more limited*

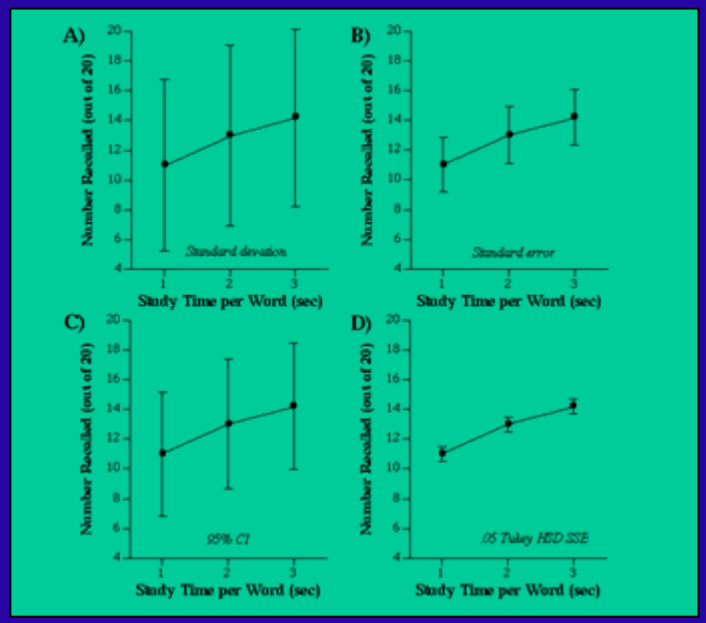
Expanded Scope of Research and Monitoring



- *Will be qualitatively different than present work, including new subject matter*
- *Will probably not replace current efforts*
- *Should focus on understanding biological interactions/processes, and measuring total fishery removals of target and non-target species*
- *Essential for understanding effects of habitat alteration and ocean climate change on target and non-target species*

Acknowledge and Respond to Higher Levels of Uncertainty

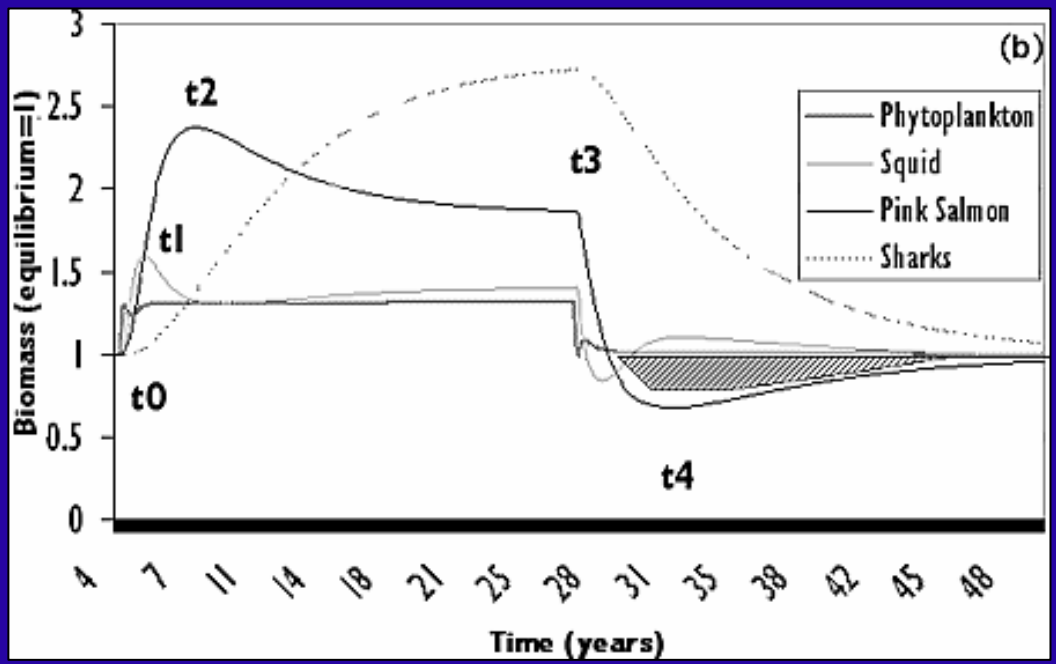




- *Current understanding of ecosystem processes in highly uncertain*
- *Existing marine ecosystem models are rudimentary, but useful to shift focus from species and populations to communities and ecosystems*
- *Focus on what information can be collected to most improve estimates of the level of uncertainty*
- *Realistically incorporate uncertainty in management policy*

Review and Improve Ecosystem Modeling/Research

ECOSIM trophic feedback model of the Alaskan Gyre (Aydin unpub)



- *Conduct modeling/research to quantify uncertainty and to identify critical data needs to reduce uncertainty*
- *Conduct modeling/research to understand critical mechanisms and interactions, and to identify most explanatory and cost effective variables to measure*
- *Include modeling that will quantify trade-offs among management objectives (MSE)*
- *Include research on how ocean climate impacts target and non-target species*

In Summary: An Ecosystem-Based Approach to Fishery Management Should

- **Incorporate a broader array of societal goals and uses for ecosystem products and services**
- **Recognize the significance of ocean-climate conditions**
- **Emphasize food-web interactions**
- **Employ spatial representation**
- **Increase and expand focus on habitat**
- **Expanded scope of research and monitoring**
- **Acknowledge and respond to higher levels of uncertainty**
- **Review and improve ecosystem modeling/research**