

Is MSA Sufficient to Protect Vulnerable Species and Habitats?

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My path...

Behavioral
ecology



Theoretical
ecology



Quantitative
conservation
biology



Fisheries
ecology

I want to
talk to
killer
whales!



Today's talk

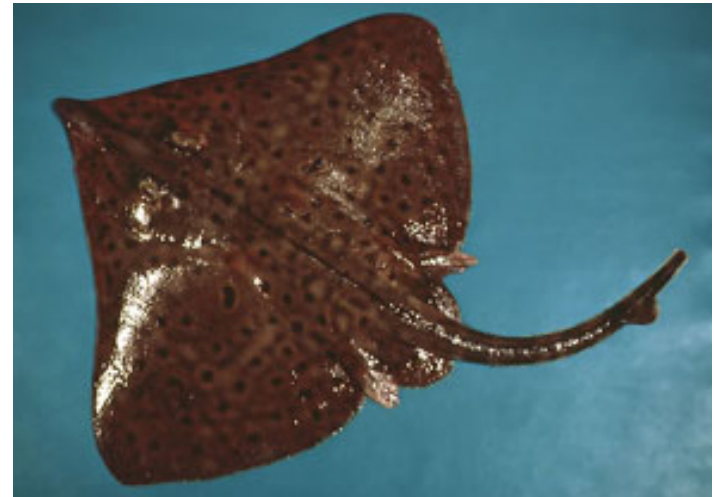
- Vulnerable Species
- Vulnerable Habitat
- Why the Endangered Species Act is not the best way to protect most vulnerable species and habitats in the sea
- MSFCMA

What makes a species “Vulnerable”?

- Life history strategy –
 - “slow” species = low sustainable exploitation rates, slow to recover if we screw up
 - “fast” species = rapid collapse potential in response to environmental change, unpredictable
- Insufficient biological information
 - Does not conform to “rules” of deterministic logistic growth
 - Vital rates are not constant over time
- Aggregation behavior
- Extremely high or extremely low value
- Occurs largely outside the US EEZ

“Bycatch” or low value catch species in mixed stock fisheries

- Inherently difficult to monitor because effort is generally not related to catch
 - target = a different species
- Probably unlikely to overfish, but less attention = less data = ??

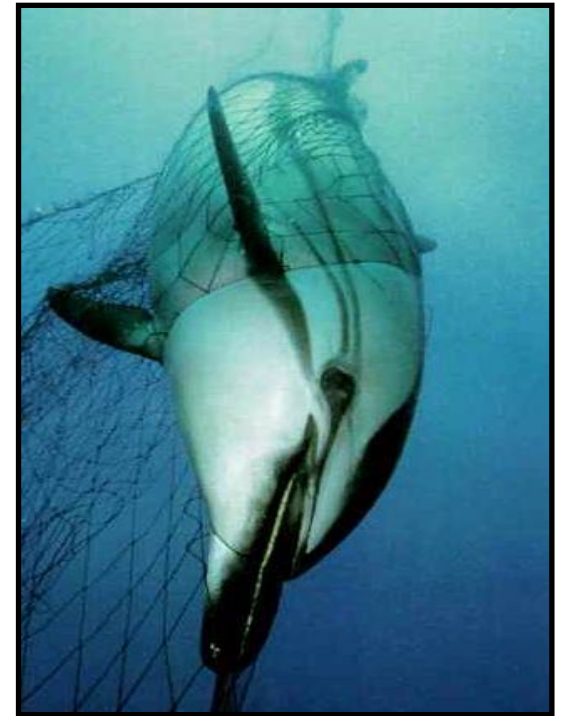


Barndoor skate

Bycatch of turtles, birds and mammals



- Trawls
- Gillnets
- Long lines
- Fixed gear



Problem is generally not that encounters are high on an individual basis, but that there are so many boats, nets, and lines out there.

MSA: Bycatch of Non-Target Species

- Pre-1996:
 - Endangered Species Act 1973 (ESA)
 - Bycatch of threatened species monitored inconsistently
- 1996 Amendments:
 - Heavily focused on the large scale drift net fisheries
 - Aimed to reduce non-target species catch and sets up observers to monitor commercial bycatch
 - Mostly aimed at non-target/overfished **fish** species, but also states compliance with ESA and Marine Mammal Act 1972 (MMA)
- 2006 Amendments and Implementation:
 - Requires bycatch reduction program to monitor non-target species and promote engineering of bycatch-reducing gear.

MSA: Bycatch of Non-Target Species

- National Standards and Guidelines:
 - (9) Conservation and management measures shall, to the extent practicable,
 - (A) minimize bycatch and
 - (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Sea Turtles



- Pre-1996:
 - Endangered Species Act 1973
 - 1987 First Turtle Excluder Device regulations on shrimp trawlers
- 1996 Amendments:
 - Sea turtles are technically defined as “fish”. No specific regulations are mentioned.
- 2006 Amendments and implementation:
 - Defines sea turtles as Ecosystem Components
 - The bycatch reduction program, which monitors non-target species including sea turtles.
 - Must integrate practices with the National Environmental Policy Act (NEPA)
 - T.E.D.s are officially part of the Bycatch Reduction Engineering Program (BREP)

Benefits of MSA to marine megafauna outside the US

- Premise: Countries that want to sell us seafood should abide by our “rules”.
- Imports = 90% of seafood consumption in US
- Examples: Lacey Act Amendments, High Seas Driftnet Moratorium
- New emphasis on IUUs (Illegal, Unreported, Unregulated fisheries)



Noaa.gov

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric
Administration

50 CFR Part 300

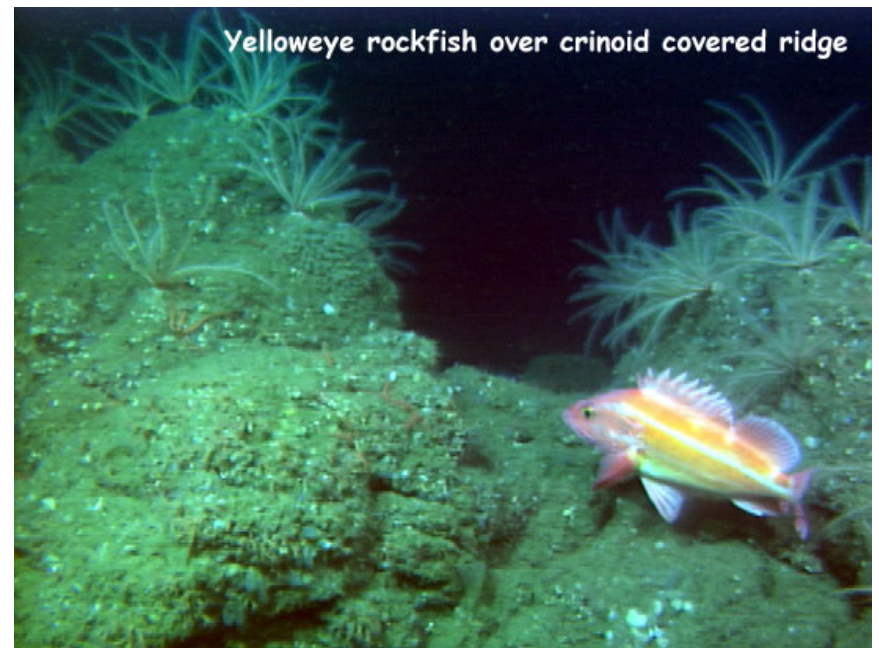
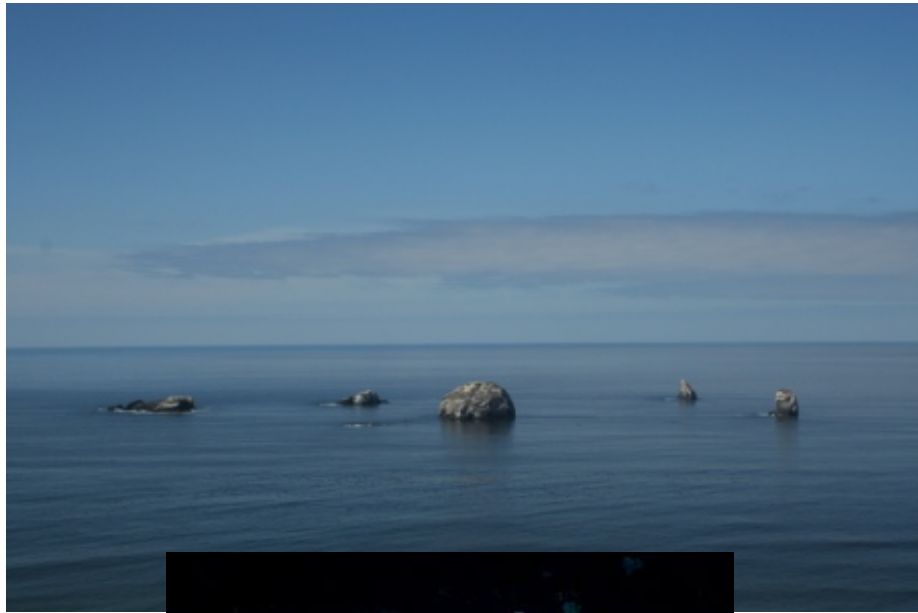
[Docket No. 110321208-1203-01]

RIN 0648-BA89

**High Seas Driftnet Fishing Moratorium
Protection Act; Identification and
Certification Procedures To Address
Shark Conservation**

AGENCY: National Marine Fisheries
Service (NMFS), National Oceanic and
Atmospheric Administration (NOAA),
Commerce.

ACTION: Proposed rule; request for
comments.



Habitat

- Pre-1996:
 - Possible associated protection from MMA and ESA
- 1996 Amendments:
 - Promotes identification and protection of essential fish habitat (EFH) for managed species
- 2006 Amendments and implementation:
 - Still promoting EFH
 - NMFS must report on habitat status/quality

What makes habitat “vulnerable”?

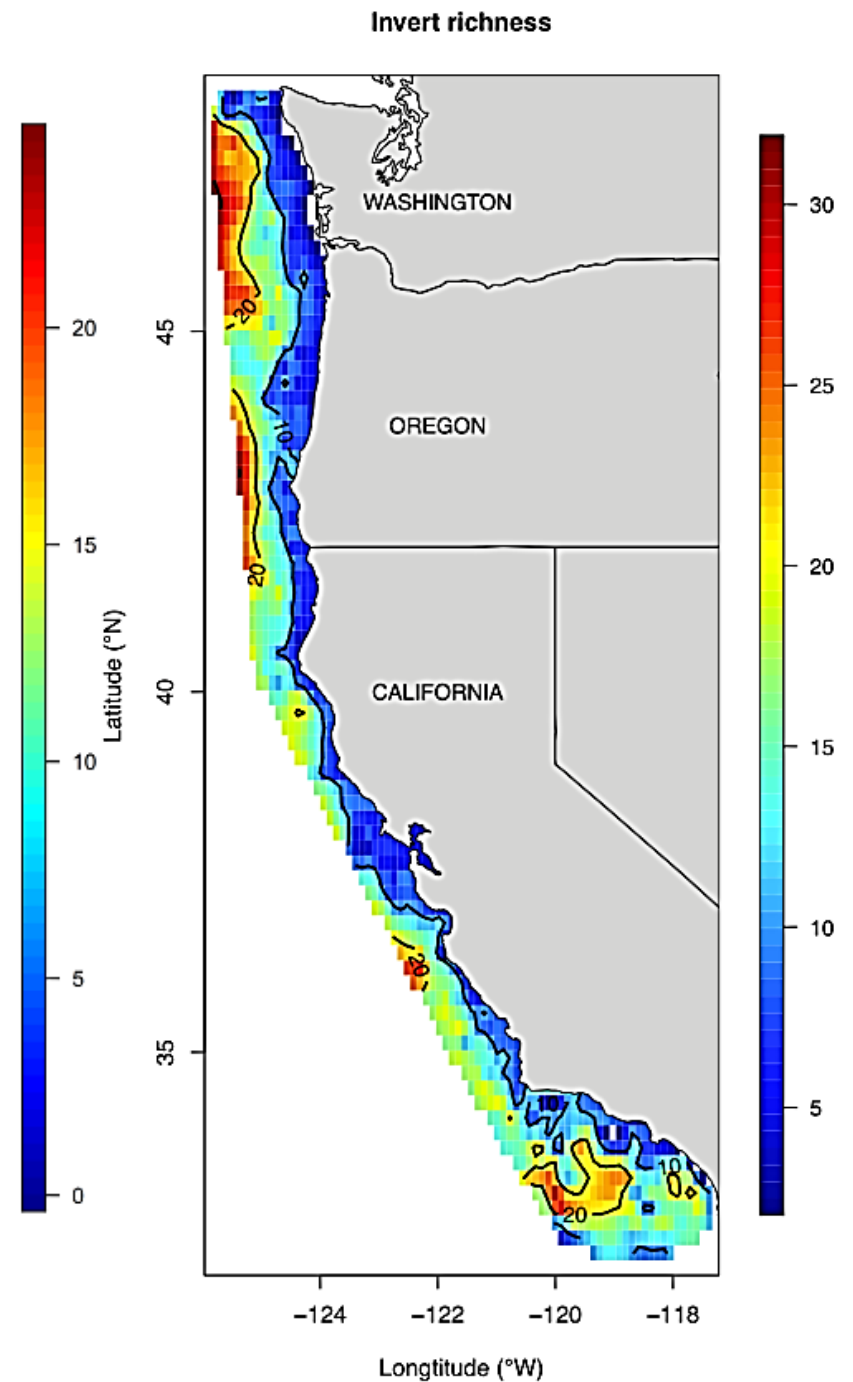
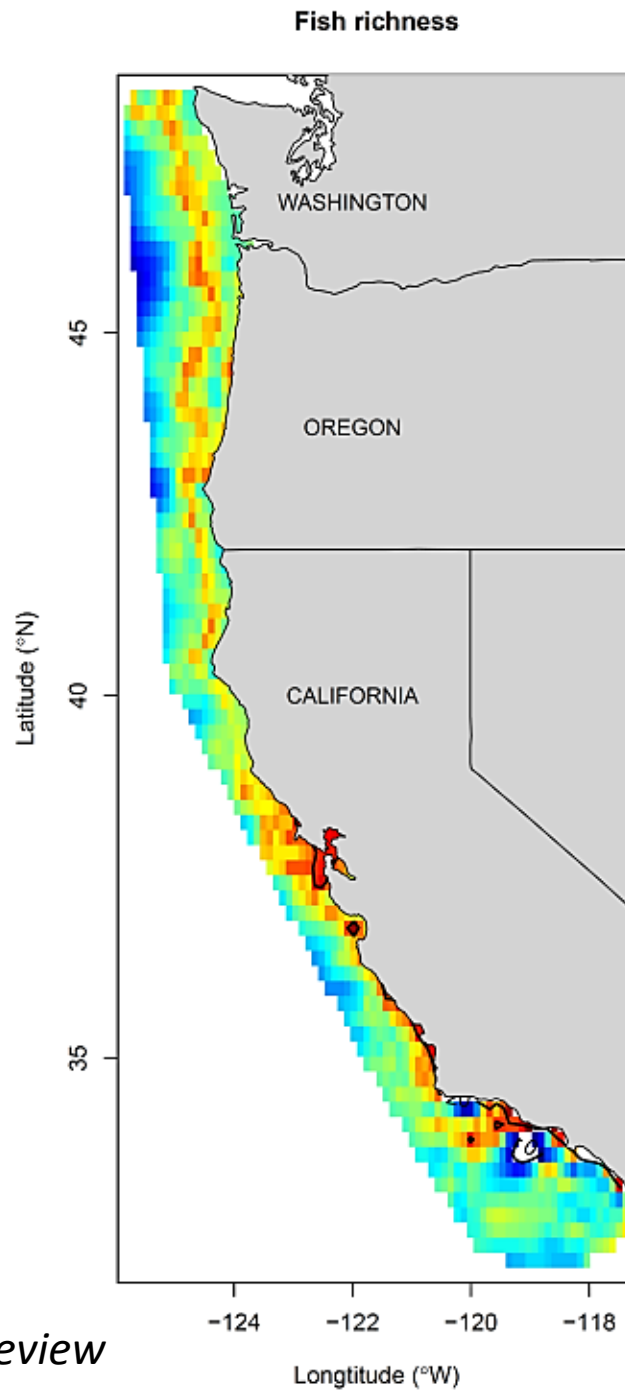
- Slow natural turn-over
- Heavily fished by gears that smash stuff up
- Delicate biogenic habitat
- High impact from climate change, other stressors



Still don't have a good way to define critical habitat for most fishes

- EFH is everywhere; Habitat Areas of Particular Concern are a good start
- Little research on habitat impacts of gear other than bottom trawl
- Little research on habitat recovery
- Need to identify areas/conditions that contribute to productivity, not just areas of high relative abundance

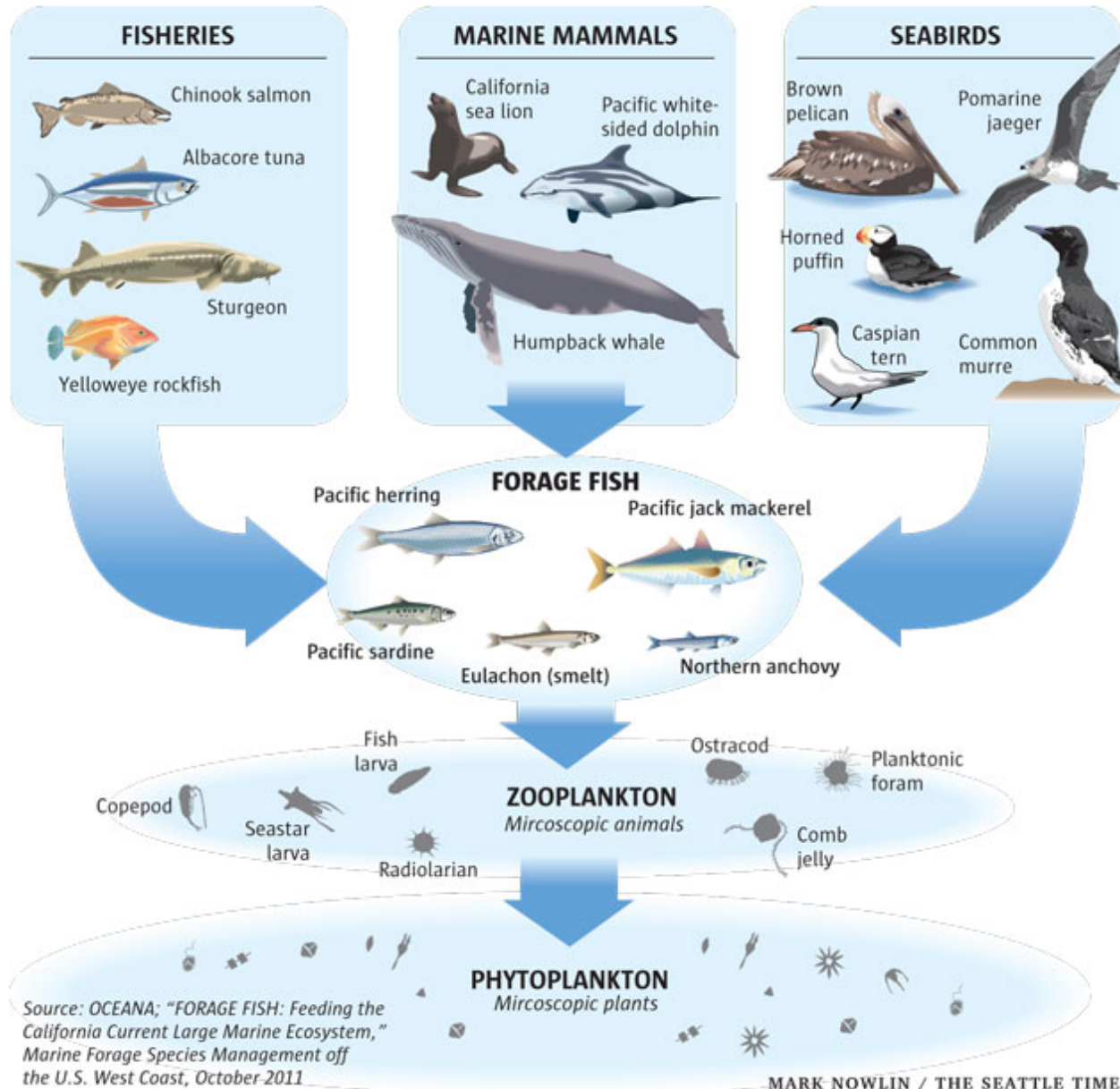
Biodiversity
mapping using
groundfish
trawl survey
data
2003-2010



Piacenza et al. *in review*

The ocean food web

Along the U.S. West Coast, most major fish, mammal and seabird species rely on forage fish for food – a group of about 30 species of small schooling fish. Scientists increasingly recognize that maintaining this small group of fish is key to ocean health.

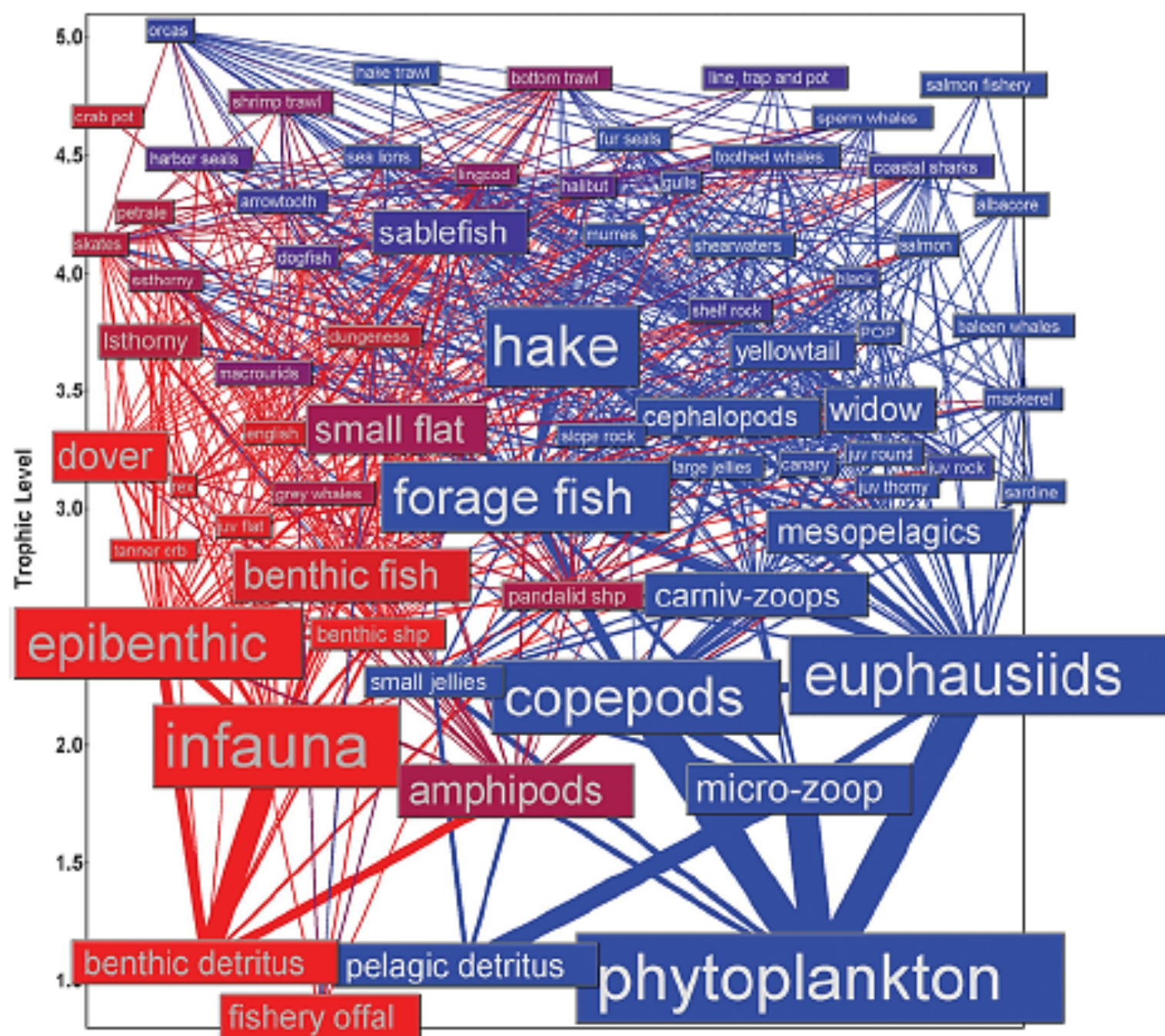


“Ecological Factors” for determination of Optimal Yield (Nat Std. 1)

- Examples include impacts on **ecosystem component species, forage fish stocks, other fisheries, predator-prey or competitive interactions, marine mammals, threatened or endangered species, and birds.**
- **Species interactions** that have not been explicitly taken into account when calculating MSY should be considered as relevant factors for setting OY below MSY.
- Consider managing **forage stocks** for higher biomass than B_{msy}
- Consider other impacts, e.g., **ecological or environmental conditions** that stress marine organisms

Reality check?

- Act and National Standards are very broad and inclusive, but do not provide guidance on *how* to incorporate ecosystem considerations into management
 - “Fish less”
 - Unfunded mandate?



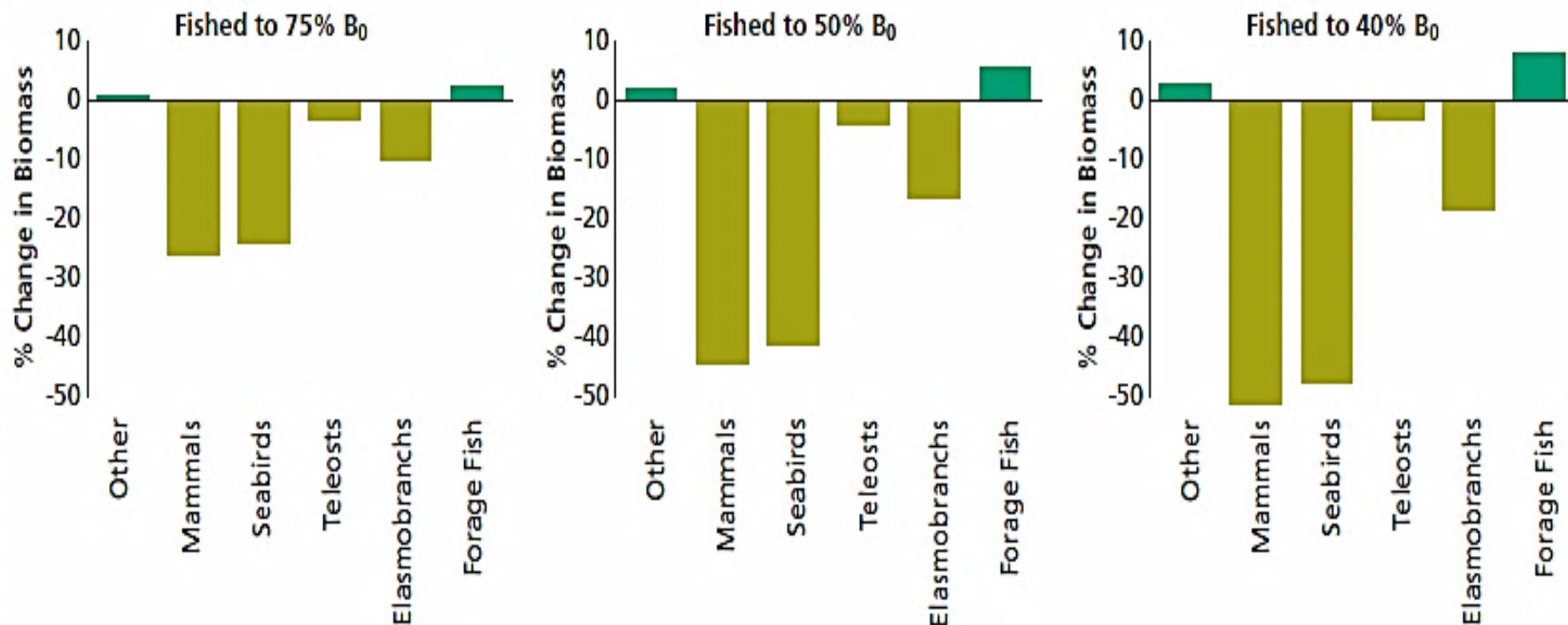
Is single-species management the underlying problem or a simple necessity?

- Need for precise control rules for management forces the agency to pour resources into single species assessment, leaving little time and funds for research on mechanisms of change, resilience and bycatch/habitat impacts

What do we mean by “sufficient to protect”?

- Removal of large amounts of fish and invertebrate biomass *by any means* will impact the ecosystem
 - Reduced biomass of top predators, other trophic changes possible
- Most fishing gears impact more than target species
- How much change is “acceptable”?
 - Avoid an increased risk of extinction?
 - Maintain biomasses above some desired level?
 - Avoid reduction in resilience to environmental change?

Effects of forage fish reduction on key ecosystem components



Example: reduction of sand eel (*Ammodytes* spp) relative to an unfished condition (B_0), in the EwE model for the North Sea (Mackinson and Daskalov 2007)

Depend on the ESA?

- Endangered Species Act should be a “law of last resort” when *extinction* is likely
 - Once the ESA is invoked, all hell breaks loose
- Waiting until a stock is determined to be at this level to take action is an irresponsible use of natural resources
 - Burden of proof?
- Promoting activities that reduce catch of unwanted species and habitat impacts is a responsible use of natural resources

That said....

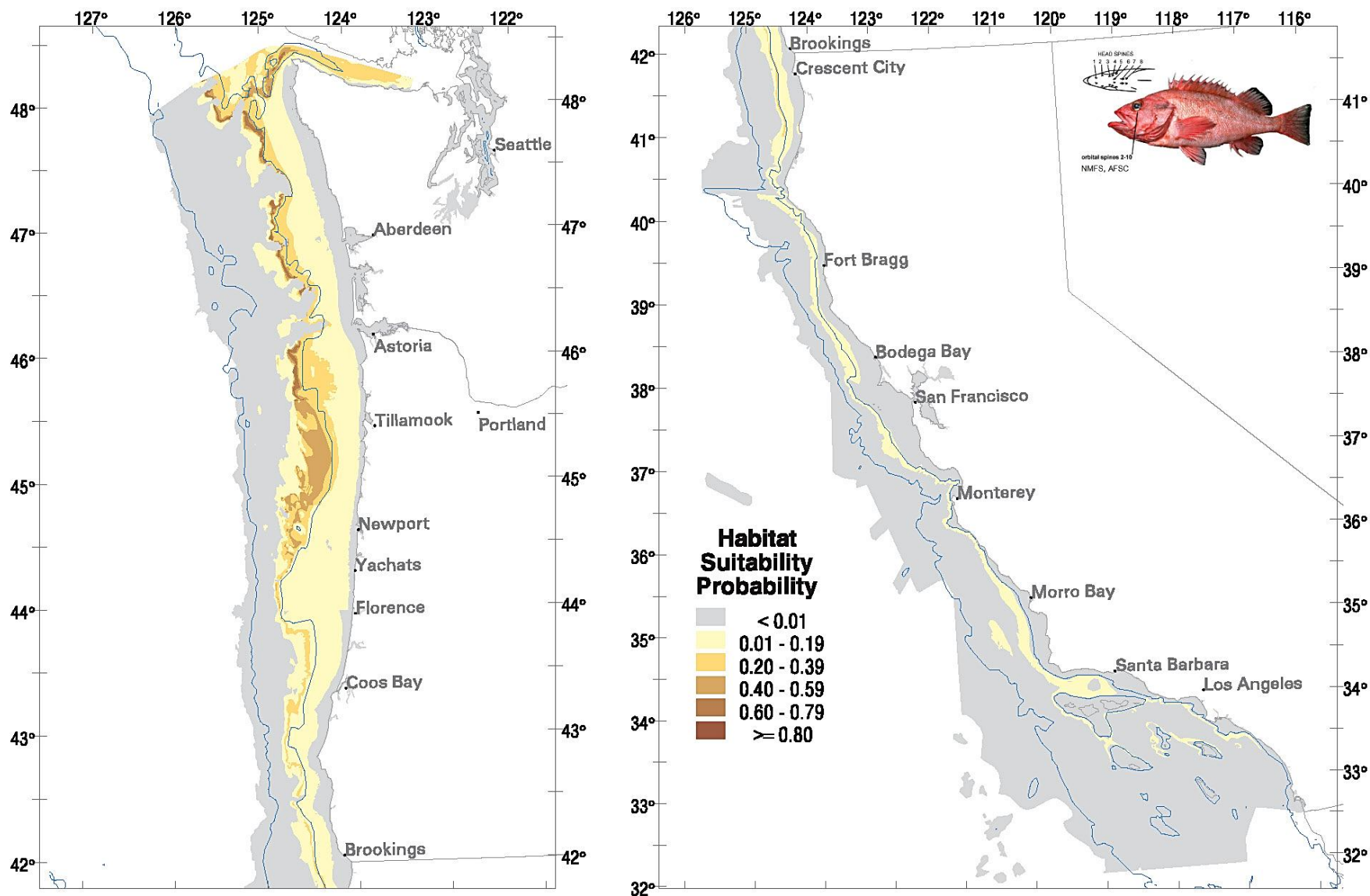
- Laws and standards should be prudent about when and how to invoke restrictions
 - Consider a multi-step process of evaluation, action
 - Example: roughey rockfish



AFSC

- Slow life history, high vulnerability
- CA = southern extent of range
- Incidental catch in slope fixed gear and trawl fisheries (mostly sablefish)
- Limited biological information

Rougeye Rockfish - Adult



Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: October 16, 2005
Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: Survey
 Groundfish FMP Appendix B.4

Strong and prudent provisions in MSA could reduce negative effects of ESA listings

- Example: longline fisheries and sea turtles
 - Direct mortality on pelagic longlines is very low, can be reduced to nearly 0%
 - Promotes switch from driftnet gear
 - Reduce overall bycatch biomass/swordfish landed by 80-90%
 - Promotes domestic swordfish fishery
 - Less reliance on imports



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Is MSA Sufficient to Protect Vulnerable Species and Habitats?

- On paper, Yes
 - Broad provisions for protection and/or consideration of habitat, bycatch and forage species
 - Emphasis on bycatch reduction incentives and conservation engineering
 - NEPA EIS requirements may duplicate some efforts, but provide valuable accounting of impacts
 - Integration with other laws

Is MSA Sufficient to Protect Vulnerable Species and Habitats?

- In practice, Probably Not (but a great start)
 - Vague guidance for setting Optimum Yield
 - Insufficient resources for research, development and implementation of tools for impact assessment
 - Councils and NOAA will continue to be pushed by special interest litigation, may not always be focused on most pressing needs

Advice?

- Increase funding if you increase mandate for ecosystem considerations
- Support fishery independent data collection, biological and ecological process research, and observer programs
- Broaden membership of fisheries science and management advice
- Support incentives for fishermen to avoid bycatch, habitat impacts
- Develop defensible, reasonable “rules” for incorporation of ecosystem considerations in OY determination
 - Develop tools and evaluation methods for those tools

Thanks!

- Conference organizers and supporters
- MSA crafters
- Heppell Lab
- Colleagues on PFMC SSC
- NOAA support of student research and training, collaborative research