

## ECOSYSTEM ADVISORY SUBPANEL REPORT ON UNMANAGED FORAGE FISH PROTECTION INITIATIVE

The Ecosystem Advisory Subpanel (EAS) reviewed and discussed the Fishery Ecosystem Plan (FEP) Initiative 1 and the Supplemental Ecosystem Workgroup (EW) Report (Agenda Item I.2.b). In general, we are suggesting the Council pursue implementation of Initiative 1 in a targeted way so that currently identified species can be protected while unresolved complexities are addressed over time. In this context, the EAS offers the following recommendations.

### Adopt a Statement of Purpose and Need

The EAS reviewed the proposed purpose and need statement in the Supplemental Ecosystem Workgroup Report and recommends modifications to improve clarity while maintaining the Pacific Fishery Management Council's intent:

*The purpose of this action is to recognize the importance of forage ~~fish~~ species to the marine ecosystem off the U.S. West Coast. This action is intended to meet the need to provide protection for unmanaged, unfished forage species that are not currently managed by the Council, or the States fish of the U.S. West Coast EEZ by prohibiting new directed fishing on those species until the Council has had an adequate opportunity to assess the scientific information relating to any proposed fishery and to consider potential impacts to existing fisheries, fishing communities, and the greater marine ecosystem.*

### Identify the Species to be Protected

The EAS recommends that the Council identify species to be protected under FEP Initiative 1. A list has already been compiled (FEP, Appendix A, Table A.2 and attached), consisting of species whose roles in the ecosystem and management status have already been assessed. The Council could proceed with Initiative 1 by focusing on those species in Table A.2 whose management status is listed as "none" or "ESA." This would provide an efficient approach to advance Initiative 1 without precluding changes to the list of protected forage species.

### Resolve Ambiguous Terms

The EAS is hopeful that focusing on the species in Table A.2 will allow the Council to proceed with implementing Initiative 1 without first resolving all of the ambiguities raised by the Supplemental EW Report.

Nonetheless, the Supplemental EW Report raises a number of concerns about definitions of "unfished," and "unmanaged." Clarifying these definitions will help determine whether modifications to Table A.2 are required to protect forage species as intended by Initiative 1.

In addition, the EAS recommends that the Council review the definition of forage species derived from Smith et al. (2011) to ensure that it meets the intent and need of Initiative 1. For example, the Council may wish to expand the definition beyond planktivorous fish (e.g. small fish-eating squid).

Table A.2: Preliminary summary of select lower trophic level species in the CCE

Common and species name	Relative abundance	Fisheries potential	Role in ecosystem	Managed?
<b>Vertebrates</b>				
Northern anchovy ( <i>Engraulis mordax</i> )	Low frequency (regime scale) variability over time and space, but typically abundant from nearshore to offshore habitats throughout the CCE	Formerly a major fisheries target (100,000s tons), currently a small scale (largely bait) and incidental catch	Key forage species for wide range of HMS, salmon, groundfish, seabird and marine mammals	CPS FMP
Pacific sardine ( <i>Sardinops sagax</i> )	Low frequency (regime scale) variability over time and space, but often abundant from nearshore to offshore habitats throughout the CCE	Historically, largest fishery in California Current (100,000s tons), currently a major fisheries target	When abundant, a key forage species for wide range of HMS, salmon, groundfish, seabird and marine mammals	CPS FMP
Pacific mackerel ( <i>Scomber japonicus</i> )	Low frequency (regime scale) variability over time and space, but often abundant from nearshore to offshore habitats throughout the CCE	Historically and currently an important fisheries target (10,000s tons)	When abundant, a moderately important forage species for many HMS and some marine mammals	CPS FMP
Jack mackerel ( <i>Trachurus symmetricus</i> )	Low frequency (regime scale) variability over time and space, but often abundant in offshore habitats (rarely close to shore) throughout the CCE	Occasionally important fisheries target (10,000s tons)	When abundant, a moderately important forage species for many HMS and some marine mammals	CPS FMP
Pacific herring ( <i>Clupea pallasii</i> )	Abundant to very abundant in nearshore and many estuaries	Fairly high commercial importance (up to 10,000s tons)	Among the more frequently encountered prey in predators such as salmon, hake, rockfish, marine mammals, seabirds	States
Round and thread herrings ( <i>Etrumeus teres</i> and <i>Opisthonema libertate</i> )	Subtropical species that are "reasonably abundant" in the southern part of the CCS. Range likely to expand with global climate change	Unknown in CCS, but in 100,000s tons throughout Eastern Tropical Pacific	Currently key LTL species in core range, could potentially be in CCS with global change	none
American shad ( <i>Alosa sapidissima</i> )	Anadromous, moderately abundant in rivers, estuaries	CCS landings in 100s tons, com./rec. important elsewhere	An introduced species, moderately important prey for some predators	none
Mesopelagic fishes (Myctophidae, Bathylagidae, Paralepididae, Gonosomatidae; 100s of species in CCS)	Likely the most abundant fish assemblage on the planet. Uncommon inshore but tremendously abundant in mesopelagic (offshore, midwater) waters	Currently limited fisheries potential; despite tremendous abundance, technology is historically infeasible	Important prey for entire mesopelagic food web, many large squids, many tunas and HMS, some rockfish (esp. blackgill, bank), rare in mammal or seabird diets	none

Common and species name	Relative abundance	Fisheries potential	Role in ecosystem	Managed?
Pacific sand lance ( <i>Ammodytes hexapterus</i> )	Common, but not abundant, in coastal waters of Pacific Northwest	Important fishery target in other regions (particularly North Atlantic)	Moderately important prey for some fishes, seabirds and marine mammals in the Pacific Northwest	none
Pacific saury ( <i>Cololabis saira</i> )	Low frequency (regime scale) variability over time and space, primarily an offshore (pelagic) species, often very abundant in offshore waters during cool regimes/periods	Very important fishery off of Japan, elsewhere in North Pacific; presumably a potential large-scale target	Relatively important prey to albacore, sablefish, sharks, other HMS species (rarely found in predators shoreward of shelf break)	none
Silversides (Atherinopsidae; includes grunion, jacksmelt, topsmelt, perhaps 3-5 other rare spp.)	Moderately abundant in nearshore (but considerably less so than osmerids based on larval abundance data)	Historically commercial and recreational targets (up to ~ 1000 tons in 1940s), recent catches relatively modest. Fisheries typically nearshore	Very abundant in some nearshore areas, presumably important forage species in such areas, but rarely encountered in food habits data for key commercial species	none
Eulachon ( <i>Thaleichthys pacificus</i> )	Anadromous, coastal, formerly fairly abundant, currently rare	Formerly of fairly high commercial/recreational importance (CCS landings in 1000s tons)	Common but not abundant prey item for wide range of predators	ESA
Other Osmerid smelts (Osmeridae; includes capelin, surf smelt, whitebait smelt, perhaps 3-5 other spp)	After the clupeids (and exclusive of mesopelagics), among the most abundant family of forage fish species in nearshore; typically less abundant offshore	Some species are of minor to modest commercial significance (surf smelt), or have been the target of major fisheries elsewhere (e.g., Atlantic capelin)	Preyed on by wide range of piscivores (seabirds, marine mammals, Pacific hake, sablefish, rockfish, salmon), but rarely comprise a large fraction of total prey.	none
Shortbelly rockfish ( <i>Sebastes jordani</i> )	Likely the most abundant <i>Sebastes</i> spp. in Central and Southern California, exhibits low frequency (regime like) variability	Minor incidental landings, potential future fisheries target	Juvenile and adult life history stages are very important to salmon, many groundfish, seabirds and marine mammals.	Groundfish FMP
Sanddabs ( <i>Citharichthys</i> spp), particularly Pacific ( <i>C. sordidus</i> ) and speckled ( <i>C. stigmaeus</i> )	One of the more abundant soft-bottom groundfish, also found in water column, typically over shelf.	Substantial commercial and recreational catches (100s to 1000s tons)	Juvenile and adult life history stages are very important to many groundfish, particularly piscivorous flatfish; some seabirds and marine mammals.	Groundfish FMP
Pacific tomcod ( <i>Microgadus proximus</i> )	Locally abundant in some nearshore habitats	Trace historical landings, little current fishery interest or potential	Relatively minor importance in most food habits studies.	none
Small croakers ( <i>Sciaenidae</i> ) e.g. white croaker and queenfish **	Fairly abundant, particularly in nearshore waters of the southern CCE	Some commercial and recreational landings (perhaps to 1000s tons)	Somewhat important for some nearshore species; larvae are very abundant in ichthyoplankton, suggesting relatively high abundance in some areas.	none

Common and species name	Relative abundance	Fisheries potential	Role in ecosystem	Managed?
<b>Invertebrates</b>				
Euphausiids (krill), primarily <i>Euphausia pacifica</i> and <i>Thysanoessa spinifera</i>	Tremendously abundant throughout coastal and offshore waters, a hugely important component of the food web	Commercial targets in Antarctica, Japan, some small fisheries off British Columbia and other locations; increasing commercial potential.	Key forage species for wide range of both juvenile and adult salmon, groundfish, squid, seabird and marine mammals	Fishing prohibited in CPS FMP
Market squid ( <i>Doryteuthis opalescens</i> )	Nearshore and shelf distribution (adults relatively rare offshore)	Very important commercial target in CCS (up to, rarely over, 100,000 tons)	Key forage species for wide range of HMS, salmon, groundfish, seabird and marine mammals	CPS FMP (CA state)
Pelagic squids (such as boreal clubhook squid, neon flying squid and Humboldt squid)	Offshore distribution (most spp. rare inshore)	Important commercial target elsewhere in range	These and other squid are key prey for HMS species and marine mammals.	none

\*\* Sciaenidae, excluding white sea bass (*Atractoscion nobilis*) and corbina (*Menticirrhus undulatus*) but including small, schooling species such as queenfish (*Seriphus politus*), spotfin croaker (*Roncadora steamsii*), white croaker and potentially others (the latter three are probably the most abundant; note that white seabass is clearly a higher trophic level predator).

PFMC  
09/15/13