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PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

FOR THE CALIFORNIA, OREGON, AND WASHINGTON GROUNDFISH FISHERY

APPENDIX B PART 1

ASSESSMENT METHODOLOGY FOR GROUNDFISH ESSENTIAL FISH HABITAT

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1.0 INTRODUCTION

In response to a court directive and settlement agreement to complete new National Environmental Policy Act (NEPA) analyses for Amendment 11 to the Pacific Coast Groundfish fishery management plan (FMP), the National Marine Fisheries Service (NMFS) developed an Essential Fish Habitat (EFH) Designation and Minimization of Adverse Impacts Environmental Impact Statement (EIS). Council action based on this EIS led to the Groundfish FMP being amended with new EFH provisions.

This document describes the rigorous assessment of groundfish habitat on the West Coast that supported the Council's decision on how groundfish EFH would be identified and described. This document is adapted from the *Risk Assessment for the Pacific Groundfish FMP* prepared by MRAG Americas, Inc.; NMFS Northwest Fisheries Science Center, FRAM Division; NMFS Northwest Regional Office; and TerraLogic GIS, Inc. The Risk Assessment describes the EHF Model used to identify and describe EFH, an Impacts Model developed to evaluate anthropogenic impacts to EFH, and a data gaps analysis.

Developing these components of the Risk Assessment was intended to answer the following fundamental questions:

- What areas could qualify as essential pursuant to section 303(a)(7) of the Magnuson-Stevens Act (MSA)?
- Given past inputs (anthropogenic and environmental), what is the probability that the condition of Pacific coast groundfish habitat has been degraded to an extent that function has been impaired?
- Given foreseeable inputs (anthropogenic and environmental) and regulatory regimes, how are trends in Pacific coast groundfish habitat expected to respond? What areas are at risk of impaired function and of particular concern?
- How might trends in habitat function be affected by altering anthropogenic inputs and regulatory regimes?
- What types of fisheries management alternatives could be applied to mitigate the effects of fishing on habitat? What are the likely impacts to habitat of specific fisheries management alternatives?
- What are the scientific limitations of assessing habitat?

The data analysis undertaken to address these questions has included spatial and temporal analysis of the distribution of habitat types, distribution of fish species, habitat use by fish, sensitivities of habitat to perturbations, and the dynamics of fishing effort.

The three parts of the Risk Assessment referenced above have been adapted as parts of the appendices to the Groundfish FMP. The description of the EFH Model for identifying and describing groundfish EFH comprises this document, part of Appendix B to the FMP.

The Risk Assessment proceeded along three major tracks: data consolidation and infrastructure development, proof of concept, and assessment modeling and review. The results of the data consolidation phase are discussed in Section 2. Proof of concept ended in February 2003 with the endorsement of the preliminary assessment methodology. Section 3 describes the EFH assessment model and outputs.

Five main types of data were available for the risk assessment: habitat use, habitat characteristics, fishing effects, nonfishing effects, and existing habitat protection. These data feed into the analytical parts of the

decision-making framework, which the development team termed the Comprehensive Risk Assessment, reflecting the integrated use of the best scientific information available in the development of guidance for the policy development process.

First and foremost, many of these data types can be analyzed and presented in GIS maps and overlays to indicate where the most important and vulnerable habitats are distributed in relation to the activities that may be impacting them (fishing and non-fishing). This information was developed to support the Impacts Model.

Thorough and responsible analysis of these data, however, involves substantially more than creating maps and spatial overlays in the GIS. To better represent the processes that make a particular piece of habitat more or less "essential" for managed species, and the risks posed to that habitat by fishing and non-fishing activities, the development team created a sophisticated modeling framework. As mentioned above, two models were developed; the EFH Model and the Impacts Model. While these components are clearly integrated, it was more practical to develop the models separately due to the complex and wide-ranging scope of the issues they address.

The first step in the process was the identification and description of EFH described in this document. The second step is an assessment of the risk to EFH from both fishing and non-fishing activities, which if fully developed, could assist the Council in developing measures to prevent, mitigate, or minimize, to the extent practicable, the adverse effects of fishing and fishing gear on EFH. As stressed above, the Impacts Model forms only part of this process. In a previous version of the decision-making framework, it was envisioned that all of the data elements from the data consolidation phase might feed into the Impacts Model. However, in practice this has not proved possible at this stage. The Impacts Model, is described in Appendix C to the Groundfish FMP.

The comprehensive risk assessment is, of necessity, a part quantitative and part qualitative procedure supporting EFH-related actions. It is hoped that in the future it will be possible to gather the necessary data and information to allow further development of the Impacts Model so that it can integrate these other data sources into an overarching quantitative model for risk analysis.

2.0 DATA CONSOLIDATION

To consolidate the available data and set the stage for the identification of EFH and risk assessment, NMFS in cooperation with the Pacific States Marine Fisheries Commission (PSMFC) implemented a multi-faceted project, which includes: (1) a GIS database that displays habitat types in comparison with known groundfish distribution/abundance and fishing effort; (2) a literature review and database of groundfish habitat associations; (3) a literature review of fishing gear impacts to habitat; (4) literature review of non-fishing impacts to habitat; and (5) analysis of information on fishing effort.

The various GIS and other databases that have been compiled for this project were organized into five major categories:

1. West Coast fish habitat
2. Use of habitat by groundfish
3. Effects of fishing on groundfish habitat
4. Non-fishing activities that affect groundfish habitat
5. Existing habitat protection measures

Within all of these categories, GIS has been a pivotal tool in compiling, analyzing, and presenting data. The first two categories form the backbone of the EFH Model, while the first and third are the principal inputs into the Impacts Model. In this section we provide a description of the data collection and processing procedures in the first four categories.

2.1 GIS Deployment in the EFH Process

This project has launched a major GIS effort to synthesize and generate spatial information previously unavailable at the Pacific Coast scale. Whether creating new GIS data (i.e., groundfish fishing regulations) or mining existing data and using it in innovative ways (i.e., invertebrate data from trawl surveys), this EFH process has been the driving force behind compiling disparate biological, regulatory, and catch data into a single GIS. The completed GIS seamlessly interacts with the Bayesian Belief Network models and is an invaluable tool for data visualization and regulatory decision-making.

2.1.1 Challenges Encountered While Compiling EFH GIS

Compiling comprehensive datasets covering the range of West Coast groundfish has proven to be an enormously complex and time-consuming task. Listed below are the issues and constraints encountered repeatedly while developing the EFH GIS data layers.

Locating Quality Data. Every GIS undertaking of this magnitude faces longstanding challenges to data sharing and integration. Compiling a GIS for an 822,000 km^2 study area requires navigating a complex web of federal, state, and local agencies in an effort to locate the best available data. Ideally, data sets sought out for inclusion were comprehensive for the West Coast where possible, already in GIS format, free, readily available, and redistributable. However, more often than not, meeting all these criteria proved impossible. Balancing cost and time requirements to meet the EIS schedule required prioritization of efforts to locate data. It is important to note that elements that received a lower priority in this round can be collected and incorporated in later versions to support future decision-making processes.

Uniting Disparate Data Sets. Reconciling data from disparate sources into a unified, coherent database presents a multitude of technical challenges, requiring decisions about seemingly arcane, yet critical, details. Almost all EFH data was available only as geographic subsets to the study area. Ideally, these

data would be "stitched" together at their edges using straightforward GIS commands. In practice, however, combining these geographic subsets into one comprehensive GIS layer required additional processing including: (1) modifying attribute definitions to make them identical; (2) eliminating overlapping areas by determining which subset has priority; (3) filling in data gaps between subsets; (4) understanding and reconciling different source scales and spatial extents; (5) validating coding; (6) updating coding as new information is provided; and (7) projecting data to a common West Coast projection. During these procedures, the goal has been to remain as consistent as possible with the intent of the source data while also creating comprehensive data coverage for the area of interest. To facilitate this process, automated procedures were used in lieu of more time-consuming manual editing procedures.

Scale and Detail Exceed Software Capacity. The large spatial extent of this project combined with the need for highly detailed GIS data has resulted in the creation of GIS datasets that exceed the capacity of essential software algorithms. To address this issue, alternative processing procedures were required to process and recompile these datasets into usable a format.

2.1.2 GIS Modeling and Management

The scale, scope, and complexity of this project have repeatedly pushed the limits of standard GIS technologies and existing spatial data, which required the project team to use innovative tools and multiple programming languages to develop the best possible GIS on which to base the EFH and Impact models. Relying on their expertise in the marine sciences, the team developed the spatial framework upon which these models are based. The result is a system that easily moves baseline data into the modeling process, facilitates model validation through results visualization, and displays the model outputs. In addition, the GIS allows for the mapping of management alternatives to allow decision makers and the public to identify preferred alternatives.

2.2 West Coast Fish Habitat

The EFH model uses information on habitat preferences of species and life stages in the Groundfish FMP for three habitat characteristics—benthic habitat (including biogenic habitat), depth, and latitude—to support the development of alternatives for identifying EFH. Accordingly, the following sections describe the data collected and processed in these three main categories. We also discuss more briefly the role of pelagic habitat in the identification of and assessment of risk to EFH.

2.2.1 Benthic Habitat

2.2.1.1 Summary

Benthic habitat is characterized primarily on the basis of the physical substrate. Marine geologists worked closely with fish ecologists to develop GIS data delineating bottom-types and physiographic features associated with groundfish habitats. Benthic habitat data for Washington and Oregon were developed by the Active Tectonics and Seafloor Mapping Lab, College of Oceanic and Atmospheric Sciences at Oregon State University. Data for California were developed by the Center for Habitat Studies at Moss Landing Marine Laboratories. TerraLogic GIS, Inc. was responsible for merging and cleaning these two data sources to create a seamless West Coast coverage. All lithologic and physiographic features were classified according to a deepwater benthic habitat classification system developed by (Greene, *et al.* 1999).

Information on the distribution of biogenic structures and other organisms, which may form an essential, and potentially sensitive, component of habitat is less readily available, but is included to the extent possible at this stage. Biological organisms may play a critical role in determining groundfish habitat use and preference. Structure-forming invertebrates, such as sponges, anemones, and cold water corals, can be an important and component of fish habitat. An example within the US EEZ is the Oculina Bank on the Atlantic coast of Florida. On the West Coast, however, assessment of the significance of associations between structure-forming invertebrates and groundfish species is limited by available literature.

GIS data have been compiled for several essential biological habitat components; canopy kelp, seagrass, and benthic invertebrates. Limited information is available to spatially delineate these biological habitats coastwide. However, because these habitats are so important, the project team felt that incomplete coverage was preferable to leaving these data out of the GIS.

Estuaries are known to be important areas for some groundfish species, such as kelp greenling, starry flounder, and cabezon. However, estuarine seafloor types were generally not mapped by the marine geologists during the initial data consolidation phase of the project. They are included as a separate mapped category of their own for inclusion in modeling efforts.

2.2.1.2 Physical Substrate

Marine geology experts have developed GIS data delineating bottom-types and physiographic features associated with groundfish habitats. Benthic habitat data for Washington and Oregon were developed by the Active Tectonics and Seafloor Mapping Lab, College of Oceanic and Atmospheric Sciences at Oregon State University (Appendix 2 to the Risk Assessment). Data for California were developed by the Center for Habitat Studies at Moss Landing Marine Laboratories (Appendix 3 to the Risk Assessment). TerraLogic was responsible for merging and cleaning these two data sources to create a seamless West Coast coverage. All lithologic and physiographic features were classified according to a deep-water benthic habitat classification system developed by (Greene, *et al.* 1999). Detailed documentation about the classification system and mapping methods are included in Appendix 3.

In general, the benthic habitat is classified according to its physical features in several levels of a hierarchical system. The levels, in order, are; megahabitat, seafloor induration, meso/macrohabitat, and modifier(s). For the West Coast, the following types have been delineated:

Level 1: Mega Habitat:
- Continental Rise/Apron;
- Basin Floor;
- Continental Slope;
- Ridge, Bank, or Seamount;
- Continental Shelf.

Level 2: Seafloor Induration:
- Hard Substrate;
- Soft Substrate.

Table 1. Unique benthic habitat types delineated in the West Coast EFH GIS.

Habitat Code	Habitat Type	Mega Habitat	Habitat Induration	Meso/Macro Habitat	Modifier
Ahc	Rocky Apron Canyon Wall	Continental Rise	hard	canyon wall	
Ahe	Rocky Apron	Continental Rise	hard	exposure	
As_u	Sedimentary Apron	Continental Rise	soft		unconsolidated
Asc/f	Sedimentary Apron Canyon Floor	Continental Rise	soft	canyon floor	
Asc_u	Sedimentary Apron Canyon Wall	Continental Rise	soft	canyon	unconsolidated
Asg	Sedimentary Apron Gully	Continental Rise	soft	gully	
Asl	Sedimentary Apron Landslide	Continental Rise	soft	landslide	
Bhe	Rocky Basin	Basin	hard	exposure	
Bs_u	Sedimentary Basin	Basin	soft		unconsolidated
Bsc/f_u	Sedimentary Basin Canyon Floor	Basin	soft	canyon floor	unconsolidated
Bsc_u	Sedimentary Basin Canyon Wall	Basin	soft	canyon wall	unconsolidated
Bsg	Sedimentary Basin Gully	Basin	soft	gully	
Bsg/f_u	Sedimentary Basin Gully Floor	Basin	soft	gully floor	unconsolidated
Fhc	Rocky Slope Canyon Wall	Slope	hard	canyon wall	
Fhc/f	Rocky Slope Canyon Floor	Slope	hard	canyon floor	
Fhe	Rocky Slope	Slope	hard	exposure	
Fhg	Rocky Slope Gully	Slope	hard	gully	
Fhl	Rocky Slope Landslide	Slope	hard	landslide	
Fs_u	Sedimentary Slope	Slope	soft		unconsolidated
Fsc/ f_u	Sedimentary Slope Canyon Floor	Slope	soft	canyon floor	unconsolidated
Fsc_u	Sedimentary Slope Canyon Wall	Slope	soft	canyon wall	unconsolidated
Fsg	Sedimentary Slope Gully	Slope	soft	gully	
Fsg/f	Sedimentary Slope Gully Floor	Slope	soft	gully floor	
Fsl	Sedimentary Slope Landslide	Slope	soft	landslide	
Rhe	Rocky Ridge	Ridge	hard	exposure	
Rs_u	Sedimentary Ridge	Ridge	soft		unconsolidated
Shc	Rocky Shelf Canyon Wall	Shelf	hard	canyon wall	
She	Rocky Shelf	Shelf	hard	exposure	
Shi_b/p	Rocky Glacial Shelf Deposit	Shelf	hard	ice-formed feature	bimodal pavement
Ss_u	Sedimentary Shelf	Shelf	soft		unconsolidated
Ssc/f_u	Sedimentary Shelf Canyon Floor	Shelf	soft	canyon floor	unconsolidated
Ssc_u	Sedimentary Shelf Canyon Wall	Shelf	soft	canyon wall	unconsolidated
Ssg	Sedimentary Shelf Gully	Shelf	soft	gully	
Ssg/f	Sedimentary Shelf Gully Floor	Shelf	soft	gully floor	
Ssi_o	Sedimentary Glacial Shelf Deposit	Shelf	soft	ice-formed feature	outwash

Level 3: Meso/macrohabitat:
- Canyon Wall;
- Canyon Floor;
- Exposure, Bedrock;
- Gully;
- Gully Floor;
- Ice-formed Feature;
- Landslide.

Level 4: Modifier:
- Bimodal Pavement;
- Outwash;
- Unconsolidated Sediment.

Each unique combination of these four characteristics defines a unique benthic habitat type. For the West Coast EFH project, 35 unique benthic habitat types have been delineated.

In addition, for Oregon, marine geologists delineated areas on the continental slope that were "predicted rock." These predicted rock areas were determined using multibeam bathymetry data having slopes greater than 10 degrees. Areas meeting this criterion "have been found from submersible dives, camera tows, and sidescan sonar data to nearly always contain a high percentage of harder substrates" (Goldfinger, *et al.* 2002). Predicted rock areas are included with other rocky habitats in the classification, but retain an additional identifier indicating that it was predicted.

2.2.1.3 Estuaries

Estuaries are known to be important areas for some groundfish species, such as kelp greenling, starry flounder, and cabezon. However, estuarine seafloor types were generally not mapped by the marine geologists during the initial data consolidation phase of the project. Only those habitats that are specifically mapped can be incorporated into the EFH model. Specific substrates within estuaries are not mapped; however, because of their significance as groundfish habitat, estuaries are included as a separate mapped category of their own, so that they can form part of the area identified as EFH. The only drawback of this approach is that an entire estuary is either identified as EFH or not. It is not presently possible to identify only part of an estuary, because there is no information in the GIS to distinguish between one part of an estuary and another. As information becomes available in GIS format this will change.

GIS boundaries for West Coast estuaries were compiled during the 1998 EFH process. The boundaries were derived primarily from the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI). Where digital data for the NWI were unavailable, data from NOAA's Coastal Assessment Framework were used. Because these data were readily available, it was decided to merge them with the existing seafloor habitat data. In most cases, the areas delineated as estuaries do not overlap the areas that have geological substrate and/or bathymetry mapped, so the depths and bottom types are currently undescribed within the GIS.

The project team encountered some challenges during the merging process due to the differences in shoreline boundaries used for the seafloor habitat and estuaries. There were both gaps and areas of overlap between the two data sets. Often these gaps or overlaps are not real, but artifacts of the mis-alignment between the layers. Because we did not have the resources for extensive manual editing to align these boundaries, we developed some decision rules for dealing with data inconsistencies in the

areas of overlap. Gaps between the data sets remain because there was not an acceptable automated method for either filling or removing them.

Various combinations of seafloor habitat and estuary habitat codes occur once the two data sets are combined. In a couple situations, one data set delineates an area as land (indicated by the code "Island"), and the other data set delineates the same area as potential EFH (either estuary or benthic habitat). Because terrestrial areas are not potentially EFH, land areas are removed prior to input to the EFH model. However, any areas that were ambiguous (i.e., at least one of the datasets identified them as potential EFH) were retained.

2.2.1.4 Biogenic Habitat

Biological organisms also play a critical role in determining groundfish habitat use and preference. In some cases, the biological component of the habitat is the most important feature that makes the habitat suitable for a particular species/life stage. GIS data has been compiled for canopy kelp, seagrass, and benthic invertebrates.

Limited information is available to spatially delineate these biological habitats coastwide. However, because these habitats are so important, the project team felt that incomplete coverage was preferable to leaving these data out of the GIS. Therefore, presence of a biological habitat polygon is a good indicator that the particular feature is there, or was there in the past. However, lack of a biological habitat polygon could mean two things: (1) the habitat type does not occur in that location; or (2) GIS data was not available for that area.

Canopy Kelp Beds

Kelp beds have been shown to be important to many groundfish species, including several rockfish species. GIS data for the floating kelp species, *Macrocystis* spp. and *Nereocystis* spp., are available from state agencies in Washington, Oregon, and California. These data have been compiled into a comprehensive data layer delineating kelp beds along the West Coast. The kelp source data were provided for each state by the following agencies; Washington Department of Natural Resources (WDNR), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Game (CDFG). Source data were collected using a variety of remote-sensing techniques, including aerial photos and multispectral imagery. Because kelp abundance and distribution is highly variable, these data do not necessarily represent current conditions. However, data from multiple years were compiled together with the assumption that these data would indicate areas where kelp has been known to occur. Washington State has the most comprehensive database, covering 10 years (1989-1992 and 1994-2000) and annual surveys of the Straits of Juan de Fuca and the Pacific Coast. Oregon did a coastwide survey in 1990, and then surveyed select reefs off southern Oregon in 1996-1999. A comprehensive kelp survey in California was performed in 1989, and additional surveys of most of the coastline occurred in 1999 and 2002.

Seagrass

Despite their known importance for many species, seagrass beds have not been as comprehensively mapped as kelp beds. An excellent coastwide assessment of seagrass has been recently published by Wyllie-Echeverria and Ackerman, (2003). This assessment identifies sites known to support seagrass and estimates of seagrass bed areas, however, it does not compile existing GIS data. Therefore, GIS data for seagrass beds had to be located and compiled for the EFH project.

Potential data sources for seagrass were identified through internet database searches as well as initial contacts provided by NMFS EFH staff and Sandy Wyllie-Echeverria at the University of Washington. Twenty-eight individuals or organizations were contacted for seagrass data or to provide further contacts.

Seagrass species found on the West Coast of the U.S. include eelgrass (*Zostera* spp., *Ruppia sp*.) and surfgrass (*Phyllospadix* spp.). Eelgrass is found on soft-bottom substrates in intertidal and shallow subtidal areas of estuaries. Surfgrass is found on hard-bottom substrates along higher energy coasts.

Eelgrass mapping projects have been undertaken for many estuaries along the West Coast. These mapping projects are generally done for a particular estuary, and many different mapping methods and mapping scales have been used. Therefore, the data that have been compiled for eelgrass beds are an incomplete view of eelgrass distribution along the West Coast. Data depicting surfgrass distribution are very limited—the only GIS data showing surfgrass are in the San Diego area.

In order to complete the EFH model by the required deadlines, acquisition of data on seagrass was ended in March 2004. Any data that were not made available by this date could not be included in the coastwide seagrass GIS layer. Table 2 lists the geographic coverage, time period, and sources of the seagrass data sets that were compiled.

Structure-forming Invertebrates

Structure-forming invertebrates—such as sponges, anemones, and cold water corals—can be an important and potentially vulnerable component of fish habitat. On the West Coast the significance of associations between structure-forming invertebrates and groundfish species, in terms of being EFH, has not been clearly identified.

Information recorded in the habitat use database (see Section 2.3.4.2) indicates that one or more species in the Groundfish FMP have been recorded as occurring with 10 separate categories of invertebrates that could be regarded as structure forming, or habitat creating. These are basketstars, brittlestars, mollusks, sea anemones, sea lilies, sea urchins, sea whips, sponges, tube worms, and vase sponges. This does not imply that fish use these structure-forming invertebrates as habitat. It also does not assume that ALL species in the various groups form structure or that those that do form structure do so all the time. Further, this is most certainly only a partial list and is incomplete—some significant groups are missing, e.g., cold water corals, including gorgonians and antipatharians, and other octocorals that form structure to an elevation of four meters above the seafloor.

Data on the presence of sponges, anemones, and cold water corals (including gorgonians, black corals, and sea pens) are available from the NOAA Fisheries bottom trawl surveys on the West Coast shelf and slope. These data form the basis for the only coast-wide source of distributional information for structure-forming invertebrates (see Morgan and Etnoyer, 2003). However, there are some serious limitations to this information. First, only presence data could be plotted; those trawl samples without structure-forming invertebrates (i.e., absence data) have not been plotted. Second, the trawl samples are notoriously biased toward trawlable soft bottom, low relief habitats. Therefore complex rock structure, which is known to be important habitat for many structure-forming invertebrates, is not well represented. The coral category includes both soft-bottom sea pen species and also species that occur primarily on complex rocky substrata.

Given the dearth of existing information on systematics, distribution, and abundance of structure-forming invertebrates (particularly in deep water) on the West Coast, a number of investigators have initiated relatively comprehensive surveys of these organisms. Notably, habitat-specific studies of structure-forming invertebrates and associated fish assemblages are underway both in the Southern California Bight

and off the Oregon Coast (Heceta Bank and Astoria Canyon). The association between fishes and these invertebrates, and more importantly what might be considered essential aspects of these associations, remains to be demonstrated.

Table 2. Summary of seagrass data sets compiled as of February 2004.

State	Geographic Coverage	Time Period	Description	Source
WA	all coastal and estuarine areas	1994-2000	Shorezone Inventory – aerial video interpretation	Washington Department of Natural Resources
WA	Skagit, Whatcom Counties	1995 1996	Nearshore Habitat Inventory – multispectral image analysis	Washington Department of Natural Resources
WA	Hood Canal	2000	multispectral image analysis	Point No Point Treaty Council
OR	coastal estuaries	1987	Oregon Estuary Plan Book maps	Oregon Department of Land Conservation and Development
OR	Tillamook Bay	1995	multispectral image analysis	Tillamook Bay National Estuary Program and Tillamook County
CA	Northern and Southern California, and San Francisco Bay	1994 1995 1998	Environmental Sensitivity Index data – compilation of various existing data sets	NOAA, National Ocean Service (NOS), Office of Response and Restoration (ORR)
CA	Tomales Bay	1992 2000-2002	aerial photo interpretation	California Department of Fish and Game and NOAA, NOS, ORR
CA	San Diego region, Dana Point to Mexican border	2002	multispectral image analysis and multibeam acoustic backscatter data	San Diego Nearshore Habitat Mapping Program
CA	Alamitos Bay	2000	SCUBA and boat-based GPS survey	NMFS, Southwest Region (data developed by Wetlands Support)
CA	Morro Bay	1998	aerial photo interpretation	Morro Bay National Estuary Program (data provided by NMFS, SWR)
CA	San Diego Bay	2000	single-beam sonar interpretation	U.S. Navy and Port of San Diego (data provided by NMFS, SWR)

2.2.2 Bathymetry

Water depth is one of the three habitat characteristics used in the EFH Model to calculate habitat suitability probability values (Section 3.4). A single West Coast bathymetric data layer was therefore developed. After collecting bathymetry from numerous sources, each was individually contoured to 10-meter depth intervals. Using an innovative technique, these contour lines were converted to polygons to facilitate analysis with additional polygonal datasets. This process proved exceptionally challenging, surpassing the limitations of the GIS software. A split and stitch approach was adopted to clip the universal coverage down to manageable regions and recompile the data after the polygons were formed. The resulting GIS coverage contains polygons with 10-meter depth ranges. The geographic extent of the

final bathymetry data was set to the same extent as the benthic habitat data, including using the same shoreline delineated by the benthic habitat data (i.e., 0-meter depth contour) for the bathymetry data.

Moss Landing Marine Lab provided 10-meter depth contours for California. These contours were derived from a publicly-available, 200-meter bathymetry grid from the California Department of Fish and Game, Marine Region GIS Unit. For Oregon, up to 46° N. latitude, Oregon State University provided 10-meter depth contours. These contours were generated from a 100-meter bathymetry grid developed by combining and resampling multiple in-house data sets. Data sources and processing procedures for these contours are described in Appendix 2 (Goldfinger, *et al.* 2002). Bathymetry data for the remaining areas, (Washington and the southernmost portion of the EEZ), were developed from free, publicly-available sources. For most of Washington, a 20-meter bathymetry grid was acquired from Washington Department of Fish and Wildlife and contoured to 10-meter depths. The remaining data gaps were filled with 10-meter contours developed from the gridded Naval Oceanographic Digital Bathymetric Data Base–Variable Resolution (DBDB-V). A small data gap between Oregon and Washington, approximately 100 to 200 meters across, was bridged by extending the contour lines to meet the shared boundary.

Due to the disparate nature of the bathymetry sources, the depth zones are discontinuous at the boundaries between data sources. No manual adjustments have been made to the compiled bathymetry data to remove these discontinuities. Due to software processing constraints and the extremely large size of the contour data files for California, these contours were algorithmically smoothed to remove extra vertexes within a maximum distance of 150 meters. By visual assessment, this generalization process had minimal impact on the contour locations.

2.2.3 Latitude

Along with depth and substrate type, latitude is the third habitat characteristic used in the EFH Model to calculate habitat suitability probability values (Section 3.4). Initially, boxes delineating one-minute latitudinal zones were created and overlaid with bathymetry and benthic habitat data to create a set of unique physical habitat polygons. During the development of the EFH model, it was concluded that species distributions change more gradually over latitude, and that 10-minute latitudinal zones would be a more appropriate level of detail. Therefore, a new GIS coverage depicting 10-minute latitude zones was developed and merged with other habitat components.

2.2.4 Pelagic Habitat

There are a number of species and life stages in the Groundfish FMP that occur in the water column, but do not have any association with benthic substrate. While the water column is likely to be much less sensitive to fishing impacts than benthic substrate, it is still necessary to identify EFH for these components of the groundfish assemblage. For example, there may be non-fishing impacts, such as pollution, that have adverse effects. However, mapping EFH in the pelagic zone is even more difficult and less exact than for the seabed. The features of the water column that are likely to be of importance include biological, physical, and chemical oceanographic processes that are hard to map. Frontal boundaries, temperature regimes and biological productivity all vary on seasonal and inter-annual scales that make identification of a static two-dimensional designation of a boundary, as is required for EFH, problematic. The project team did not attempt to map these features in the GIS in the same way as for the benthic substrate at this stage. EFH for species and life stages residing in the water column is mapped instead on the basis of latitudinal and depth ranges reported in the literature.

2.2.5 Data Quality

An important component to the modeling of habitat suitability probability is the level of uncertainty in data inputs. While we have observations of habitat features such as the physical substrate and the depth, these are not known with certainty, and depending on how the observations were made the quality of the data will vary. The information available on data quality is described in the following sections.

2.2.5.1 Physical Substrate

The maps of physical substrate have been interpreted and compiled from various types of source data, including existing geologic maps, sediment samples, sidescan sonar imagery, seismic reflection data, and multibeam bathymetry. As with any type of mapping, there is some uncertainty involved in mapping benthic habitats. Each data source has its own strengths and weaknesses, as well as a specific spatial resolution. In general, when more than one source of information is available, or the data source is highly detailed, the interpretation will be of higher quality and accuracy.

A data quality GIS layer was developed to indicate the degree of certainty that the mapped seafloor type represents the "real" seafloor type. For the Washington and Oregon benthic habitat maps, the Active Tectonics and Seafloor Mapping Lab at OSU provided a data quality layer created by developing four separate 100-meter grids for each data type (bathymetry, sidescan sonar, substrate samples, seismic reflection) and ranking the data sources on a scale of 1 to 10. OSU geologists created an overall substrate data quality layer by summing the values from the four individual data quality layers, creating a new layer with values from 1 to 40. Detailed documentation of the Washington/Oregon data quality layer is provided as Appendix 4 to the Risk Assessment. No data quality layer is available for benthic habitat in California.

2.2.5.2 Bathymetry

Bathymetric data quality is affected by the source data's spatial resolution, spatial accuracy, and attribute accuracy and precision. A general data quality layer for bathymetry has been developed by TerraLogic GIS. The boundaries for each bathymetry data source have been delineated and the overall quality of each data source can be ranked on a relative scale. The bathymetry data from Oregon are the highest quality, the data from California are second best quality, the third quality level are the data from Washington (WDFW), while the lowest quality data is from the Naval Oceanographic Office used to fill gaps off Washington and Southern California. Within each data source, there are also variations in data quality. However, other than Oregon, there is not adequate information to delineate these within-source variations. Therefore, the project team used a single quality rank for each source.

Discussion at the Pacific Fishery Management Council's SSC Groundfish Sub-Committee review meeting in February 2004 suggested that the influence of the bathymetry data quality on the outcome of the modeling process would be limited, because of the scale on which depth was being considered in the model generally exceeded the scale of the error in even the worst data areas. At the March 2004 Council meeting, the SSC therefore recommended that work on the bathymetry data quality layer should be suspended. The data quality layer for bathymetry was therefore not included in modeling process.

2.3 Use of Habitat by Groundfish

2.3.1 NMFS Trawl Surveys

Trawl surveys can provide valuable information on fish distribution, and hence provide source data for estimating the suitability of habitat within the area covered by the FMP. Bottom trawl surveys have been conducted on the continental shelf and upper slope off the West Coast (Washington, Oregon, and California) since 1977. These surveys provide the primary source of abundance and trend information for most stock assessments conducted on West Coast groundfish. Three survey series in the study area are described below. A summary comparison of the details of these surveys in 2001 is provided in Table 3.

The shelf survey (30-200 fathoms) by the Alaska Fisheries Science Center (AFSC) uses larger (120 to 130 ft) chartered fishing vessels and has been conducted triennially since 1977. This is commonly known as the triennial shelf survey. The ninth and final survey in the series was conducted in 2001.[1] From 1977 through 1986, the surveys were aimed at estimating rockfish abundance. The five latter surveys from 1989 to 2001 shifted the emphasis more toward better assessments of a broader range of groundfish species. From 1987 to 1992, the depth range of the survey was 55 to 366 m. In 1995, the lower depth was increased to 500 m in order to cover the habitat of slope rockfish more completely. The final 2001 survey encompassed the coastal waters from Point Conception, California, to central Vancouver Island, British Columbia (34° 30' N. latitude–49° 06' N. latitude). A total of 527 stations were occupied, of which 506 were successfully sampled. Catches included over 166 fish species representing more than 57 families (Weinberg, *et al.* 2002).

A second survey series also conducted by AFSC was initiated in 1984. This survey aimed at covering the slope (100-700 fathoms) and was motivated by the need for information on the commercially important species inhabiting that region (Lauth et al. 1998). These species, comprising the "deepwater complex," include Dover sole, sablefish, shortspine thornyhead, and longspine thornyhead. The survey has been conducted annually since 1988 using primarily the 225 ft NOAA Research Vessel Miller Freeman. The spatial coverage of the surveys has varied. In 1997, for the first time, the entire West Coast from Point Conception to the US-Canada border was surveyed.

In 1998 the Northwest Fisheries Science Center (NWFSC), initiated a new bottom trawl survey of the commercial groundfish resources in the slope zone (100–700 fathoms). Conducted in the summer months, this survey uses chartered local West Coast trawlers ranging in size from 60 to 100 ft. In 1998, the survey covered the area from Cape Flattery, Washington (48° 10' N. latitude), to Morro Bay, California (35° N. latitude), between August 20 and October 16. This survey has been conducted annually since 1998. Although the survey aims to sample the slope, in 2001 the design was changed for one year to cover the shelf. The survey in all other years (1998-2000 and 2002) has been a segmented transect design that divides the US Pacific coast into 10-degree equidistant sections north to south and 10 east-west segments based on depth. The area covered in 1998-2000 was 34° 15' N. latitude to 48° 15' N. latitude. In 2002, the area covered expanded at the southern margin to 32° 30' N. latitude (south of Point Conception) and contracted very slightly at the northern margin to 48° 10' N. latitude.

For all these surveys, haul locations are stored both as points indicating the vessel's start position and trawl mid-point, as well as straight lines connecting the vessel's start and end point. The tabular data associated with each haul, such as species code and species weight, are stored in related database tables. The information in these related tables can be queried geographically, or tabular queries can be performed and then the results displayed geographically.

The data from these trawl surveys have been compiled and converted to GIS format. They can be used in geographic overlays with other information, such as fishing effort or habitat, to validate model outputs or assess the relationship between various layers.

[1] The triennial shelf survey years were 1977, 1980, 1983, 1986, 1989, 1992, 1995, 1998, and 2001.

The survey data also can be analyzed to characterize the preferences of species and life stages for different components of the habitat. For example, it is possible to explore the relationships between catch per unit effort (CPUE) and habitat attributes such as latitude and depth.

Table 3. Comparison of the three trawl survey series covering the West Coast of the US. Information provided by NOAA Fisheries.

Item (year=2001)	NWFSC Slope Survey	AFSC Triennial Shelf Survey	AFSC Slope Survey
Vessel type	Chartered West Coast trawler	Chartered Alaska trawler	Fisheries research vessel
Period	1998-ongoing	1977-2001	1984-ongoing
Frequency	Annual	Triennial	Annual since 1988
Survey type and depth	Slope (100-700 fathoms)	Shelf (30-200 fathoms)	Slope (100-700 fathoms)
LOA vessel	68-92 ft	125-128 ft	225 ft
Survey design	Stratified by lat & depth, random by depth & proximity	Stratified by lat & depth, somewhat fixed stations	Stratified by lat & depth, somewhat fixed stations
Yearly use of same survey vessels	Yes in some instances, but not intent of design	Yes, if possible	Yes
Survey time of the year	Summer	Summer	Fall
No. of vessels available for hire	Approx. 40 (have used 9 vessels to date)	At least 100	1
No. of scientists on board	3	6	12
No. of hours vessel worked/day fishing (daytime or round the clock)	14 (daytime only sampling)	14 (daytime only sampling)	24 (round the clock sampling)
Days at sea (2001)	166	130	28
Average no. of tows/day (2001)	2.01	3.89	7.43
Number of attempted tows (exclude experimental)	408	539	216
Number of valid tows*	334	506	208
Net mensuration	Yes	Yes	Yes
All fish species identified	Yes	Yes	Yes
Invertebrate species ID	No, only crab identified	Yes, all invert spp.	Yes, all invert spp.
No. of different length spp.	4 primary, 15 total	28 primary, 77 total	9 primary and total
Average no. of lengths collected/tow	196	510	545
Average no. otoliths collect/haul/vessel	18	15	40
Commercial fish retained?	Yes	No	No
Targeted tow duration	15 mins	30 mins	30 mins
Average lift off-lag time (minutes)	4.5	0.4	"almost immediately"
Range of lift off-lag times	1-20 minutes	0-2 minutes	NA
Average no. of weather days	0.5	0.75	0

* Difference in number of valid tows is highly correlated to whether tow location is fixed or random from year to year.

2.3.2 Ichthyoplankton Surveys

This section describes surveys that could provide some information on the distribution of planktonic phases of groundfish species. Data from these surveys have not been used in the EFH model. They do not provide comprehensive coastwide coverage. Where possible, fish habitat in the water column has been

described using information on the latitude and depth ranges of the species and life stages in question (see Section 3.4.2.1).

2.3.2.1 CalCOFI Ichthyoplankton Surveys

The California Cooperative Oceanic Fisheries Investigations (CalCOFI) unit has conducted standardized ichthyoplankton surveys, primarily offshore of California and Baja California, since 1951. Survey methods and results are described by Moser, *et al*. (1993). GIS maps of egg and larval distributions of managed species have been developed from data collected during these surveys (NMFS 1998).

2.3.2.2 NMFS Icthyoplankton Surveys

Research surveys extending from the Strait of Juan de Fuca to northern California and offshore to the boundary of the EEZ were conducted periodically during the 1980s. They were intended to complement the egg and larval data obtained from the CalCOFI ichthyoplankton surveys. NMFS conducted these surveys cooperatively with the Soviet Pacific Research Institute. Survey methods and their results are described by Doyle (1992). Data on egg and larval distribution were used to develop the GIS maps of NMFS ichthyoplankton survey results in the 1998 EFH Appendix.

2.3.3 NOAA Atlas

In the late 1980s, NOAA compiled information about several commercially-valuable groundfish species on the West Coast. This information was synthesized into a hand-drawn map atlas format showing the species' distribution for various life stages (NOAA 1990). The source data for these maps included NMFS' RACEBASE, commercial and recreational catch statistics, state or regional agency data, and expert review. The scale of these maps is generally 1:10,000,000. In the 1990s these atlas maps were converted to GIS format. This conversion included clipping the species polygons with a 1:2,000,000 land polygon. The 13 groundfish species and life stages that are available in GIS format are listed in Table 4.

Table 4. Groundfish distributions mapped in the NOAA Atlas (1990).

	Life History Stage							
NAME	adult	juvenile	mating	old juvenile	young juvenile	spawning	release of young	range
arrowtooth flounder (*Atheresthes stomias)*	x	x						
Dover sole (*Microstomus pacificus)*	x	x				x		
English sole (*Parophrys vetulus (=Pleuronectes vetulus)*)	x			x	x	x		
flathead sole (*Hippoglossoides elassodon*)	x	x				x		
lingcod (*Ophiodon elongates*)	x	x				x		x
Pacific cod (*Gadus macrocephalus*)	x			x	x	x		
Pacific hake (*Merluccius productus*)	x				x	x		
Pacific ocean perch *(Sebastes alutus*)	x		x	x			x	
petrale sole (*Eopsetta jordani*)	x			x	x	x		
sablefish (*Anoplopoma fimbria*)	x	x				x		
spiny dogfish (*Squalus acanthias*)	x		x	x	x			
starry flounder (*Platichthys stellatus*)	x			x	x	x		
widow rockfish (*Sebastes entomelas*)	x	x	x				x	

2.3.4 Fish/habitat Functional Relationships

Using habitat distribution information to identify EFH requires some knowledge of the functional relationships between the species of interest (in this case the Pacific Coast Groundfish Fishery Management Unit) and the habitats they use. This section describes the information available to describe these relationships.

2.3.4.1 The Updated Life Histories Descriptions

In 1998, A Life Histories Appendix to Amendment 11 to the Pacific Coast Groundfish FMP described the life histories and EFH designations for 83 of the individual species that the FMP manages. The primary sources of information for the life history descriptions and habitat associations were published reports and gray literature. GIS maps of species and life stage distributions generated were included.

The Life Histories Appendix was intended to be a living document that could be changed as new information on particular fish species became available, without using the cumbersome FMP amendment process. The EFH regulations state that the Councils and NMFS should periodically review and revise the EFH components of FMPs at least once every five years. In response to this requirement for periodic review, the life history descriptions were recently updated and included in Groundfish FMP Appendix B. The update was compiled by conducting literature searches using the *Cambridge Scientific Abstracts Internet Database Service* and by reviewing recently completed summary documents, such as the California Department of Fish and Game's Nearshore Fishery Management, the Oregon Department of Fish and Wildlife's Nearshore Fisheries Management Plan, and *The Rockfishes of the Northeast Pacific* by Love *et al*. (2002).

The life history descriptions included in Groundfish FMP Appendix B provide an extensive and detailed reference on species/life stage and habitat interactions. However, detailed bathymetry information for all species' life stages is incomplete at present. Furthermore, the information on substrate is somewhat patchy, and the classification of substrates and habitats is inconsistent across species. Some of these problems are unavoidable. For example, although most groundfish species are demersal, some life stages (for example, eggs and larvae) are sometimes pelagic. It is therefore difficult in some instances to associate these life stages with a particular habitat.

2.3.4.2 The Habitat Use Database (HUD)

The life history descriptions also provide a valuable compilation of information on the habitat preferences of all the species and life stages in the Pacific Coast Groundfish FMP to the extent known. However, the text format in which the information is presented does not lend itself well to analysis of habitat use across many habitat types or many species and life stages.

A Pacific Coast Groundfish Habitat Use Relational Database was therefore developed to provide a flexible, logical structure within which information on the uses of habitats by species and life stages could be stored, summarized, and analyzed. The database is designed primarily to capture the important pieces of information on habitat use by species in the Pacific Groundfish FMP as contained in the life history descriptions compiled by NMFS (see Section 2.2.2.1). Some of this information needs to be captured in a database format so that habitat use data can be analyzed both by species and habitat to provide input into various components of the analysis of EFH, habitat areas of particular concern (HAPCs), and fishing impacts (See Appendix 6 to the Risk Assessment- Manual of the Habitat Use Database).

3.0 DESCRIBING AND IDENTIFYING EFH

3.1 Guidance from the EFH Final Rule

The Magnuson-Stevens Act (MSA) defined EFH to mean "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (MSA § 3(10)). This defines EFH, but does not specify how to distinguish among various parts of a species' range to determine the portion of the range that is essential. The EFH Final Rule (50 CFR Part 600) elaborates that the words "essential" and "necessary" mean EFH should be sufficient to "support a population adequate to maintain a sustainable fishery and the managed species' contributions to a healthy ecosystem."

The EFH Final Rule provides regulations and guidance on the implementation of the EFH provisions of the MSA. It includes guidance on the types of information that can be used for describing and identifying EFH.

3.1.1 EFH Description for the Fishery

According to the MSA, EFH must be described and identified for the fishery as a whole (16 U.S.C. §1853(a)(7)). The EFH Final Rule clarifies that every FMP must describe and identify EFH for each life stage of each managed species. As further clarification, NOAA General Counsel has stated that "Fishery" as used in the MSA in reference to EFH refers to the fishery management unit (FMU) of an FMP. Therefore, a single EFH designation for Pacific Coast Groundfish EFH must aggregate individual species/life stages EFH identifications. In the groundfish FMP a single map is used to describe and identify EFH for the fishery. However, the analysis that produces that map will include the preparation of maps of EFH for as many species and life stages as possible.

Designation of EFH for a fishery is therefore achieved through an accounting of the habitat requirements for all life stages of all species in the FMU. Prior to designating EFH for a fishery, the information about that fishery needs to be organized by individual species and life stages. If data gaps exist for certain life stages or species, the EFH Final Rule suggests that inferences regarding habitat use be made, if possible, through appropriate means. For example, such inferences could be made on the basis of information regarding habitat use by a similar species or another life stage (50 CFR Pt. 600.815(a)(iii)). All efforts must be made to consider each species and life stage in describing and identifying EFH for the fishery and to fill in existing data gaps using inferences prior to determining that the EFH for the fishery does not include the species or life stage in question.

While identification of EFH is carried out at the fishery (FMP) level, the determination of whether an area should be EFH depends on habitat requirements at the level of individual species and life stages. Potentially, only one species/life stage in the FMU may be required to describe and identify an area as EFH for the FMP. Many areas of habitat, however, are likely to be designated for more than one species and life stage. The composite habitat requirements for all the species in the Pacific Coast Groundfish FMP are likely to result in large areas of habitat being described and identified as EFH, due to the overlay of multiple species habitat needs. Descriptions of groundfish fishery EFH for 82 of the species in the groundfish FMP and their life stages resulted in over 400 EFH identifications in the 1998 EFH Amendment. When these individual identifications were taken together, EFH for the groundfish FMP included all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California seaward to the boundary of the U.S. Exclusive Economic Zone.

The identification of substantial portions, if not all of the EEZ, as EFH has been seen as a weakness in the EFH mandate, because if "everything" is EFH then the designation process apparently fails to focus conservation efforts on habitats that are truly "essential". However, this conclusion does not take into consideration that the distinction between all habitats occupied by a species and those that can be considered "essential" is made at the species and life stage level. The designation of EFH at the FMP level delineates a static two dimensional boundary for consultation purposes. A consultation process will be triggered when an agency plans to undertake an activity that potentially impacts habitat within the boundary of the area designated as EFH. The resulting consultations will consider how the proposed action potentially impacts EFH. The detailed characteristics of the habitat in the relevant location will be an important part of this analysis. In this context, it is possible to envision that an area of EFH that has been designated as such for a particularly large number of species and life stages, or is particularly rare, or stressed, or vulnerable might be of particular concern. In recognition of this, the Final Rule encourages regional Fishery Management Councils to identify HAPC within areas designated as EFH (600.815(a)(8)).

The process of distinguishing between all habitats occupied by managed species and their EFH requires one to identify some difference between one area of habitat and another. In essence, there needs to be a characterization of habitats and their use by managed species that contains sufficient contrast to enable distinctions to be drawn, based on available information. This needs to be a data-driven exercise, and the methodology we have developed aims to use all available data with which to make such a determination.

In this context, the project team noted that if a species is overfished and habitat loss or degradation may be contributing to the species being identified as overfished, all habitats currently used by the species may be considered essential. However, fish stocks depleted by overfishing, or by other factors, are likely to use less of the available habitat than a virgin stock or a stock at "optimum" biomass would use. Indeed, other species may have expanded their range to fill some of these ecological niches. Certain historic habitats that are necessary to support rebuilding the fishery and for which restoration is technologically and economically feasible may also be considered as essential. Once the fishery is no longer considered overfished, the EFH identification should be reviewed and amended, if appropriate (EFH Final Rule CFR 600.815(a)(1)(iv)(C)).

3.1.2 Levels of Information for Identifying EFH

The EFH Final Rule explains that the information necessary to describe and identify EFH should be organized at four levels of detail, Level 4 being the highest and Level 1 the lowest detail:

Level 4 — Production rates by habitat are available.
Overall production rates can be calculated from growth, reproduction, and survival rates. However, using this information to describe and identify EFH requires not only that production rates have been calculated, but also that they have been calculated for different patches of habitat that can then be distinguished from each other. According to the EFH Final Rule, at this level, data are available that directly relate the production rates of a species or life stage to habitat type, quantity, quality, and location. Essential habitats are those necessary to maintain fish production consistent with a sustainable fishery and the managed species' contribution to a healthy ecosystem.

Level 3 — Growth, reproduction, or survival rates within habitats are available.
Similar to information on overall production rates, it can be used to describe and identify EFH. Growth, reproduction, and survival rates would need to have been calculated for different patches of habitat that can then be distinguished from each other. According to the EFH Final Rule, at this level, data are available on habitat-related growth,

reproduction, and/or survival by life stage. The habitats contributing the most to productivity should be those that support the highest growth, reproduction, and survival of the species (or life stage).

Level 2 — Habitat-related densities of the species are available.
Relative density information may be available from surveys, or it could perhaps be inferred from catch per unit effort data, although only for those areas that have been fished. According to the EFH Final Rule, at this level, quantitative data (i.e., density or relative abundance) are available for the habitats occupied by a species or life stage. Because the efficiency of sampling methods is often affected by habitat characteristics, strict quality assurance criteria should be used to ensure that density estimates are comparable among methods and habitats. Density data should reflect habitat utilization, and the degree that a habitat is utilized is assumed to be indicative of habitat value. When assessing habitat value on the basis of fish densities in this manner, temporal changes in habitat availability and utilization should be considered.

Level 1 — Distribution data are available for some or all portions of the geographic range of the species.
Distribution information is available from surveys, catch/effort data, and evidence in the biological literature, including ecological inferences (e.g., a habitat suitability index, HSI). According to the EFH Final Rule, distribution data may be derived from systematic presence/absence sampling and/or may include information on species and life stages collected opportunistically. In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred on the basis of distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.

3.2 Habitat Characteristics of Importance for Fish

Habitat characteristics comprise a variety of attributes and scales, including physical (geological), biological, and chemical parameters, location, and time. It is the interactions between environmental variables that make up habitat that determine a species' biological niche. These variables include both physical variables—such as depth, substrate, temperature range, salinity, dissolved oxygen—and biological variables—such as the presence of competitors, predators, or facilitators.

Species distributions are affected by characteristics of habitats that include obvious structure or substrate (e.g., reefs, marshes, or kelp beds) and other structures that are less distinct (e.g., turbidity zones, thermoclines, or fronts separating water masses). Fish habitat utilized by a species can change with life history stage, abundance of the species, competition from other species, environmental variability in time and space, and human induced changes. Occupation and use of habitats by fish may change on a wide range of temporal scales; seasonally, inter-annually, inter-decadal (e.g., regime changes), or longer. Habitat not currently used but potentially used in the future should be considered when establishing long-term goals for EFH and species productivity.

Fish species rely on habitat characteristics to support primary ecological functions comprising spawning, breeding, feeding, and growth to maturity. Important secondary functions that may form part of one or more of these primary functions include migration and shelter. Most habitats provide only a subset of these functions. The type of habitat available, its attributes, and its functions are important to species productivity and the maintenance of healthy ecosystems.

In developing a process for identifying EFH the project team built a model that expresses the probability that a particular location contains suitable habitat for species in the groundfish FMP, based on our knowledge of the habitat conditions at that location and of the habitat preferences of those species. As recognized in the EFH Final Rule, the only true measure of habitat suitability is obtained through measurement of demographic parameters (production, mortality, growth, and reproductive rates—Levels 4 and 3 described above). For example, EFH could be defined as areas with above-average survival, growth, or recruitment (which for ease of exposition we will refer to as areas of high growth potential). However, data on these parameters across a range of habitats are extremely difficult to obtain. Fish population density, or even presence/absence in data-poor situations (Levels 2 and 1 respectively), are often used as a proxy for growth potential. However, growth potential and density are not necessarily well correlated. For example, in source-sink systems, source populations may have lower densities than sink populations (because they are exporting propagules), even though they are the basis for the overall population's growth potential (Lundberg and Jonzen 1999a; Lundberg and Jonzen 1999b).

In a spatially heterogeneous system, in which source-sink dynamics are likely to be occurring, EFH should be protecting source areas, and not inadvertently protecting sink areas. There is a risk that this can occur if population density is used as a proxy for growth potential. The risk is further exacerbated under harvesting pressure, if source populations are being more heavily fished than sink areas (Tuck and Possingham 1994). Similarly, in a heavily perturbed system, in which external factors such as pollution may be distorting the natural spatial patterns of growth potential, current population density may be a poor proxy for EFH under protected conditions. The question then is whether EFH or HAPC designations should be acting to protect areas that would have high growth potential if protected, or whether they should be protecting areas that currently have higher growth potential regardless of their intrinsic value as EFH. By using data on presence/absence or population density that are collected in a perturbed system under current conditions, the project team attempted the latter, but without a clear understanding of the relationship between density and growth potential.

The EFH Final Rule requires using the highest level of information (production rates) first if it is available, followed by the second highest level (growth, reproduction, or survival rates) and so on. Information at Levels 2 through 4, if available, should be used to identify EFH as the habitats supporting the highest relative abundance; growth, reproduction, or survival rates; and/or production rates within the geographic range of a species. The guidelines also call for applying this information in a risk-averse fashion to ensure adequate areas are protected as EFH. The most complete information available should be used to determine EFH for the FMP, accounting for all species and their life stages that it contains. If higher level information is available for only a portion of the species/life stage range, then it should be used for at least that portion. A decision also needs to be made regarding if and how the information could be used to extrapolate to the rest of the range. Information at lower levels should be used only where higher-level information is unavailable and cannot be validly extrapolated.

There is an implicit link between the level of information available for species and life stages and the extent of EFH that is likely to be designated for that species/life stage. Figure 1 illustrates the expectation that on a relative scale. If information is available at level 4, it is easier to identify a smaller portion of the overall range of a species as EFH, than if we are relying on less precise or proxy information at lower levels. For example, an identification of EFH based on areas where production rates are highest is likely to result in a smaller area than one based on basic distribution data, because production rates are unlikely to be at their highest level throughout the species range. Rather, they will be highest where habitat conditions are optimal for the species and life stage in question.

Figure 1 is, however, an oversimplification. It is not always the case, for example, that the EFH identified based on the higher level of information will be entirely within the area identified based on the lower

level. As indicated above in the discussion of source-sink dynamics, EFH identified on the basis of areas of highest density (Level 2) might not necessarily encompass the areas of highest productivity for some life stages. It does demonstrate, however, that if we are relying on information at lower levels, it is important to use that information in such a way that it does provide sufficient contrast to offer a range of alternatives for identifying as EFH those that are believed to be the most important parts of the range of each species and life stage in the FMP. Although identifying a large area as EFH would seem to be the most risk averse approach, it is not sufficient to do this without adequate justification. As mentioned previously, the EFH Final Rule (600.815(a)(1)(iv)(A)) requires that FMPs explain how EFH for a species is distinguished from all habitats potentially used by that species, in order to improve understanding of the basis for the designations.

If only Level 1 information is available, distribution data should be evaluated (e.g., using a frequency of occurrence or other appropriate analysis) to identify EFH as those habitat areas most commonly used by the species. FMPs should explain the analyses conducted to distinguish EFH from all habitats potentially used by a species. Such analyses should be based on geo-referenced data that show some areas as more important than other areas, to justify distinguishing habitat and to allow for mapping. The data must at least show differences in habitat use or in habitat quality that can be linked to habitat use.

If no information for a species/life stage is available at the lowest level (distribution) and it is not possible to infer distribution from other species or life stages, then EFH cannot be identified for that species designated (600.815(a)(1)(iii)(B)).

3.3 Available Information for Identifying EFH

There are two main categories of available information to describe and identify EFH:

- Empirical geo-referenced data on species distributions, densities, and/or productivity rates derived from analyses of surveys and commercial catches. These data are essentially independent of the underlying habitat.

- Information about associations and functional relationships between species/life stages and habitat that can be used to make inferences about species distributions, density and/or productivity rates, based on the distribution of habitat.

Information at all four levels of detail described in the EFH Final Rule may exist in both of these categories. Examples of such are provided in Table 5. Only the shaded cells of Table 5 contain information that is currently available for identifying EFH under the Groundfish FMP. Virtually no information exists at Levels 3 and 4 and none of the information that does exist at these levels could be used to distinguish between different areas of habitat with sufficient contrast to indicate that one should be identified as EFH and another should not.

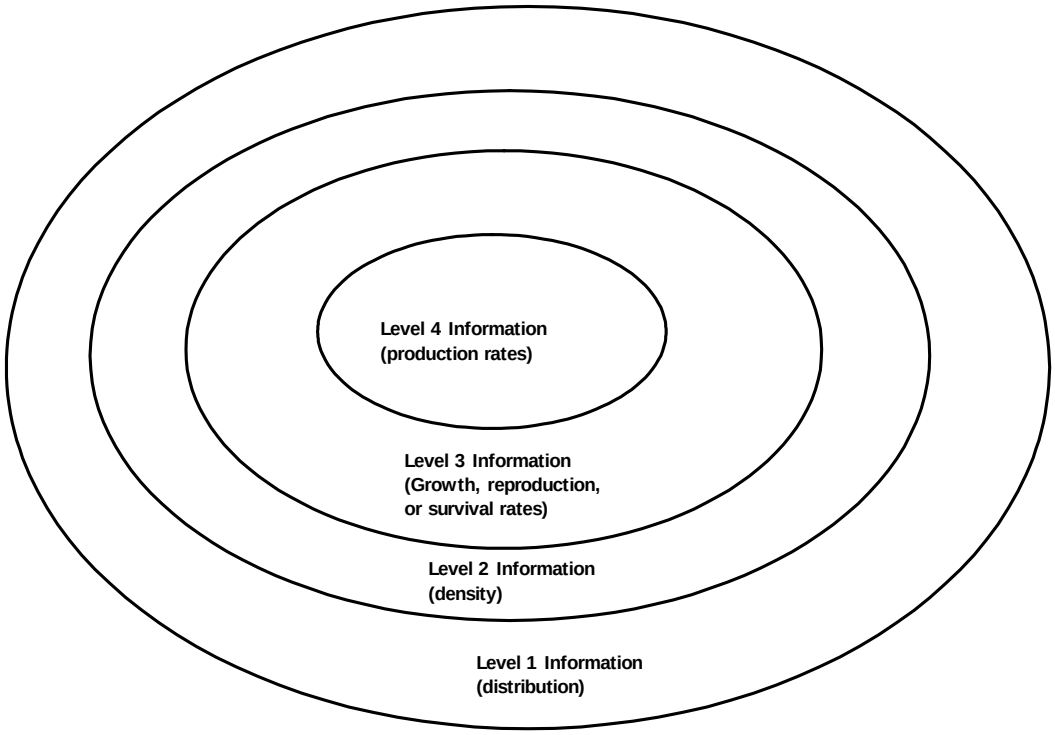

Figure 1. Diagrammatic representation of the effect of levels of information and the relative extent of the area of EFH likely to be identified for an individual species/life stage (not to scale).

Table 5. Types of information that could be used at the four levels of detail described in the EFH Final Rule (only the shaded cells contain information that is currently available for identifying EFH).

	Empirical Geo-referenced Information	Species-Habitat Relationship Modeling
Level 4: production rates by habitat	*In situ* physiological experiments and mortality experiments	Life history-based meta-population models
Level 3: growth, reproduction, or survival rates within habitats	Tagging data (growth); Fecundity data by area	Spatially discreet stock/recruitment relationships; Bio-energetics models
Level 2: habitat-related densities of the species	Survey/fishery related CPUE as proxy for density	Spatial modeling of habitat suitability probability, based on cpue (proxy for density)
Level 1: distribution data	Trawl survey data and the NOAA Atlas (Sections 2.2.1 and 2.2.2)	Habitat-species associations (Section 2.2.3); Spatial modeling of habitat suitability probability, based on presence/absence

3.4 The EFH Model

3.4.1 Introduction

Robust methods need to be devised for identifying EFH in a climate of uncertainty. In this study, the project team developed a modeling approach (called the EFH Model) for assessing the likely importance of habitats for each species and life stage in the FMP, to the extent that data are available to do so. This is done by evaluating the probability that particular habitats are suitable for particular species and life stages, based on available data sources; the NMFS groundfish surveys (Section 2.3.4.2) for as many species and life stages as possible, and information on habitat associations from the habitat use database (Section 2.3.4.2) for other species and life stages. The model provides a scientific method for assessing Pacific Coast groundfish habitat and identifying EFH.

A Bayesian Belief Network (BBN), a particular type of network model, was chosen as a suitable analytical tool for developing the EFH Model.

The EFH model takes information about the preferences of species/life stages for certain habitat conditions, and uses this to plot habitat suitability probabilities across the habitat parcels mapped in the GIS. Three habitat attributes or parameters are used to describe habitat conditions: depth, latitude, and benthic substrate (from the GIS). Taken together, these three parameters are considered to provide a reasonable basis for predicting the HSP for all species and life stages in the groundfish FMP.

Of the various types of data that can be used for identifying EFH, the approach adopted in the EFH Model falls under the heading of spatial modeling of HSP (Levels 1 and 2 under species-habitat relationship modeling in Table 5). The model has been designed to take advantage of the GIS data and available information on species distribution and habitat preferences. It was recognized at the outset that this assessment was occurring in a data-poor environment and therefore output had to be expressed in terms of probabilities rather than absolute numbers.

3.4.2 Calculating HSP

The EFH Model requires suitability indices for depth, latitude, and habitat type, taking into account any interactions that might exist between them (for example, a species' preferred depth range may vary with latitude).

HSP is a measure of the likelihood that a habitat with given characteristics is suitable for a given fish species/life stage or species/lifestage assemblage. It represents the quantitative link between habitat characteristics (habitat type, depth, and latitude) and the probability of occurrence of species in the FMP.

The overall HSP is calculated from separate probabilities for each habitat characteristic, which can be derived from various sources. To date, most approaches have been based on linear regression modeling of abundance data (Brown, *et al.* 2000; Christensen, *et al.* 1997; Clark, *et al.* 1999; Rubec, *et al.* 1999; Rubec, *et al.* 1998). However, the association between fish abundance and quantitative habitat characteristics is typically non-linear, and possibly quite complex.

National Ocean Service (NOS) scientists have developed draft habitat suitability models for 18 fishes and one invertebrate for the biogeographic assessment of the three central California marine sanctuaries. Bathymetry (meters) and bottom substrate were used as the habitat parameters to examine habitat quality for benthic species. Mean sea surface temperature and bathymetry were used to model pelagic species. At the February 2004 meeting of the Ad Hoc Groundfish Habitat Technical Review Committee (GHTRC), the possibility of using the NOS HSI data directly in the BBN model was discussed. Although these data do provide a useful guide for the BBN model, substantial additional work has been needed to develop a complete model of EFH for the FMP. The NOS HSI data cover only a few of the species in the FMP and the study was for a limited geographic area, and hence does not include the effect of latitude. Some concerns have also been expressed regarding the methodology used in the NOS model. The models of the relationships between abundance and habitat characteristics are somewhat rudimentary (e.g., a polynomial regression curve fit of mean log abundance [survey data] by categorical bathymetric class) and not always well represented by the data. Also, the combined HSI values are calculated using the geometric mean, which gives potentially unintended results when one of the individual indices is very low.

In recent years, there has been increasing interest in generalized additive models (GAMs) (Hastie and Tibshirani 1990) which have been particularly useful in modeling fish abundance and related parameters (Augustin, *et al.* 1998; Borchers, *et al.* 1997a; Borchers, *et al.* 1997b; Swartzman, *et al.* 1992). The basic idea of a GAM is to fit a regression model in which the explanatory variables are modeled by smooth curves; the fitting algorithm actually estimates the functional form (shape) of these curves.

The NMFS surveys provide a valuable source of data on the occurrence and density (measured as catch per area swept by the net) of fish at sampled locations (stations). The survey data routinely record depth and latitude at sampling stations, but not substrate. Hence they cannot be used directly to describe the effect of all three habitat characteristics of interest in the BBN model. A way around this problem would be to use the GIS to overlay the survey stations on the bottom substrate layer and thereby allocate a substrate type to each sample station. This would enable substrate type to be used as a third explanatory variable alongside latitude and depth in a GAM. However, there are several potential problems with this approach that would take some time to resolve. Some of these problems are:

- individual tows cover an area large enough to have a variety of different substrate characteristics;
- the survey records the location of the vessel, not the trawl, and the variability in towing conditions makes it very difficult to estimate the actual position of the net on the bottom; and

- the location of sampling stations is not random with respect to substrate because the trawl cannot operate over some substrates (e.g., rocky terrains).

It was therefore decided to use the survey data to develop a model incorporating depth and latitude only and to add in the effect of substrate separately within the network model, based on information recorded in the habitat use database, and other expert opinion (see below). The basic relationships in the EFH Model are shown, in a slightly simplified form, in Figure 2.

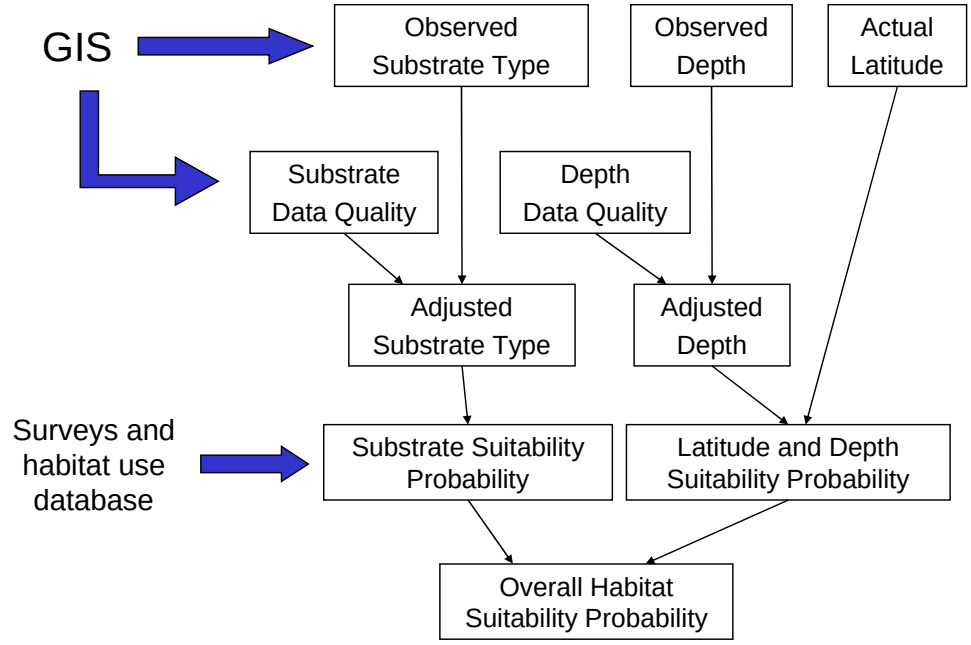

Figure 2. Simplified relationships in the BBN model to identify EFH.

3.4.2.1 Depth and Latitude

NMFS Survey Data

An extensive exploratory data analysis was undertaken to investigate the best approach to analyzing the NMFS survey data for the purpose of identifying EFH through the BBN model. Initial runs involved using GAMs to model the effects of depth and latitude on relative abundance (CPUE)[2]; however, a number of problems were encountered. The first few species analyzed revealed a problem with over dispersion in the CPUE data, which are often characterized by a large number of zero values and a very few large values. As described in Section 3.1.2, population density may in fact be a poor proxy for growth potential. Rather than pursue the analysis of the CPUE data, it was therefore decided to model the effects of habitat on the presence/absence of fish species in the FMP. In addition to avoiding the problems of over-dispersion in CPUE data that were present for some species, this approach was preferred because fitted values are directly interpretable as probabilities that the habitat is suitable for the fish (based on the likelihood that the fish are present), and hence directly applicable to the identification of EFH.

[2] There was also an expectation that there would be an interaction between the effects of depth and latitude, which was also investigated.

Following discussion with the Council's SSC, it was noted that GAMs and generalized linear models (GLMs) that can accommodate zero catches have been commonly used to obtain indices of abundance using West Coast trawl survey data for stock assessment. There are limitations in using presence/absence information to infer the locations of EFH habit. For example, a species may have a broad depth or geographic distribution, but may only reach high densities in a limited area. The project team agreed, but had previously concluded that the use of presence-absence from a large number of surveys would provide the most robust result at this stage, even though technically it means that the model essentially discarded Level 2 data in favor of Level 1 data. While noting also that the analysis of depth and latitude ranges is only part of the input into the EFH model (it uses information on substrate preference also), EFH designations resulting from this analysis can be considered to be reasonable approximations that will need to be refined as additional information becomes available and more sophisticated analyses become possible.[3]

Preliminary results using GLMs to model presence/absence resulted in an over-smoothing of the data, giving insufficient contrast in the probability profiles. It was therefore decided to use GAMs rather than GLMs due to the GAMs greater smoothing flexibility. A GAM incorporating a cubic smoother with six degrees of freedom was found to smooth the data most adequately.[4]

The response was modeled as a Binomial variable (0 = non-present and 1 = present) and the data were fitted by a GAM with a logit link function (See Appendix 18 for details of the development of the modeling approach):

$$P_{(\mathrm{Pr}esent))} = \begin{cases} 0 & ;\text{no fish are present in haul} \\ 1 & ;\text{one or more fish are present in haul} \end{cases}$$

In addition to describing the exploratory data analyses, Appendix 18 to the original Risk Assessment description (MRAG Americas Inc., *et al.* 2004, from which this document is adapted) provides a report on the GAM analysis conducted for the 20 species that were completely covered by the survey data A further 40 species required additional expert opinion to complete their profiles, because the surveys did not sample in the 0-30 meters depth range. Spreadsheets for these species were developed and sent out to experts requesting them to provide data independently for the 0-50 meters depth interval. The columns for 40 and 30 meters were compared to the output from the model and the data in the 20, 10, and 0 columns were incorporated in the partially completed profiles. In the time available, this procedure was completed for a further 16 species, thereby increasing the number of completed habitat suitability profiles for adults from 20 to 36.

[3] We also note that the NMFS survey data were used for only a minority of the species and life stages mapped.

[4] These decisions regarding the modeling approach were taken by MRAG Americas in consultation with NMFS following discussions at the August 4 meeting of the TRC and subsequent discussions between MRAG Americas and NMFS.

An example of one of the spread sheets filled out by an expert, is shown below. The grayed area is that filled out by the expert.

Depth in 10 m intervals

Latitude (degrees)	**70**	**60**	**50**	**40**	**30**	**20**	**10**	**0**	
49	0.96023	0.97329	0.98212	0.98	0.98	0.7	0.3	0.1	Washington
48	0.95263	0.9681	0.97861	0.98	0.98	0.7	0.3	0.1	Washington
…	…	…	…	…	…	…	…	…	…
34	0.94459	0.96258	0.97486	0.75	0.5	0.2	0.1	0.1	So.Calif. Bight
32-33	0.75	0.75	0.5	0.5	0.2	0.2	0.1	0.1	So.Calif. Bight

The other 24 species for which only a small portion of the profile was missing could not be completed, because the experts could not provide the necessary information in the time available.

An example of the modeling output (HSP) for depth and latitude is provided in Figure 3. In all cases, the interaction terms between these two explanatory variables proved to be statistically non-significant. This analysis therefore provides values of HSP given depth and latitude. The addition of the effect of physical substrate and biogenic habitat to the model is described in the next section.

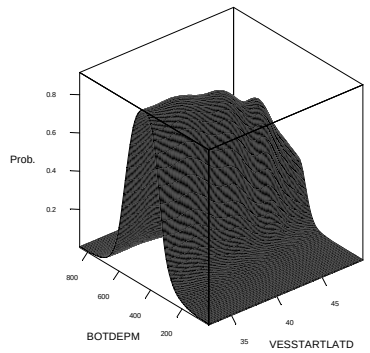

Figure 3. HSP for aurora rockfish.

Habitat Use Database (HUD)

The habitat preferences of the 82 species are broken down by four life stages: eggs, larvae, juveniles, and adults and the identification of EFH needs to account for all of these stages to the extent possible. This makes a theoretical total of 328 possible HSP profiles (82 x 4).

As described in the previous section, out of these 328 possible profiles it was only possible to produce 36 complete profiles from the NMFS trawl survey data (including those completed with additional expert opinion).[5]

[5] Note that the 36 profiles from the survey data were considered to be indicative of the HSP for only the adult life stages of the 36 species covered, because of the type of sampling gear used on the surveys. Size

The Habitat Use Database (HUD) contains absolute and preferred depth and latitude values for the four life stages of most of the species in the FMP. No data are recorded in the HUD for a total of 74 of the 328 possible species/life stage combinations. Of the 74 combinations, 56 are eggs and 17 are larvae. A further 94 combinations (mainly larvae and juveniles) have so little data in the HUD that it is not possible to develop profiles. This leaves 124 combinations for which profiles could be developed from the HUD. We therefore developed a method to convert the information on depth and latitude preferences in the HUD into HSP profiles that could be used in the EFH model.

There are up to 4 different values recorded for depth and latitude in the HUD. These are:

AbsMinDepth	Absolute minimum depth
PrefMinDepth	Preferred minimum depth
PrefMaxDepth	Preferred maximum depth
AbsMaxDepth	Absolute maximum depth

AbsMinLat	Absolute minimum latitude
PrefMinLat	Preferred minimum latitude
PrefMaxLat	Preferred maximum latitude
AbsMaxLat	Absolute maximum latitude

Assuming that the habitat will be most suitable somewhere between the preferred minimum and preferred maximum values, a fifth value, termed the optimum, was created for both depth and latitude.

For simplicity, the discussion below will examine the depth observations since the same principle will be applied to the latitude observations. The case with Pacific ocean perch (adults) is used to illustrate the approach, because it is a species for which we have both the survey data results and a full complement of data in the HUD. The optimum value in

Table 6 is calculated as:

$$Optimum_{depth} = \frac{\text{PrefMinDepth} + \text{PrefMaxDepth}}{2}$$

This results in a mean value between PrefMinDepth and PrefMaxDepth. An index value, which is a proxy for the habitat suitability probability calculated from the survey data, is then assigned to each of the five depth points. This has the value of 0.0 at AbsMinDepth and AbsMaxDepth. The optimum is given the value of 1 (the maximum possible value). It then remains to assign index values for the PrefMinDepth and PrefMaxDepth. Following discussions with the SSC's Groundfish Sub-Committee, it was decided to calculate these values from the 36 profiles completed from the survey data. We have the actual habitat suitability probability values at the PrefMinDepth and PrefMaxDepth for these species. We took the averages of these values and used those for the HUD species. These values were 0.19 at PrefMinDepth and 0.236 at PrefMaxDepth.

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composition data are available for many groundfish from the surveys and these could be used to distinguish juveniles from adults in the survey hauls, however, such a detailed analysis was outside the scope of the current study and the size composition data were not used.

Table 6. Observed values from the HUD and their assigned HSP index values for Pacific ocean perch adults.

	Abs Min Depth	Pref Min Depth	Optimum	Pref Max Depth	Abs Max Depth
Value in HUD	25	100	275	450	825
HSP index value	0.0	0.19	1	0.236	0.0

The five points (depth, HSP index) are plotted in Figure 4 with four lines drawn between them (the line labeled Habitat). Data points are extracted from these four lines and fed to a GAM that smoothes the data (the line labeled "Smooth"). The line labeled Survey in Figure 4 is the profile that was produced from the GAM analysis of the survey data and is included in the plot to compare with the results obtained from the HUD data. The depth profile in (Smooth) is then extrapolated over latitude 32° to 49° and the result is shown in Figure 5.

The same procedure is performed for the latitude data and the two profiles are then multiplied together and scaled up so the maximum HSP index value yields 1.

$$HUD_{index} = Depth_{index} \cdot Latitude_{index}$$

Note: these are not probabilities, but rather index values that are scaled up to 1 to be comparable to the probability profiles produced from the NMFS survey data. The final index profile is shown in Figure 6.

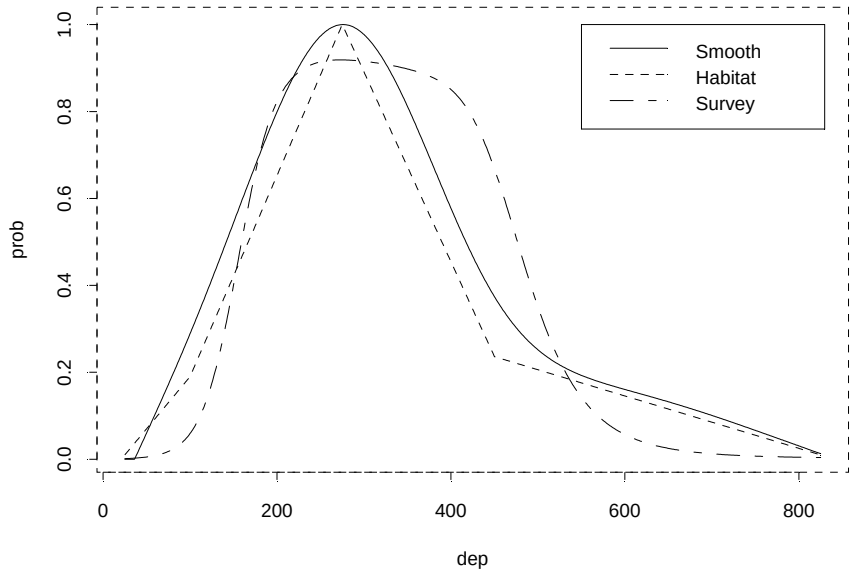

Figure 4. Comparison of probability profiles for depth based on the survey data and the HUD (smoothed and unsmoothed).

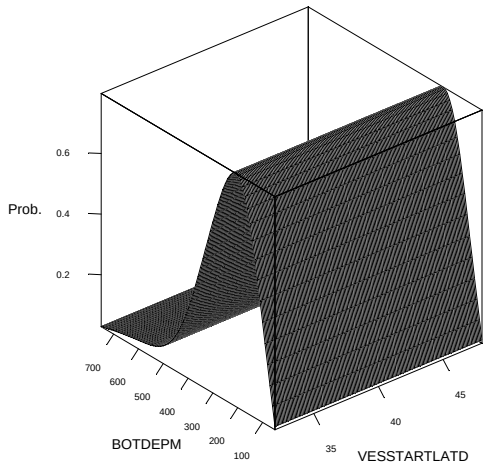

Figure 5. HUD depth profile extrapolated over the latitude interval 32-49 degrees.

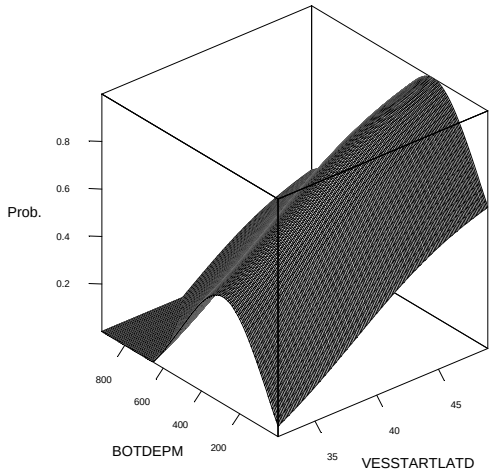

Figure 6. Index profile for adult Pacific ocean perch, based on the observations in the HUD.

Table 7 shows a summary of the outcome of the modeling of depth and latitude profiles for species and life stages in the Groundfish FMP. Of the species/life stage combinations that have latitude/depth probability profiles there are three categories. The Survey category indicates that the profile was derived solely on the basis of survey data. The Survey+ category is for species/life stages that needed expert opinion to complete their profiles but were otherwise completed using survey data. The HUD category signifies those species that could not be modeled using survey data, and had profiles developed on the basis of the information in the HUD. The distinction between these categories has important implications for the interpretation of the results and their use in identifying EFH. In particular, the depth/latitude habitat suitability profiles derived from survey data can be regarded as true probabilities, but those interpreted from the HUD data represent relative indices only. We note, however, that the calculation of the final Habitat Suitability Probabilities (HSP) includes information on substrate preferences interpreted from the HUD, and therefore it is debatable whether any of the HSPs produced can be regarded as true probabilities. This is discussed further in Section 3.5.3.

There are two categories of species/life stages that did not have profiles developed. The first ("insufficient data") contains species/life stages for which some data are available on their habitat preferences/requirements, but this was insufficient to develop a profile. The second category contains species/life stages for which we had no data at all in the HUD.

Table 7. Summary of sources of information on the species and life stages in the Groundfish FMP used for the EFH Model.

		Source of latitude and Depth Data in the EFH Model				Level of Substrate information in the HUD			
	Common Name	Adults	Juveniles	Larvae	Eggs	Adults	Juveniles	Larvae	Eggs
1	Arrowtooth flounder	Survey+	HUD	HUD	HUD	4	4	3	3
2	Aurora rockfish	Survey	HUD	Too Few Data	No Data	3	3	3	No Data
3	Bank rockfish	Survey	HUD	No Data	No Data	4	4	No Data	No Data
4	Big skate	HUD	HUD	No Data	HUD	4	3	No Data	4
5	Black rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
6	Black-and-yellow rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
7	Blackgill rockfish	Survey	HUD	HUD	No Data	4	3	3	No Data
8	Blue rockfish	HUD	HUD	HUD	No Data	4	4	3	No Data
9	Bocaccio	Survey+	HUD	HUD	No Data	4	4	4	No Data
10	Bronzespotted rockfish	HUD	HUD	No Data	No Data	4	4	No Data	No Data
11	Brown rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
12	Butter sole	HUD	Too Few Data	Too Few Data	Too Few Data	4	4	4	4
13	Cabezon	HUD	Too Few Data	Too Few Data	Too Few Data	4	4	3	4
14	Calico rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
15	California scorpionfish	HUD	Too Few Data	No Data	Too Few Data	4	4	No Data	3
16	California skate	HUD	HUD	No Data	HUD	4	3	No Data	4
17	Canary rockfish	Survey+	HUD	Too Few Data	No Data	4	4	3	No Data
18	Chilipepper	Survey+	HUD	Too Few Data	No Data	4	4	4	No Data
19	China rockfish	HUD	Too Few Data	Too Few Data	No Data	4	3	3	No Data
20	Copper rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	4	No Data
21	Cowcod	Survey	HUD	Too Few Data	No Data	4	4	3	No Data
22	Curlfin sole	Survey+	Too Few Data	Too Few Data	Too Few Data	4	4	3	3
23	Darkblotched rockfish	Survey	HUD	HUD	No Data	4	4	3	No Data
24	Dover sole	Survey+	HUD	Too Few Data	Too Few Data	4	4	3	3
25	Dusky rockfish	HUD	Too Few Data	No Data	No Data	4	4	No Data	No Data
26	English sole	Survey+	Too Few Data	Too Few Data	Too Few Data	4	4	3	3
27	Finescale codling	HUD	No Data	No Data	No Data	2	No Data	No Data	No Data
28	Flag rockfish	Survey	HUD	Too Few Data	No Data	4	4	3	No Data
29	Flathead sole	Survey+	Too Few Data	Too Few Data	Too Few Data	4	4	3	3
30	Gopher rockfish	HUD	HUD	HUD	No Data	4	4	3	No Data
31	Grass rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
32	Greenblotched rockfish	Survey	HUD	Too Few Data	No Data	4	4	3	No Data
33	Greenspotted rockfish	Survey	HUD	Too Few Data	No Data	4	4	3	No Data
34	Greenstriped rockfish	Survey	HUD	Too Few Data	No Data	4	4	3	No Data
35	Harlequin rockfish	HUD	Too Few Data	Too Few Data	No Data	4	3	3	No Data
36	Honeycomb rockfish	HUD	Too Few Data	No Data	No Data	4	4	No Data	No Data
37	Kelp greenling	HUD	HUD	HUD	HUD	4	4	3	4
38	Kelp rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	4	No Data
39	Leopard shark	HUD	HUD	No Data	No Data	4	2	No Data	No Data
40	Lingcod	Survey+	HUD	HUD	HUD	4	4	3	4

Table 7 Cont.

		Source of latitude and Depth Data in the EFH Model				Level of Substrate information in the HUD			
	Common Name	Adults	Juveniles	Larvae	Eggs	Adults	Juveniles	Larvae	Eggs
41	Longnose skate	HUD	HUD	No Data	HUD	3	3	No Data	2
42	Longspine thornyhead	HUD	HUD	Too Few Data	Too Few Data	4	4	3	4
43	Mexican rockfish	HUD	HUD	HUD	No Data	4	3	3	No Data
44	Olive rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
45	Pacific cod	Survey+	HUD	HUD	HUD	4	4	3	4
46	Pacific hake	HUD	HUD	HUD	HUD	3	3	4	3
47	Pacific ocean perch	Survey	HUD	HUD	No Data	4	3	3	No Data
48	Pacific rattail (grenadier)	HUD	Too Few Data	HUD	HUD	4	4	3	3
49	Pacific sanddab	Survey+	Too Few Data	Too Few Data	Too Few Data	4	4	3	3
50	Petrale sole	Survey+	HUD	Too Few Data	Too Few Data	4	4	3	3
51	Pink rockfish	HUD	Too Few Data	No Data	No Data	4	3	No Data	No Data
52	Quillback rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
53	Redbanded rockfish	Survey	Too Few Data	No Data	No Data	4	3	No Data	No Data
54	Redstripe rockfish	Survey	Too Few Data	Too Few Data	No Data	4	4	3	No Data
55	Rex sole	Survey+	Too Few Data	Too Few Data	Too Few Data	4	4	3	3
56	Rock sole	HUD	Too Few Data	Too Few Data	Too Few Data	4	4	3	4
57	Rosethorn rockfish	Survey	Too Few Data	Too Few Data	No Data	4	3	3	No Data
58	Rosy rockfish	HUD	HUD	No Data	No Data	4	4	No Data	No Data
59	Rougheye rockfish	Survey	HUD	No Data	No Data	4	4	No Data	No Data
60	Sablefish	HUD	HUD	HUD	HUD	4	4	4	3
61	Sand sole	HUD	HUD	Too Few Data	Too Few Data	4	4	3	3
62	Sharpchin rockfish	Survey	HUD	HUD	No Data	4	4	3	No Data
63	Shortbelly rockfish	Survey+	Too Few Data	Too Few Data	No Data	4	4	3	No Data
64	Shortraker rockfish	Survey	Too Few Data	Too Few Data	No Data	4	2	3	No Data
65	Shortspine thornyhead	HUD	HUD	Too Few Data	HUD	4	4	4	4
66	Silvergray rockfish	Survey	Too Few Data	Too Few Data	No Data	3	4	3	No Data
67	Soupfin shark	HUD	HUD	No Data	No Data	4	4	No Data	No Data
68	Speckled rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
69	Spiny dogfish	HUD	HUD	No Data	No Data	4	4	No Data	No Data
70	Splitnose rockfish	Survey	HUD	HUD	No Data	4	4	3	No Data
71	Spotted ratfish	HUD	HUD	No Data	HUD	4	4	No Data	4
72	Squarespot rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
73	Starry flounder	HUD	Too Few Data	Too Few Data	HUD	4	4	3	4
74	Starry rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
75	Stripetail rockfish	Survey+	HUD	Too Few Data	No Data	4	4	3	No Data
76	Tiger rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
77	Treefish	HUD	Too Few Data	Too Few Data	No Data	4	4	3	No Data
78	Vermilion rockfish	HUD	Too Few Data	Too Few Data	No Data	4	4	4	No Data
79	Widow rockfish	Survey	Too Few Data	Too Few Data	No Data	4	4	3	No Data
80	Yelloweye rockfish	HUD	HUD	Too Few Data	No Data	4	4	3	No Data
81	Yellowmouth rockfish	Survey	HUD	Too Few Data	No Data	3	3	3	No Data
82	Yellowtail rockfish	Survey+	HUD	Too Few Data	No Data	4	4	3	No Data

For the latitude/depth profiles, 20 came from the surveys (Surveys), 16 from the surveys with expert opinion to fill in the gaps (Survey+), 124 came from the HUD, 94 had too few data in the HUD, and 74 had no data at all. The values in the substrate columns indicate the maximum level of habitat classification in the HUD in each case (Level 4 being the highest, see Table 8): 162 were classified to Level 4, 88 to Level 3 and 4 to Level 2. No data on substrate associations were available for 74 species/life stage combinations. (Note that species are classified in the HUD as being associated with the water column, where appropriate.)

3.4.2.2 Benthic Substrate

Extracting Information from the HUD

The HUD (Section 2.3.4.2.) contains data on the types of substrates used by species in the FMP. This strength of the link between species/life stages and the each substrate with which it is known to associate is measured in terms of a four-point scale: unknown, weak, medium, and strong. In order to incorporate information about substrate preferences into the BBN model, the four point scale was translated into habitat suitability probabilities as follows: unknown = 0.33[6], weak = 0.33, medium = 0.66, and strong = 1. These probabilities differ from the probabilities derived from the surveys in that they are subjective and not based directly on actual observational data. They are, however, based on the best scientific evidence available in the literature and currently represent the best available data for including substrate in the BBN model. As part of the future analysis, the sensitivity of the output to the assumed probability levels should be investigated, along with the possibility of including a measure of uncertainty into the model. This could be achieved, for example, by expressing the probabilities as ranges or distributions rather than fixed points.

The substrate classification system in the HUD is on four levels, based on the Our Living Oceans (OLO) habitat classification and is shown in Table 8. However, substrate is not classified to the fourth level in all cases (see Table 7). For some species and life stages, the level of information only allows us to make a link to a substrate at a higher level of classification. Nevertheless, this represents the best information available and all such links between species and substrates were used in the EFH model.

Reconciling the Substrate Classifications in the HUD and the GIS

The substrate classification system in the HUD is similar to the system used in the GIS, which was devised by Gary Greene (Moss Landing Marine Lab) and is described in Appendix 3. However, there were some differences that required reconciling so that the output from the EFH Model could be plotted directly in the GIS. We therefore devised a system of correspondence between the two systems, as described below.

[6] Where the habitat association was recorded as "unknown" in the HUD we assumed that the habitat suitability should be at the same level as if it had been recorded as "weak". This is because there must have been some level of association recorded for the information to be entered into the database, even if the strength of the association is unknown. An alternative approach that was considered was to give these records a score of zero, but this would have eliminated them from the analysis, thereby giving these habitat types no chance of being identified as EFH for these species and life stages.

Table 8. Four-level classification of substrate types (geological and biogenic) in the habitat use database, based on the OLO classification system.

Level 1	Level 2	Level 3
Abyssal Plain	Basin	Abyssopelagic Zone
Coastal Intertidal	Benthos	Artificial Structure
Estuarine	Ice	Bathypelagic Zone
Island Shelf	Intertidal Benthos	Biogenic
Shelf	Seamount	Biogenic Reef
Slope/Rise	Submarine Canyon	Epipelagic Zone
Slope/Rise/Plain	Subtidal Benthos	Fast Ice
Unknown	Unknown	Hard Bottom
	Water Column	Mesopelagic Zone
		Mixed Bottom
		Pack Ice
		Tide Pool
		Unconsolidated
		Unknown
		Vegetated Bottom

Level 4		
Algal Beds/Macro	Gyre	Sea Anemones
Algal Beds/Micro	Macrophyte Canopy	Sea Lilies
Artificial Reef	Marine Moss	Sea Urchins
Basketstars	Mixed Mud/Sand	Sea Whips
Bedrock	Mollusk Reef	Seasonal Fast Ice
Boulder	Mud	Seasonal Pack Ice
Brittlestars	Mud/Boulders	Seawater Surface
Clay	Mud/Cobble	Silt
Cobble	Mud/gravel	Silt/Sand
Coral Reef/Barrier Reef	Mud/Rock	Soft Bottom/Boulder
Coral Reef/Fringe Reef	Oil/Gas Platform	Soft Bottom/Rock
Coral Reef/Patch Reef	Permanent Fast Ice	Sponges
Current System	Permanent Pack Ice	Tube Worms
Demosponges	Piers	Unknown
Drift Algae	Rooted Vascular	Upwelling Zone
Emergent Wetlands	Sand	Vase Sponges
Fronts	Sand/Boulders	Worm Reef
Gooseneck Barnacles	Sand/Cobble	
Gravel	Sand/Gravel	
Gravel/Cobble	Sand/Gravel/Cobble	
Gravel/Rock	Sand/Mud/Rock	
	Sand/Rock	

The habitat codes in the GIS data comprise four levels as shown below: Mega Habitat, Habitat Induration, Meso/Macro Habitat, and Modifier. These are copied here for ease of reference:

Mega habitat:

A	Continental Rise
B	Basin
F	Slope
R	Ridge
S	Shelf

Induration:

h	Hard
s	Soft

Meso/Macro habitat :

c	Canyon
e	Exposure
c/f	Canyon floor
g	Gully
g/f	Gully floor
i	Iceformed
l	Landslide
(blank)	Sedimentary

Modifier:

u	Unconsolidated
b/p	Bimodal
o	Outwash

The last level (Modifier) is largely redundant and does not add very much to the information, since each combination of the other three fields only has at most one value of the Modifier field. The HUD uses four levels (see above), but Level 4 represents more detail than is really needed for mapping the GIS habitats. Only some of the categories in Levels 1 to 3 relate directly to the GIS classification. In the following mapping scheme, the letters refer to the habitat description used in the GIS classification.

F (Slope) should be mapped to Slope/Rise, and S (Shelf) to Shelf. Also B (Basin) maps to Slope/Rise, Basin. Mapping A (Continental Rise) and R (Ridge) is less straightforward—should they both be Slope/Rise, or does A correspond to Abyssal Plain?

h (Hard) maps to Hard Bottom and s (Soft) to Unconsolidated, but Mixed Bottom in the HUD is not specified in the GIS data. In almost all cases where it occurs in the database there are also values for either Hard or Unconsolidated. In these cases it can perhaps be ignored, given that it cannot be mapped directly. However, it could be represented as a level of uncertainty in the BBN model, since there is a non-zero probability that the fish in question will be associated with both hard and soft bottoms. In cases where it occurs without a value for either hard or unconsolidated both s and h in the GIS data were given the value for Mixed Bottom.

Both c (Canyon) and c/f (Canyon Floor) map to Submarine Canyon in the HUD. The other Meso/Macro Habitat values have no obvious corresponding values in the habitat use database, but can be treated as

Benthos. The habitat use database does not have any Basin or Canyon data, so it is unclear whether to put this with Basin or Slope Canyon.

The correspondence used between the two databases is as follows:

Habitat Use Database	**GIS Habitat Codes**
Shelf, Benthos, Hard	She, Shi_b/p
Shelf, Benthos, Soft	Ss_u, Ssg, Ssg/f, Ssi_o
Shelf, Canyon, Hard	Shc
Shelf, Canyon, Soft	Ssc_u, Ssc/f_u
Slope, Benthos, Hard	Fhe, Fhg, Fhl, (Rhe, Ahe)
Slope, Benthos, Soft	Fs_u, Fsg, Fsg/f, Fsl, (Rs_u, As_u, Asg, Asl)
Slope, Canyon, Hard	Fhc, Fhc/f, (Ahc)
Slope, Canyon, Soft	Fsc_u, Fsc/f_u, (Asc/f, Asc_u)
Slope, Basin, Hard	Bhe
Slope, Basin, Soft	Bs_u, Bsg, Bsg/f_u, (Bsc/f, Bsc_u)

Codes in parentheses are considered to be hard to correspond between the two databases.

Some Level 2 and 3 habitats in the HUD are given as Unknown. The Level 2 unknowns all have a probability of 0, so they can safely be ignored. The Level 3 unknowns apply to only a few species, and in most cases the type of substrate can be inferred from other habitats or the NMFS Life Histories Appendix as follows:

Species	**Habitat**
Galeorhinus	Probably Soft
Antimora	No information
Coryphaenoides	Soft
Sebastolobus	Soft
Sebastes helvomaculatus	Hard
S. diploproa	Soft/ Mixed?
S. ruberrimus	Unclear – probably Hard/Mixed
S. reedi	Hard

As noted in Section 2.2.4, there are several species/life stages in the Groundfish FMP that have no association with a benthic substrate type, but instead occur in the water column. There are values for minimum and maximum latitude recorded in the HUD for these species/life stages to the extent that these are known. For some there are also minimum and maximum depths recorded. These depth ranges are intended to indicate geographic distribution rather than position in the water column (Bruce McCain, pers. comm.). It is therefore possible to model habitat suitability for these cases using the methodology described in Section 3.4.2.1. There is, however, no substrate component, and at present, no other way of further refining the probability profile, beyond what is provided by the depth and latitude ranges. This results in habitat suitability profiles that contain much less contrast and also cover wider areas than for the species and life stages that are associated with benthic substrates.

3.4.3 The Bayesian Network for the EFH Model (Version 1)

Figure 7 shows the EFH Model use to calculate HSP for a GIS polygon with observed values of substrate type, depth, and latitude.

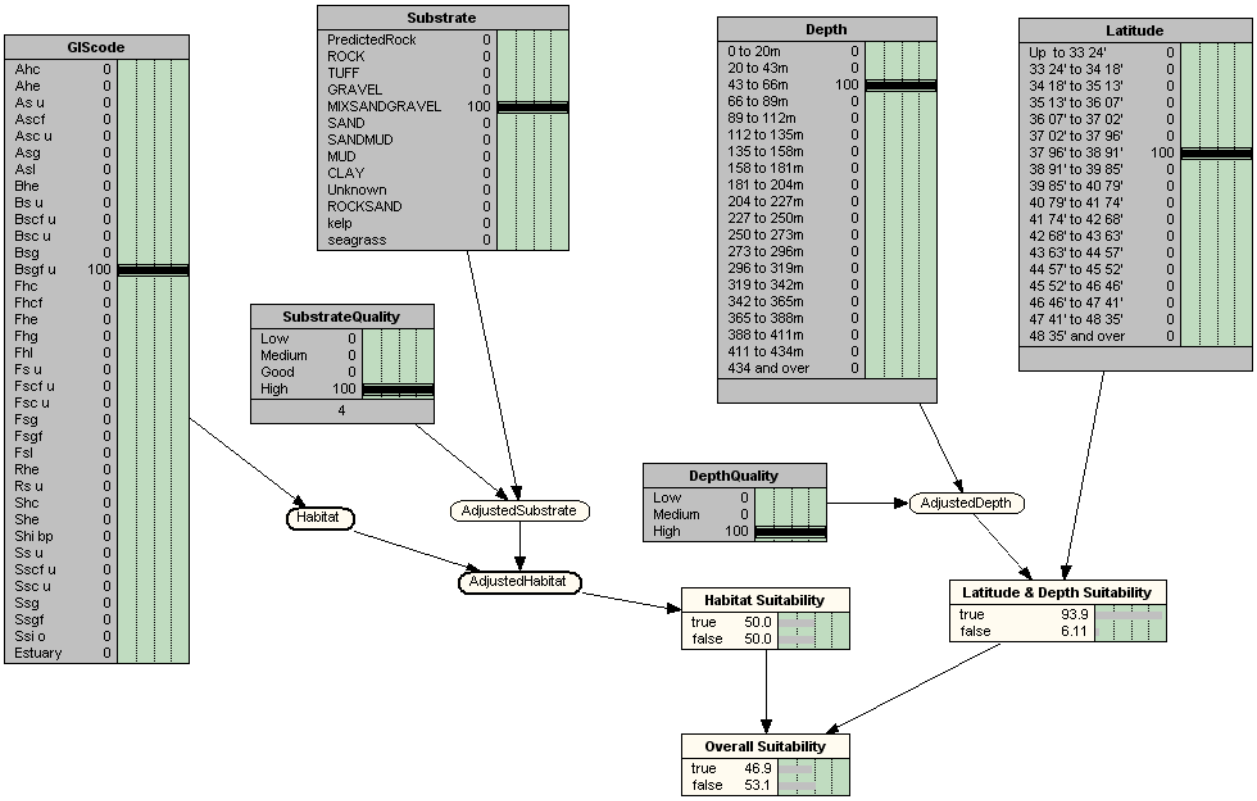

Figure 7. The EFH Model showing substrate, depth, latitude, and data quality nodes

For the given GIS polygon, the habitat code, substrate, depth, and latitude are entered into the appropriate nodes in the BBN. The model includes the facility for allowing measures of uncertainty in habitat characteristics, as described in Section 2.2.5, to be included explicitly. Uncertainty in the substrate classification is accommodated by means of the *SubstrateQuality* node which represents the quality of the substrate data (low/medium/good/high). This assigns a probability distribution (elicited from expert judgments) of possible true substrates, given an observed substrate. The resulting substrate type is in the *AdjustedSubstrate* node in the BBN. There is a similar facility that allows for uncertainty in depth observations. However, neither of these facilities is effectively activated in Version 1 of the model, because it has not been possible yet to fully develop the data quality metrics, nor test their effects on the model outputs. This is achieved by permanently setting the substrate and depth data quality indicators to "High", which leaves the data in the *AdjustedSubstrate* and *AdjustedDepth* nodes the same as those in the *Substrate* and *Depth* nodes respectively.

The Substrate Suitability node calculates the Habitat Suitability Probability (HSP) corresponding to the Adjusted Substrate. The node uses suitability probabilities obtained from the HUD (see Section 3.4.2). Similarly, the Latitude & Depth Suitability node uses the combined HSP value estimated by GAM modeling.

Finally, the Overall Suitability node calculates the estimated joint HSP value of the polygon by multiplying the Substrate and Latitude/Depth HSPs, thus:

$$HSP(overall) = HSP(substrate) \times HSP(depth, latitude)$$

This specification of the model treats depth/latitude and substrate as independent factors in determining the overall habitat suitability probability. This assumes that there is no interaction between them. A later version of the model could investigate the validity of this assumption.

HSP values are calculated for a given species/life stage for all the habitat polygons in the GIS, which are uniquely identified by their substrate type, depth range (every 10 m), and latitude range (every 10 minutes).

A computer program written for the project reads the polygon data from a GIS based data file, passes them efficiently to the model, which calculates the HSP values, and writes these values back to the GIS data file. These HSP values are then plotted for the entire coast in the form of a contour plot. Ways of identifying EFH from these plots and data are discussed in the next section.

3.5 EFH Model Output

3.5.1 Database and Maps of Habitat Suitability

The primary output of the EFH Model is in the form of a database of HSP values by species and life stage for every benthic habitat polygon in the GIS. A total of 160 species/life stage combinations have been analyzed to date out of a possible total of 328. The remaining 168 species/life stages have not been completed due to insufficient data. All of the adult and most of the juvenile stages have been covered either by the survey data or by the information in the HUD. Of those remaining, 69 cases are eggs (84% of species), 66 are larvae (80% of species) and 33 are juveniles (40 % of species). Of these, 94 have some data available, but not enough to develop HSP profiles. There are no data at all for 68% (56 species) of egg stages. Seventeen species have no data available for their larval stages. It is therefore mainly eggs and larvae for which information is lacking on habitat associations.

The HSP data are presented in contour plots produces by the GIS (included in Appendix B to the FMP).

3.5.2 Validation of Model Results

The HSP profiles from the EFH Model incorporate relatively new data sets and modeling techniques that have been developed specifically for this project. The results obtained to date from the EFH Model have already raised some concerns, particularly over the effect of bias in the survey data arising from the non-random coverage of substrates. Essentially the trawl is limited in its capability to sample on very rocky substrates. Species that specifically associate with such substrates will therefore not be well sampled, and may be under-represented in the survey data that are used to model the effects of latitude and depth.

As time goes by, the model and its outputs will benefit from additional focused interaction with subject-matter experts for validation of the results. Validation, for purposes of this project, has been limited primarily to a qualitative review of the data sets and mapped output to identify results that are counter to the experience or expectations of the reviewers.

3.5.3 Using the EFH Model Output to Identify EFH

The final result of the EFH analysis is maps by life history stage for each groundfish species that show on a qualitative scale the importance of different habitat to that species. There are various ways in which these maps can be used to identify EFH in a more or less inclusive way. In the Groundfish FMP,

groundfish EFH is identified in a precautionary way to include all areas of known occurrence of groundfish species. This area includes all of the areas identified by the EFH model output as having a suitability value greater than zero.

Model output—the species/life stage HSP maps—could be used to evaluate the effects future management decisions on groundfish EFH and in consultations on nonfishing impacts to EFH. These outputs allow some additional discrimination as to the relative value of different areas as groundfish habitat. In using the maps, however, it is important to remember that, while they look similar in terms of a product of the analysis, the type, accuracy, and precision of the information that has gone into each is highly variable. They should not, therefore, be treated all with the same level of confidence.

Table 7 is a very important table in that it provides a summary of the levels of information that have gone into the estimation of HSPs for each species and life stage. In the case of depth and latitude, the GAM models that used survey data estimated true probabilities of the survey encountering species across the area they covered. However, the profiles based on the HUD data are based on far fewer data that can be regarded to give a relative scale of likelihood at best. One important product of this difference is that the depth and latitude profiles derived from the HUD were scaled to have a maximum value of one, while profiles from the survey data can have a maximum value considerably less than one, particularly for rare species where the probability of occurrence in the survey catches is low everywhere.

In the case of the substrate component of the model, data inputs were derived entirely from the HUD and therefore cannot be regarded as true probabilities. The combination of these data with the depth and latitude data in the EFH Model means that the HSP profiles, whether or not the depth and latitude data were derived from the survey or the HUD, cannot be regarded as true probabilities. The data are on different scales, depending on where the input data came from.

It is important to remember when using the model outputs that a method that is considered to be appropriate for one species/life stage may not necessarily be appropriate for others. Having said that, it is possible to derive model output for groups of species and life stages, which could make the results easier to use than if each species/life stage is considered individually. Such groupings should take into account both the variable data inputs, and hence variable levels of uncertainty in the outputs. Other considerations used for groupings could be the status of the stocks (e.g., depleted, overfished, experiencing overfishing, etc.), species guilds, or species complexes used for management.

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Public Review DRAFT

PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

FOR THE CALIFORNIA, OREGON, AND WASHINGTON GROUNDFISH FISHERY

APPENDIX B
PART 7

Research Needs and Data Gaps Analysis for Groundfish Essential Fish Habitat

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1.0 INTRODUCTION

The material in this part of the Groundfish fishery management plan (FMP) appendices is adapted from the description of research needs originally incorporated into the FMP as section 11.10.6 by Amendment 11 (Section 2.0) and the data gaps analysis (Section 3.0) in the *Risk Assessment for the Pacific Groundfish FMP* prepared by MRAG Americas, Inc.; National Marine Fisheries Service (NMFS) Northwest Fisheries Science Center, FRAM Division; NMFS Northwest Regional Office; and TerraLogic GIS, Inc. The Risk Assessment describes the essential fish habitat (EFH) Model used to identify and describe EFH, an Impacts Model developed to evaluate anthropogenic impacts to EFH, and a data gaps analysis.

2.0 RESEARCH NEEDS

Many data gaps and research needs are readily apparent as a result of the efforts to identify EFH, fishing and nonfishing impacts to EFH, and conservation measures to protect, restore, and enhance EFH. These findings reinforce and complement habitat research needs previously identified in the FMP and other documents such as the Council's Research and Data Needs document. For example, a very comprehensive list of research needs has been identified as a significant component of Oregon's Ocean Resources Management Plan (State of Oregon 1991); they often are applicable throughout the EEZ and most have not been met. Several recommended research needs for EFH are taken from this list and contributions received from the technical team and others interested in marine fish, fishery, and habitat issues.

The following recommendations for research needs directly support implementation of the proposed recommendations in this amendment and provide for improved protection, restoration, and enhancement of EFH for a healthy ecosystem and productive fisheries over the long term. The Council will integrate these recommendations into the Research and Data Needs document. The Council will emphasize research needs to better identify and preserve EFH for populations whose productivity may be seriously impaired as a result of habitat loss or degradation and for populations whose habitat needs are very poorly or not known. These recommendations are also based on the assumption that ongoing EFH activities will continue to gather and incorporate existing information that could not be incorporated to date. Also, research studies often can address multiple needs simultaneously and the list below is not intended to represent independent research efforts. Further, habitat is meant in the broad context of its physical, chemical, and biological characteristics.

- Specifically identify habitat areas of particular concern: those rare, sensitive, and vulnerable habitats (to adverse fishing and nonfishing effects). Identify associated life stages and their distributions, especially for species and life stages with level 1 (or no) information. Develop appropriate protection, restoration, and enhancement measures.

- Identify any existing areas that may function as "natural" reserves and protection measures for these areas.

- Map benthic habitats on spatial scales of the fisheries and with sufficient resolution to identify and quantify fish/habitat associations, fishery effects on habitat, and the spatial structure of populations. Mapping of the rocky areas of the continental shelf is critical for the identification of the rocky shelf and nonrocky shelf composite EFHs.

- Explore merits of harvest refugia as a potential management tool. Determine candidates, sites, and criteria for refugia; develop quantitative and qualitative methods to assess the effectiveness of the refugia; and develop methods to protect refugia from anthropogenic impacts.

- Conduct experiments to assess the effects of various fishing gears on specific habitats on the West Coast and to develop methods to minimize those impacts, as appropriate. From existing and new sources, gather sufficient information on fishing activities for each gear type to prioritize gear research by gear, species, and habitat type.

- Explore and better define the relationships between habitat, especially EFH, and productivity of groundfish species. Improved understanding of the mechanisms that influence larval dispersal and recruitment is especially important.

- Evaluate the potential for incentives as a management tool to minimize adverse effects of fishing and nonfishing activities on EFH.

- Standardize methods, classification systems, and calibrate equipment and vessels to provide comparable results in research studies and enhance collaborative efforts.

- Develop methods, as necessary, and monitor effectiveness of recommended conservation measures for nonfishing effects. Develop and demonstrate methods to restore habitat function for degraded habitats.

Reference:

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3.0 DATA GAPS ANALYSIS

3.1 Data Gaps for Identifying EFH

3.1.1 Groundfish habitat

3.1.1.1 Geological substrate

The Comprehensive Risk Assessment has provided the first coastwide compilation of geological substrate for the West Coast of the U.S. This is a major achievement of the project, but although the coverage of the resulting map is “continuous”, it is not complete and the quality of the data varies from place to place. There are many areas where the substrate data need to be improved. Both the OSU Active Tectonics Laboratory and the Moss Landing Marine Laboratory (MLML) are continuing to work on updating the substrate data. However, it has not been possible to incorporate the most recent updates into the assessment process at this stage due to time constraints.

Data quality information can be explicitly incorporated into the EFH Model so that the advice on identification of EFH reflects the degree of confidence in the identification of habitat type. However, there is currently a mismatch between the substrate polygons and the data quality polygons, which caused some artifacts in the HSP output when data quality data were included in the model. This issue could not be resolved in the time available for the preparation of the assessment.

Available data quality data are based on measurement error only; genuine data quality depends also on:

- transition zones (e.g., between two substrate types, or areas where depth changes sharply)

- genuine mixtures within a parcel of habitat identified as a single substrate type (e.g., gradual changes in depth or latitude)

No data quality information is currently available for California.

In some cases, interpretive decisions had to be made when stitching together data from different sources. To facilitate this process, in the time available, automated procedures were used in lieu of more time-consuming manual editing procedures. Future work may provide interpretations that are different to those used in this analysis. However, it is not expected that this will substantially change the results, or have major implications for the identification of EFH.

Detailed geological substrate data are missing for some areas of the EEZ. The two major gaps are the estuaries, which are currently delineated from the rest of the map, but have no geological characterization at all, and the area between the current western limit of the substrate map and the outer edge of the EEZ. There is a smaller physical gap in the map between the end of OSU's interpretation in Straits of Juan de Fuca and the NWI Estuaries boundary.

Certain benthic features are not identified separately in the substrate classification system; for example, seamounts are lumped together with ridges and banks. Therefore, there may be some benthic features of importance to groundfish that are not mapped separately.

Substrate type information for the seabed off California is classified only into hard and soft substrates. Off Washington and Oregon there is a much more detailed breakdown into categories such as mud, sand, gravel, rock, etc.

The shoreline is not consistent along the entire coast. The standard adopted by the two laboratories (OSU and MLML) are not the same. In addition, the boundaries of the estuaries are not aligned with the shoreline, resulting in gaps and overlaps.

Table 1. Summary of Data Gaps for Geological Substrate.

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
Data quality is highly variable across the existing substrate map. New data exist that have not yet been incorporated into the assessment, due to time constraints.	HSP maps assume habitat type is recorded in the GIS without error irrespective of the true level of uncertainty Identification of EFH may miss important areas of substrate, and/or areas may be mis-identified as EFH for some species and life stages.	The most recent data on benthic substrate need to be processed and incorporated into the EFH Model.
Data quality data do not currently reflect the full range of uncertainty in benthic substrate type and are not used in the EFH Model.	As above.	Enhanced measures of data quality need to be developed and their use in the EFH Model investigated further.
No data quality data are currently available for California (Section 2.2.5.1).	As above.	Data quality information for California could be developed by Moss Landing Marine Lab.
Detailed geological substrate data are missing for some areas of the EEZ.	No EFH can be identified offshore of the area of the current benthic substrate map to the edge of the EEZ. Some important features, such as seamounts may not be properly represented; estuaries are	Benthic substrate data for areas not covered by the substrate map should be collected, processed, and incorporated into the assessment.

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
	defined as a single substrate "type" irrespective of the actual substrate; there can be no subdivision of areas within estuaries based on substrate type.	
The classification system does not separate out some benthic features that may be important to groundfish.	The importance of some specific areas of seabed as EFH for groundfish may not be properly identified.	The classification system needs to be re-examined from a groundfish ecological perspective.
Off California, substrate type is divided only into hard and soft.	Habitat preferences are recorded in the HUD to a finer classification than just hard and soft substrates, but this information is lost when projecting these preferences onto the substrate map off California. The information is used in a risk averse way such that some areas may be mis-identified as EFH for some species/life stages.	More detailed substrate type data should be compiled for California.
The shoreline is not set to a consistent standard and does not align with the estuary data.	Identification of EFH at the shoreline boundary may be inaccurate when projected onto some maps. It may appear that some small areas of land have been identified as EFH, or some small areas of the seashore may not be properly mapped as EFH.	The shoreline must be set to a common standard along the entire coast and must be aligned with all other relevant GIS datasets, such as estuaries.

3.1.1.2 Bathymetry

Bathymetry data for Oregon and California were provided by OSU and MLML respectively. Additional data were acquired for Washington, which were already compiled and continuous. This limits the range of contours that can be used to identify EFH to depth to 10 m intervals.

Depth zones are discontinuous at the boundaries between data sources, due to the disparate nature of the bathymetry sources. No manual adjustments were made to the compiled bathymetry data to remove these discontinuities.

A small data gap exists between Oregon and Washington, approximately 100 to 200 meters across. This was bridged by extending the contour lines to meet the shared boundary.

Table 2. Summary of Data Gaps for Bathymetry.

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
The bathymetry dataset is not of a consistent level of detail across the West Coast.	Data for Washington limit the range of contours that can be used to identify EFH to depth to 10 m intervals.	Compile data sets to develop a continuous bathymetric grid of the best available data for the entire West Coast which could be used to generate contours at any required interval.
Discontinuities exist in bathymetry data at the boundaries between data sources.	Given the scale of the bathymetry data used in the EFH Model, this data gap is unlikely to be of major significance to the assessment.	Targeted surveys to collect bathymetry data in the relevant boundary areas.

3.1.1.3 Biogenic habitat

There is limited information on both the distribution of biogenic habitat and its importance as a habitat for groundfish on the West Coast. These habitats are, however, known to be vulnerable to physical impacts caused by fishing gears, with, in some cases, protracted recovery times of ten years or more. Mapping of vulnerable biogenic habitats should be given a high priority.

In addition to mapping current extent, it is particularly important in the case of biogenic habitats to obtain information on their historical extent. These habitats may respond rapidly to short and long term shifts in oceanographic conditions and anthropogenic disturbance, including coastal development. Historical data are therefore important to give an indication of both the current status and extent relative to the past and the potential future extent, in the event that conditions change. No historical data have been obtained to date.

Table 3. Summary of Data Gaps for Biogenic Habitats.

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
Limited understanding of the importance of biogenic habitats for groundfish species.	Biogenic habitat may not be identified as an important habitat for groundfish species, or conversely may be wrongly identified as an important habitat for groundfish.	Visual observation of the association between groundfish and biogenic habitats. Sampling and analysis of groundfish life stages in known areas of biogenic habitats.
Limited mapping of the occurrence of organisms that form biogenic habitats, in terms of shape files delineating metrics, such as levels of density of organisms that can be related to the importance of the location as habitat for groundfish.	Areas of habitat of importance to groundfish that are particularly vulnerable to impacts and may have very long recovery times may not be correctly identified as EFH and may not receive protection from potentially damaging activities. Note that areas of biogenic habitat may still be identified as EFH by virtue of their non-biogenic characteristics and the presence of groundfish in those areas.	Visual survey of seabed to determine the density of organisms that represent important biogenic habitat for groundfish. Some structure-forming invertebrates are found primarily on soft bottom, and would be sampled effectively in the NMFS trawl surveys. Example include sea whips and perhaps sponges. For these soft bottom invertebrates, maps of relative CPUE by station should be produced (SSC Feb 2004). Collection of all available data on historical extent of biogenic habitats.

3.1.2 Use of Habitat by Groundfish

The identification of EFH is based almost entirely on Level 1 (distribution) data, either from the NMFS trawl surveys or inferred from the Habitat Use Database (HUD). The NMFS trawl survey data were modeled using a general additive model (GAM) of presence/absence in survey samples. This approach ignores information on relative density from trawl surveys (based on catch per unit effort), which may provide a more accurate picture of the importance of specific habitat for groundfish. A species may have a broad depth or geographic distribution, but may only reach high densities in a limited area. However, catch-per-unit-effort data from surveys may provide an overly distorted picture of relative density depending on the statistical techniques used to analyze them. Further investigation is needed to explore the use of catch-per-unit-effort from the surveys as a means of identifying habitat suitability from Level 2 (density) data.

Out of the 328 possible profiles of Habitat Suitability Probability (HSP), it was only possible to produce 36 from the NMFS trawl survey data (including those completed with additional expert opinion), all of which were for adults. A further 124 profiles were developed from data organized in the HUD. HSP profiles for 168 species/life stage combinations could not be developed due to lack of data describing their habitat requirements. Data are lacking particularly for egg and larval stages.

The relative levels of precision achieved by the two main methods of calculating HSPs based on depth and latitude (the NMFS trawl survey data and the HUD) need to be investigated further so that uncertainty in the outputs can be properly expressed in the EFH Model, and hence reflected accurately in the decision-making process.

EFH is mapped on the basis of benthic habitat characteristics. The characteristics of pelagic habitat have not been considered to date. The features of the water column that are likely to be of importance include biological, physical, and chemical oceanographic processes that are hard to map. Frontal boundaries, temperature regimes, and biological productivity all vary on seasonal and inter-annual scales that make identification of a static two dimensional designation of a boundary such as is required for EFH problematic. We have not attempted to map these features in the GIS in the same way as for the benthic substrate at this stage. EFH for species and life stages residing in the water column is mapped instead on the basis of latitudinal and depth ranges reported in the literature.

The only true measure of habitat suitability is obtained through measurement of demographic parameters, i.e., production, mortality, growth, and reproductive rates. EFH could then be defined as areas with above-average survival, growth, or recruitment. There are, however, no data currently available for identifying EFH at Levels 3 (habitat specific growth, reproduction, or survival rates) and 4 (habitat specific production rates).

Table 4. Summary of data gaps for habitat use data.

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
The analysis of NMFS survey data for distribution of fish by depth and latitude does not take into account relative densities as indicated by catch per unit effort. The limitations of presence/absence information to infer EFH should not be ignored (SSC Feb 2004).	The use of presence/absence data in the EFH Model treats the data in a risk averse way. A species may have a broad depth or geographic distribution, but may only reach high densities in a limited area. However, catch per unit effort data from surveys may provide an overly distorted picture of relative density depending on the statistical techniques used to analyze them.	GAMs and Generalized Linear Models (GLMs) that can accommodate zero catches have been commonly used to obtain indices of abundance using West Coast trawl survey data for stock assessment and could be used in a re-examination of the data for the purposes of identifying EFH.
168 species/life stage combinations have no HSP profile developed for them. Only six species in the FMP have depth/latitude profiles developed for all life stages. All species in the Groundfish FMP have at least one HSP profile developed (all adults are covered).	EFH cannot be identified for species/life stage combinations without an HSP profile. EFH identified for species with less than the full complement of four profiles may not represent the full extent of EFH. However, when all areas identified as EFH are added together for the FMP, the likelihood than an area for a particular species is missed will be reduced.	Conduct an extensive, worldwide literature review to investigate whether more data can be obtained for filling out the HUD, particularly for eggs and larvae. Undertake exploratory data analyses of ichthyoplankton survey data such as the CalCOFI and NMFS datasets for areas off California to investigate the utility of these type of data for identifying EFH.
Only 36 HSP profiles were developed from NMFS trawl	EFH will likely be described less precisely from HUD-based HSP	Obtain information from specialists with expert knowledge of the

Data Gap	Significance for the Identification of EFH	Potential Means of Filling Data Gap
survey data. A further 20 profiles could be developed with the help of expert opinion to complete the shallow part of the depth/latitude profile.	profiles than they would be from survey-based profiles for these species and life stages.	distributions of the species involved, using the same technique as used during this study.
The NMFS trawl survey data are used to support identification of EFH only for adult life stages.	Many species occupy different habitats at different life history stages. Information about these ontogenetic shifts present in the trawl data is not being utilized in the present analysis.	Size composition data are available for many groundfish from the NMFS trawl surveys. In many cases, juveniles can be reliably distinguished from adults on the basis of size.
The characteristics of pelagic habitat have not been mapped and are not used in the identification of EFH.	The important features of habitat for species and life stages that are not associated with benthic habitats are not taken into consideration. For the most part these habitats are not at risk from the actions of fishing gears, however, they may be at greater risk from nonfishing activities that cause modification of the chemical composition and physical characteristics of the pelagic environment.	Pelagic habitat characteristics could be mapped in the GIS and incorporated into the EFH Model.
No data are available for identifying EFH at Levels 3 (habitat specific growth, reproduction, or survival rates) and 4 (habitat specific production rates)	In a spatially heterogeneous system, in which source-sink dynamics are likely to be occurring, EFH should be protecting source areas, and not inadvertently protecting sink areas. There is a risk that the latter can occur if population density is used as a proxy for growth potential.	Conduct tagging (growth) studies and study fecundity by area; develop spatially discreet stock/recruitment relationships; and bio-energetics models. Conduct *In situ* physiological experiments and mortality experiments and develop life history-based meta-population models.

3.2 Data gaps for Assessing Impacts

3.2.1 Groundfish Habitat

The data gaps described above for the identification of groundfish habitat under the headings of geological substrate, bathymetry, and biogenic habitat apply equally to the assessment of impacts. Data on habitat are one of the main inputs into the assessment of impacts on EFH. They provide the framework for the development of spatially explicit habitat-based mitigation measures.

Within areas identified as EFH, if we assign sensitivity and recovery values by habitat type, but habitat type is misidentified, then some areas may receive less, or more, protection than they require. For these reasons, as well as those discussed above, it is important to address the data gaps in the identification of groundfish habitat.

3.2.2 The Effects of Fishing on Habitat

3.2.2.1 Sensitivity and Recovery

There is a general lack of West Coast specific studies on the effects of fishing gears on habitat. The risk assessment developed a review of gear impacts from which were developed the sensitivity and recovery indices for gear types used on the West Coast. At the same time as noting the paucity of West Coast

specific studies, we do not think that this invalidates the relevance of the assessment that has been undertaken. Nevertheless, it would be preferable to undertake specific studies on the West Coast to reduce the level of uncertainty in the analysis that arises from having to use the results of studies conducted elsewhere.

The sensitivity index provides a relative measure of the likely changes to habitat caused by interactions with various fishing gears. However, it is not explicit that the changes described in the index result from a single contact with the gear, nor what happens with subsequent contacts. The process of recovery is similarly difficult to quantify. The relationship between fishing effort and habitat change (impact) is likely to be complex and almost certainly non-linear. At this stage, however, we have no empirical data from which to develop such relationships. This data gap is at the heart of the problem of interpreting the output of the Impacts Model for trawl gears developed during this study. If data could be collected that would relate a specific quantum of fishing effort to a specific change in habitat condition (i.e., an impact), then it might be possible to develop a calibration of the model in terms of a value for *k*.

It has been suggested that there exists underwater video taken during surveys for laying underwater cables across areas that may have been subject to past fishing activity. Such visual observation records would be particularly useful if they could be overlaid spatially with detailed location-specific fishing effort data that would give an indication of the number of times observed areas had been contacted by fishing gear.

There is also no quantitative link between change in habitat structure and consequent change in its utility for managed species. For example, for a habitat/gear combination with a sensitivity level of 2, the index tells us that contact with the gear will cause substantial changes in the habitat, such as deep furrows on the bottom, with differences between impact and control sites being 25 to 50% in most metrics measured. What the index does not tell us, however, is what this change implies in terms of the functionality or utility of the habitat for the species that occupy it. We don't know, therefore, if habitat impacts are limiting to the status of groundfish.

Qualitative information is available in the literature on the likely effects of habitat change in specific cases; for example physical disturbance of spawning areas at spawning times is likely to cause some disruption of the process, and hence threaten reproductive success. However, no quantitative metrics are currently available to incorporate into a large scale statistical analysis of risk. This issue is linked closely to the lack of information at Levels 3 (habitat specific growth, reproduction, or survival rates) and 4 (habitat specific production rates) for identifying EFH. If we have no measure of these rates in specific habitats, we cannot yet hope to measure changes in these rates caused by specific changes in habitat structure and composition.

Substantial new research, probably involving laboratory experiments and in-situ studies of unprotected and protected areas of habitat, is required to develop metrics of sensitivity and recovery with all the desired characteristics for modeling impacts. However, before embarking on this research, there should be a detailed theoretical statistical modeling of the impacts-recovery process and an exploration of the sensitivity of the outputs of that model to different assumptions about functional relationships between habitat-gear contacts and the utility of habitat for groundfish. Such a process should be undertaken with the aim of providing clear guidance for future studies of impacts on habitat.

The sensitivity and recovery matrices categorize habitat types using the methodology adopted for the GIS. This distinguishes implicitly, to some extent, between habitats in high and low energy environments (e.g., shelf, slope, basin floor), but this distinction is limited. Currently there is no explicit accounting for natural disturbance in the evaluation of the significance of fishing impacts in terms of effects on the utility of EFH for groundfish. Existing data on natural physical disturbance, such as wave height and storm frequency could be collected and incorporated into the GIS. The sensitivity of habitats (stratified by

depth) to various impacts could then be modified based on predicted levels of natural physical disturbance by area.

3.2.2.2 Fishing Effort Data

One of the most significant constraints to assessment of habitat impacts from fishing is the fishing effort data. There are no reliable spatial data available for fixed gears, nor for recreational gears, for the whole West Coast. There are also limitations in the logbook data themselves. The PacFIN logbook database contains information on the start position of each haul, and the duration of the haul. There is no information on the speed and direction of the tow, nor the estimated width of the ground gear. At this stage, it is therefore not possible to plot the footprint of the trawl gear in the GIS. Regarding speed and direction, the logbooks themselves do contain end position of tows, but these data have not been entered into the database. Regarding the width of the gear, it is possible to estimate this information for different gear types, but it is quite variable, depending on the specific rigging of the trawl, and the way in which it is fished.

The PacFIN database contains the following gear codes for bottom trawls:

Gear Name	CODE
Bottom Trawl	
ALL TRAWLS EXCEPT SHRIMP TRAWLS	TWL
BEAM TRAWL	BMT
BOTTOM TRAWL	BTT
FLATFISH TRAWL	FFT
GROUNDFISH TRAWL (OTTER)	GFT
GROUNDFISH TRAWL FOOTROPE > 8 in.	GFL
GROUNDFISH TRAWL FOOTROPE < 8 in.	GFS
ROLLER TRAWL	RLT

However, the database contains only three codes for groundfish trawls: flatfish trawl (FFT), groundfish trawl (GFT), or roller trawl (RLT). This limits the extent to which reliable gear width estimates could be applied to the tows in the database because of the wide range of variability within each of the gear categories actually used. It has not been possible within the scope of the current project to undertake additional work to develop alternative approaches to characterizing the fishing effort which would provide a more accurate picture of fishing impacts and the effects of management alternatives.

Entering trawl end points into the PacFIN database would be a useful first step in developing a better spatial record of trawl fishing effort. However, there are additional problems when trying to plot spatial changes in fishing effort over time based on this database. Coastwide, trawl start points and duration are recorded from 1987 to the present. However, prior to 1997 position data for trawls off California were provided by logbook block (10 nm x 10 nm) only, not by precise haul location. There are additional anecdotal reports that some other start points may not be accurately recorded in the database. Also, prior to 1998, date was recorded as year only, making tracking of seasonal patterns impossible. Completing the focus group assessment of fishing effort for the entire West Coast would be a highly worthwhile undertaking to provide spatial information on non-trawl gears, as well as a calibration for trawl gears. However, this would be rendered more useful if the information collected could include meaningful metrics of fishing intensity.

In terms of future monitoring of fishing effort, the most likely way in which detailed data on locations of gears will be obtained is through the use of an electronic vessel monitoring system (VMS) that logs position at suitably fine scale intervals. We note, however, that such systems record the position of the

transceiver, and not necessarily the location where the fishing gear contacts the habitat. Detailed calibration studies would need to be undertaken for each gear to develop ways of interpreting VMS data for the purposes of monitoring gear impacts on habitat. For the historical record it may be possible to obtain detailed fishing location data from fishermen. For example, many satellite navigation systems store location data of previous fishing activities for future reference. Similar calibration of these data would be necessary.

3.2.3 Effects of Nonfishing Activities on Habitat

There is information available on nonfishing impacts, but the spatial and temporal resolution of these data are limited. Different types of impacts can be overlaid in the GIS to show their spatial overlap, but it is not possible at present to develop any quantitative evaluation of the relative importance and/or cumulative effects of fishing and nonfishing impacts on EFH. Data for some kinds of nonfishing activities are lacking.

Improvement in the data on nonfishing impacts would require a substantial data collection exercise from a wide variety of sources outside of fisheries. The greatest challenge to this data collection effort is the lack of centralized spatial data storage at the agency level. Although many individuals were contacted, identifying the right individual is critical or a potentially useful dataset may be overlooked. In addition, data incorporating nonfishing impacts often reside with the states. If data are located in Oregon, equivalent data must be located for Washington and California. If available, data developed independently by state agencies are often collected at different scales or degrees of accuracy. Stitching together these disparate data into a unified, coherent database requires reconciliation of data sets to make them usable in a coast wide database. This reconciliation of data will be possible for some data sets and impossible for others.

3.3.3 Measuring Cumulative Impacts

The Groundfish FMP, as with all others, must be amended, as necessary, to prevent, mitigate, or minimize to the extent practicable adverse effects from fishing on EFH (600.815(a)(2)(ii)).[1] In addition, Federal agencies must consult with NMFS on Federal projects that may adversely impact EFH. These requirements recognize that both fishing and nonfishing actions may adversely affect fisheries productivity through a variety of impacts on EFH.

To the extent feasible and practicable, therefore, FMPs should analyze how fishing and nonfishing activities influence habitat function on an ecosystem or watershed scale (§ 600.815 (a) (6) (i)). This is being achieved for West Coast groundfish through the development of an EIS, of which this risk assessment is part. The EIS must include a description of the ecosystem or watershed; the dependence of the managed species on the ecosystem or watershed, especially EFH; and how fishing and nonfishing activities, individually or in combination (cumulatively), impact EFH and the managed species; and how the loss of EFH may affect the ecosystem. Cumulative impacts are defined as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (CEQ regulations, 40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. An assessment of the cumulative and synergistic effects of multiple threats should also include the effects of natural stresses such as storm damage or climate-based environmental shifts.

[1] The EFH provisions at 16 U.S.C. §§ 1853(a)(7) state that each FMP shall identify EFH and "minimize to the extent practicable adverse effects on such habitat caused by fishing…."

Measuring the cumulative impacts of different types of fishing gear in a quantitative sense requires the development of a common metric. Currently this is not possible for a number of reasons; primarily the lack of spatially explicit effort data and the need to better interpret the sensitivity and recovery scales for different gear types. Nevertheless, with better effort data from which to develop gear footprints, and better calibration of impacts through the sensitivity and recovery indices, it should be possible to achieve a quantitative assessment of the combined impacts of several gears operating in the same area, and their relative contributions.

There is perhaps an even bigger problem, however, when we consider the cumulative impacts of fishing and nonfishing activities. Fishing gears have a primarily physical impact on habitat, although other less obvious effects, such as the selective removal of portions of the food chain also occur. Nonfishing impacts, however, range from similar kinds of physical disturbance to sedimentation and chemical alteration of the seawater, among many other things. Evaluating the cumulative effects of all of these potentially impacting processes is an immensely complicated task, for which we currently have a major lack of data.

3.3.4 Economics Analysis: Evaluating Practicability

A large gap left by the Comprehensive Risk Assessment is the evaluation of the economic effects of alternatives, and specifically the ways in which fishermen respond to regulation intended to mitigate identified problems. The risk assessment was never intended to address this issue; however, it is obviously vitally important to the success of the EFH mandate. It is also useful to consider how the analysis undertaken in this study could be expanded to incorporate socio-economic and economic factors. It may be possible, through such a study to develop the kind of common metric needed to consider impacts in a cumulative sense.

In the context of the EFH mandate described in the previous section, "practicable" was interpreted to mean "reasonable and capable of being done in light of available technology and economic considerations." In other words, a gear modification, time/area closure, or other management measure is "practicable" if the technology is available and effective, and will not impose an unreasonable burden on the fishers. Councils must therefore evaluate alternatives to prevent, mitigate, or minimize the adverse effects of fishing in this context.

The EFH regulations at 50 CFR 600.815(a)(2)(iii) provide guidance on evaluating the practicability of management measures:

> In determining whether it is practicable to minimize an adverse effect from fishing, Councils should consider the nature and extent of the adverse effect on EFH and the long and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation, consistent with national standard 7.

The costs of fishery management measures can be estimated on a gross, relative scale given expected changes in allowable catch and effort, and hence economic condition of the fishery. However, such an estimate will mask an underlying picture of complex ways in which individual fishers and fishing communities are affected by, and respond to management measures that are likely to either change the way they use fishing gear, change the gear itself, or simply ban some gears from fishing in some areas or at certain times of the year. In addition, economic costs are not only related to how fishers respond to management measures. Measures to prevent, mitigate, or minimize the adverse effects of fishing on EFH are intended to restore, or prevent declines in the productivity of the organisms that rely on those habitats. Hence taking no action might have associated economic consequences in the future, and the action itself

might, in the longer term lead to improvements in productivity and hence catches, even if some areas can no longer be fished with certain gears.

The EFH regulations at 50 CFR 600.815(a)(2)(iii) also state that "In determining whether management measures are practicable, Councils are not required to perform a formal cost/benefit analysis." However, in order to effectively evaluate practicability in an objective way, it is necessary to develop an integrated analysis that enables consideration of both sides of the cost/benefit equation in some form of common currency. On the cost side, this would involve consideration of the economic consequences of management measures that change human behavior (including both fishing and nonfishing activities), and also the potential consequences of no action in terms of economic losses resulting from habitat degradation.

On the benefit side, this would involve consideration of economic gains arising from habitat restoration that results in, for example, improved productivity of fisheries, or perhaps eco-tourism. The benefits of fishery management measures would need to be evaluated in the context of impacts arising from nonfishing activities, which themselves may or may not be mitigated once identified.[2] However, the benefits of specific actions to protect or restore habitat are not all readily quantifiable in the same units as the costs. This is in part due to uncertainty in the direct effects of fishing gears and nonfishing impacts on habitat function and the lack of information on the relationships between habitat function and productivity. This uncertainty and lack of information is both a consequence of and exacerbated by the complexities of the ecological relationships and processes involved.

This problem has been recognized and studied by several authors (e.g., Costanza et al. 1997) and attempts have been made to estimate the value of various "ecosystem services," including those provided by EFH. Such studies tend to agree that this type of valuation is very difficult to do and fraught with uncertainties. It also seems likely that any estimates that are calculated will be at best minimum estimates, or more likely under estimates. Costanza et al. (1997), however, agree that quantification of the value of the ecosystem is a worthwhile objective, citing among other benefits, the value of such estimates in project appraisal, i.e., in the preparation of EISs.

The EFH EIS for the Gulf of Mexico FMPs[3] used six specific practicability factors relevant to EFH Final Rule requirements to evaluate the concepts discussed in the previous section (see table below). These factors were chosen to help identify the costs and benefits to EFH, the fisheries, and the nation. Factors 1 and 2 address burdens on fishers, and the remaining four address availability and effectiveness of technology.

Practicability Factor	Relevance to 50 CFR 600.815(a)(2)(iii)	Description
1. Net economic change to fishers	The long and short-term costs and benefits of potential management measures to: • associated fisheries • the nation	Changes in short-term and long-term economic conditions of fishers as a result of fishing impacts alternatives

[2] The Council and NMFS cannot take direct action to mitigate impacts on EFH other than those caused by fishing. For impacts arising from non-fishing activities, the EFH mandate makes provision for a written, public consultation process between NMFS and the agency responsible for the non-fishing activity. Such a consultation exercise may result in action by that agency to modify the non-fishing activity, in which case the economic consequences of such modification may need to be considered in an integrated model to evaluate practicability.

[3] Prepared by MRAG Americas under contract to the Gulf of Mexico Fishery Management Council

Practicability Factor	Relevance to 50 CFR 600.815(a)(2)(iii)	Description
2. Equity of potential costs among communities	The long and short-term costs and benefits of potential management measures to: • fishing communities	Changes in short-term and long-term economic conditions for communities that are dependent on fisheries or vulnerable to fishing impacts alternatives
3. Effects on enforcement, management, and administration	The long and short-term costs and benefits of potential management measures to: • associated fisheries • the nation	Changes in requirements or effectiveness of enforcement, management, and administration as a result of fishing impacts alternatives
4. Changes in EFH	The nature and extent of the adverse effect on EFH and The long and short-term costs and benefits of potential management measures to: • EFH	Future improvement or degradation in the extent, quality and/or function of EFH resulting from fishing impacts alternatives
5. Population effects on FMU species from changes in EFH	The nature and extent of the adverse effect on EFH and The long and short-term costs and benefits of potential management measures to: • EFH • associated fisheries	Magnitude and direction of productivity changes resulting from changes in EFH
6. Ecosystem changes from changes in EFH	The long and short-term costs and benefits of potential management measures to: • EFH • associated fisheries	Improvement or degradation of ecosystem function resulting from changes in EFH

This current project has focuses on biological impacts to EFH caused by fishing. We have therefore investigated only a part of the cost/benefit equation. A program of work is needed that will provide a precursor to developing a functional economics component of the Impacts Model. The overall aim should be to move towards the development of a fully integrated Impacts Model that can be used to objectively evaluate trade offs and practicability to assist Councils and NMFS in decision making with respect to mitigating impacts on EFH. Such a model would need to treat the socioeconomic behavior of fishers and the options open to them in terms of responding to new measures, in order to develop a framework of probabilistic rules of behavior that can be expressed in a Bayesian Network. The economic consequences of those fishers' decisions and behavior will be based on expectations of catch and catch value, operational costs (e.g., for new gears, learning new techniques, switching to other target species), etc. Existing models of fishers' responses to management for the West Coast and elsewhere could be used in developing the model. If successful, there is a broad potential for expanding the application and principles of Bayesian Network models to other aspects of fishery management in an ecosystem context.

COUNCIL OPERATING PROCEDURE

Documentation of Outside Agreements

14

Approved by Council: 01/14/88
Revised: 04/06/95, **09/17/04**

[editorial note – text in ~~strikeout~~ is a suggested deletion, text in underline is a suggested policy-neutral clarification or previously adopted policy change, reverse shaded text is a suggested addition or clarification that represents a potential change in policy, and straight brackets [ ] designate explanatory rationale phrases for suggested revisions.]

PURPOSE

Some ~~harvest~~ management recommendations adopted by the Council are the result of joint recommendations or agreements among stakeholders ~~users~~ and managers developed outside the direct Council process (e.g., Klamath Fishery Management Council and north of Cape Falcon stakeholder~~users~~ and agency meetings). The results of these meetings and specific agreements need to be clearly documented to guide the Council in its preseason deliberations, to assure management intent is not subverted by inseason action, and to allow for participation and understanding by interested or affected persons. Guidelines presented below are provided to assure a clear and sound basis for the Council's management recommendations and to allow for an accurate assessment of the effectiveness of the Council in meeting management objectives.

REQUIRED DOCUMENTATION

The Council requests documentation of all management recommendations brought before it which represent positions or agreements arrived at in joint agency and stakeholders ~~users~~ meetings outside the Council's scheduled advisor meetings or public hearings. The Council suggests that one participating agency act as lead agency to document the meeting. Where possible, Council staff will be available to assist the lead agency in this task. The following information should be documented:

1. Date, location, and purpose of the meeting.

2. Meeting participants (indicate designated agency and user group representatives).

3. Identify any affected parties not represented at the meeting.

4. Summarize any consensus or agreement reached at the meeting and/or indicate majority and minority opinions. List specific recommendations to the Council which result from this meeting and the rationale for the recommendations, including compliance with approved management plans and agreements previously available for Council review.

5. Provide a copy of any signed or draft agreement resulting from this meeting that affects Council management.

6. Identify pertinent technical modeling used to arrive at decisions in this meeting and describe coordination with or review by the pertinent Council advisory body ~~Salmon Technical Team~~. Only technical data or models previously recognized by the appropriate entities of the Council, ~~or~~ Pacific Salmon Commission or similar management authority should be utilized.

This information should be available to the Council in writing before the time it is discussed at a Council meeting and will be incorporated in the Council meeting record.

Management recommendations from outside meetings and agreements which become part of the Council's recommended ocean salmon management are evaluated by the Salmon Technical Team in its annual post season review.

COUNCIL OPERATING PROCEDURE

14

Documentation of Outside Agreements

Approved by Council: 01/14/88
Revised: 04/06/95, **09/17/04**

[editorial note – text in ~~strikeout~~ is a suggested deletion, text in underline is a suggested policy-neutral clarification or previously adopted policy change, reverse shaded text is a suggested addition or clarification that represents a potential change in policy, and straight brackets [ ] designate explanatory rationale phrases for suggested revisions.]

[Proposed changes by Mr. Anderson in addition to those proposed by the staff are shaded.]

PURPOSE

Some ~~harvest~~ management recommendations adopted by the Council are the result of joint recommendations or agreements among stakeholders ~~users~~ and managers developed outside the direct Council process (e.g., Klamath Fishery Management Council and north of Cape Falcon stakeholder~~users~~ and agency meetings). The results of these meetings and specific agreements need to be clearly documented to guide the Council in its preseason deliberations, to assure management intent is not subverted by inseason action, and to allow for participation and understanding by interested or affected persons. Guidelines presented below are provided to assure a clear and sound basis for the Council's management recommendations and to allow for an accurate assessment of the effectiveness of the Council in meeting management objectives.

REQUIRED DOCUMENTATION

The Council requests documentation of all management recommendations brought before it which represent positions or agreements arrived at in a joint agency and stakeholders ~~users~~ meeting~~s~~ or process outside the Council's scheduled advisor meetings or public hearings. The Council suggests that one participating agency act as lead agency/entity to document the meeting/process. Where possible, Council staff will be available to assist the lead agency in this task. The following information should be documented:

1. Date(s), location(s), and purpose of the meeting/process.

2. Meeting participants (indicate designated agency and user group representatives).

3. Identify ~~any~~ affected parties not represented at the meeting.

4. Summarize the recommendations being presented to the Council ~~any consensus or agreement reached at the meeting and/or indicate majority~~ and summarize minority opinions, if any. List specific recommendations to the Council which result from this meeting and the

rationale for the recommendations, including compliance with approved management plans and agreements previously available for Council review.

5. Provide a copy of any signed or draft agreement resulting from this meeting/process that affects Council management.

6. Identify pertinent technical modeling used to base the recommendations on ~~arrive at decisions in this meeting~~ and describe coordination with or review by the pertinent Council advisory body ~~Salmon Technical Team~~. Only technical data or models previously recognized by the appropriate entities of the Council, ~~or~~ Pacific Salmon Commission or similar management authority should be utilized.

This information should be available to the Council in writing before the time it is discussed at a Council meeting and will be incorporated in the Council meeting record.

Management recommendations from outside processes ~~meetings and agreements~~ which become part of the Council's recommended ocean salmon management shall be ~~are~~ evaluated by the Salmon Technical Team in its annual post season review.

COUNCIL OPERATING PROCEDURES (COP)

In order to change a COP, the Council should observe the following procedures as indicated in the COP introduction:

> "...revisions to a COP may occur through Council review (including advisory body and public input) and adoption. This may occur with proper notice before a Council meeting, or may occur over the course of two Council meetings, with preliminary action at the first meeting and final action at the second. After final Council action the revised COP would enter into effect."

COP 7 lists membership in the Groundfish Allocation Committee (GAC) as the Council Chair, and one representative each from the state management agencies, National Marine Fisheries Service, and Pacific States Marine Fisheries Commission, with NOAA General Counsel providing legal advice. The Council also established and filled six non-voting seats to advise the GAC on intersector allocation issues relating to development of a trawl individual quota program. The non-voting seats were appointed on an ad hoc basis prior to establishing the GAC as a permanent committee, and the advisors were expected to serve as needed without specified appointment terms. However, when COP 7 was adopted in March 2005 establishing the GAC as a permanent committee, the non-voting advisors were not listed in the GAC membership.

At its September 2005 meeting, the Council proposed to modify COP 7 to give the non-voting members formal membership in the GAC, and to add another non-voting seat representing the whiting trawl sector. Council Staff has developed the following draft language to modify COP 7 for Council consideration:

COMPOSITION

> The Groundfish Allocation Committee will be composed of <u>voting members and non-voting members. Voting members will include</u> the Council Chair, and one representative each from Washington, Oregon, and California ~~the state~~ management agencies, National Marine Fisheries Service, and Pacific States Marine Fisheries Commission. <u>Non-voting members will include one advisor representing each of the following fishery sectors: non-whiting trawl, whiting trawl, open access, fixed gear, recreational, processor, and conservation.</u> NOAA General Counsel will provide legal advice.

These changes would have non-voting members as well as voting members serve indefinite terms.

The Council is scheduled to fill the non-voting advisor representing the whiting sector at this meeting, pending approval of the proposed COP changes.

At the March 2005 Council meeting modifications or replacements for most COPs were adopted. One exception was COP 14, Documentation of Outside Agreements (Agenda Item B.1.a, Attachment 1). The Council requested more time to review the COP, in particular points 3 and 4 under the Required Documentation section.

Council Action:

1. **Consider proposed changes to COP 7.**
2. **Consider changes to COP 14**

Reference Materials:

1. Agenda Item B.1.a, Attachment 1: COP 14 Documentation of Outside Agreements.

Agenda Order:

a. Agenda Item Overview — Don McIsaac
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Changes to COP 7 (Groundfish Allocation Committee) and COP 14 (Documentation of Outside Agreements)

PFMC
10/17/05

ELECTION OF COUNCIL CHAIR AND VICE CHAIR FOR 2006

Council Operating Procedure (COP) 1 states that the Council Chair and Vice Chair shall be elected, generally at the November Council meeting, by a majority vote of the Council. The officers shall serve one-year terms, which commence January 1. Further, COP 1 states that each officer may not serve more than two consecutive one-year terms in his/her respective office.

Chairman Hansen and Vice Chairman Ortmann were elected to their second consecutive terms in November 2004.

Council Action:

Elect Council Chair and Vice Chair for the 2006 term.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Don McIsaac
b. Nomination of Officers
c. **Council Action:** Elect Chair and Vice Chair for 2006

PFMC
10/18/05

Preliminary Draft Three Meeting Outlook for the Pacific Council

(All Candidate Agenda Items Listed; Shaded Items are Contingent and Counted in Time Estimate)

March Seattle, WA 3/6-3/10/06 Floor Time Estimate = 103% of Standard	April Sacramento, CA 4/3-4/7/06 Floor Time Estimate = 106% of Standard	June Foster City, CA 6/11-6/16/06 Floor Time Estimate = 81% of Standard
Administrative	**Administrative**	**Administrative**
Closed Session; Open Session Call to Order; Min.	Closed Session; Open Session Call to Order; Min.	Closed Session; Open Session Call to Order; Min.
Legislative Committee Report	Legislative Committee Report	Legislative Committee Report
		Fiscal Matters
Interim Appointments	Interim Appointments	Interim Appointments
3 Mtg Outlook, Final April Agenda	3 Mtg Outlook, Draft June Agenda, Workload	3 Mtg Outlook, Draft Sept. Agenda, Workload
Public Comment on Non-Agenda Items	Public Comment on Non-Agenda Items	Public Comment on Non-Agenda Items
Fishery Overcapacity Policy--Info Rpt--Mr. Terry		
Coastal Pelagic Species	**Coastal Pelagic Species**	**Coastal Pelagic Species**
NMFS Report		NMFS Rpt
Pac. Mackerel: Consider Need for Mop-up Fishery		Pacific Mackerel Harvest Guideline for 2006/07
Krill Amendment: Adopt Final Preferred Alt.		[SAFE doc provided to Council]
Enforcement Issues	**Enforcement Issues**	**Enforcement Issues**
USCG Annual Fishery Enforcement Rpt.		State Activity Rpt
Groundfish	**Groundfish**	**Groundfish**
NMFS Report	NMFS Report	NMFS Report
Stock Assmnts.: Prelim Plan for 2009-2010	Stock Assmnts.: Adopt Final Plan for 2009-2010	
2006 Inseason Management (1 Session)	2006 Inseason Mgmt (2 Sessions)	2006 Inseason Management (2 Sessions)
Pac. Whiting: Adopt Final 2006 Spx & Mgmt Meas.		EFPs for 2007: Submit for Initial Adv. Bod. Review
	2007-2008 Mgmt Recommendations: Adopt 1) Final Harvest Specs. (ABC/OY Levels) 2) Range of Refined Mgmt Measures for Public Review, &, if possible, a Preferred Alt.	2007-2008 Mgmt Recommendations: Adopt Final
	Intersector Allocation EIS: Plan Next Steps	
		Open Access Limitation: Planning
		Spiny Dogfish Longline Endorsement: Adopt FMP Amendment Alts. For Public Review

Agenda Item B.3.a
Attachment 1
November 2005

Preliminary Draft Three Meeting Outlook for the Pacific Council

(All Candidate Agenda Items Listed; Shaded Items are Contingent and Counted in Time Estimate)

March Seattle, WA 3/6-3/10/06 Floor Time Estimate = 103% of Standard	April Sacramento, CA 4/3-4/7/06 Floor Time Estimate = 106% of Standard	June Foster City, CA 6/11-6/16/06 Floor Time Estimate = 81% of Standard
Habitat Issues	**Habitat Issues**	**Habitat Issues**
Habitat Committee Report	Habitat Committee Report	Habitat Committee Report
Highly Migratory Species	**Highly Migratory Species**	**Highly Migratory Species**
NMFS Rpt		NMFS Rpt
Bigeye Tuna OF Response: Adopt Final Preferred FMP Amendment Alt.		Mgmt Measures: Prelim Proposals for any Change [Prelim SAFE Doc--Info Rpt]
Drift Gillnet Mgmt: Adopt Preferred Option for Modifying Time/Area Closure for Turtles	PFMC Representation in IATTC Process	Mgmt Regime for HS Longline Fishery: Consider Adopting FMP Amendment Alts. For Public Rev.
Albacore Mgmt Considerations	Albacore Mgmt Considerations	
Marine Protected Areas	**Marine Protected Areas**	**Marine Protected Areas**
Pacific Halibut	**Pacific Halibut**	**Pacific Halibut**
Rpt on IPHC Annual Mtg		
Incidental Catch Regs for 2006: Adopt Options for Public Rev	Incidental Catch Regs for 2006: Adopt Final	
Salmon	**Salmon**	**Salmon**
2006 Mgmt Options: Adopt Range for Public Rev & Appt. Hearings Officers	2006 Management Options: Final Adoption	Fishery Update--Info Rpt
Ft. Bragg Commercial Fishery Opening Mar 15: Consider Opening/Closing Date & Quota	2006 Methodology Review: Establish Process & Preliminary Priorities	EFH Review Process: Next Steps
Mass Marking & CWT Information Briefing	Identify Stocks not Meeting Consv. Objectives	
Klamath Fall Chinook Conservation Objective: Next Steps	Selective Fisheries Briefing (or Information Rpt)	
Update on EFH Review Process	Klamath Fall Chinook Conservation Objective: Next Steps	
Special Joint Sessions	**Special Joint Sessions**	**Special Joint Sessions**
Salmon Excluder Device in Makah Whiting Fishery (Wed.)	Salmon Genetics Research Rpt	

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/	ANCILLARY MEETING SCHEDULE Day/Group	Start Time	Continuing Through
MONDAY, MARCH 6 - 8:00 am					**MONDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →			A. GMT	8:00 AM	Thur.
		[Habitat Committee meets in Portland in the week prior to Council Mtg]			B. GAP	8:00 AM	Thur.
					C. SAS	8:00 AM	Fri.
		SPECIAL SESSIONS			D. STT	8:00 AM	Fri.
		On Wed. 10 am--Salmon Excluder Device Used in Makah Whiting Fishery		GAP; SAS	E. SSC	8:00 AM	Tue.
					F. Legislative	9:30 AM	Mon.
					G. HMSAS	1:00 PM	Tue.
					H. HMSMT	1:00 PM	Tue.
					Chair's Briefing	1:30 PM	Mon.
					I. EC	5:30 PM	Fri.
CLS	1.00	**Closed Session Agenda: Personnel & Litigation--3:00 pm**					
		Adv. Body Issues - Appointments	Info	None			
		Litigation Status (E. Cooney)	Info	None			
A.	0.30	***General Session*** **Call to Order - 4:00 pm**					
1-3		Opening, Roll Call, ED Rpt	Info				
4		Approve Agenda	Decision				
B.		**Administrative Matters**					
1	0.20	Approve Minutes - September & November 2005	Decision				
2	0.20	Council Meeting Agenda Planning	Guidance	All			
	1.70						
TUESDAY, MARCH 7 - 8:00 am					**TUESDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →			EC; GAP; GMT; SAS; STT; SSC;		
					HMSAS; HMSMT continue		
C.		**Enforcement Issues**					
1	1.00	USCG Annual Fishery Enforcement Rpt	Info	EC			
D.		**Habitat**					
1	0.50	Habitat Committee Rpt	Decision	HC			
E.		**Pacific Halibut Mgmt**					
2	0.30	Report on International Pacific Halibut Commission Annual Mtg	Info	GAP; SAS			
3	1.00	Incidental Catch Regs in Salmon Troll & Sablefish Fisheries: Adopt Pub Rev Options	**Action**	GAP; SAS			
F.		**Salmon Mgmt**					
1	0.50	Ft. Bragg Mar 15 Commercial Fishery Opening: Consider need to Modify Opening Date & Quota	**Action**	STT; SAS			
2	0.50	Review of 2004 Fisheries & Summary of 2005 Stock Abundance Est.	Decision	STT; SAS; SSC			
3	3.00	2006 Mgmt Options: Identify Mgmt Objectives & Prelim Definition	Decision	STT; SAS; EC			
	0.50	**Public Comment Period for Non-Agenda Items**	Info				
	7.30						

Agenda Item B.3.a
Attachment 2
November 2005

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/	ANCILLARY MEETING SCHEDULE Day/Group	Start Time	Continuing Through
WEDNESDAY, MARCH 8 - 8 am					**WEDNESDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →		→	EC; GAP; GMT; SAS; STT continue		
G.		**Highly Migratory Species Management**					
1	0.50	NMFS Rpt--Region & Science Ctr	Info	HMSAS; HMSMT			
2	1.00	Bigeye Tuna Overfishing Response: Adopt Final Preferred FMP Amendment Alt.	Decision	HMSAS; HMSMT			
3	2.00	Drift Gillnet Mgmt: Adopt Final Regulatory Amendment to Closed Area	Decision	HMSAS; HMSMT; EC			
4	0.50	Albacore Mgmt: Consider Possible Actions	Guidance	HMSAS; HMSMT			
F.		**Salmon Mgmt (continued)**					
4	2.00	2006 Mgmt Options: Council Recommendations for Analysis	Guidance	STT; SAS; EC			
5	1.00	PSC Report on Mass Marking & CWTs: Briefing--Invite Author	Info	STT; SAS			
6	1.50	Klamath Fall Chinook Conservation Obj.: Next	Decision	STT; SAS; SSC			
	8.50						
		10 am Briefing--Salmon Excluder Device Used in Makah Whiting Fishery		GAP; SAS			
THURSDAY, MARCH 9 - 8 am					**THURSDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →		→	GAP; GMT; EC; SAS; STT continue		
H.		**Groundfish Mgmt**					
1	0.75	NMFS Rpt (Region & Science Center)	Info	GMT; GAP; EC			
2	1.00	Stock Assessments: Planning for 2009-2010 Season	Guidance	GMT; GAP; SSC			
3	2.50	Pacific Whiting: Adopt Final 2006 ABC, OY, & Mgmt Measures	**Action**	GMT; GAP, EC, SSC			
4	2.00	Inseason Adjustments: Final Adoption of Appropriate Changes	**Action**	GMT; GAP; EC			
F.		**Salmon Mgmt (continued)**					
7	0.75	Update on EFH Review Process	Guidance	STT; SAS; HC			
8	1.00	2005 Mgmt Options: Further Council Direction, If Necessary	Guidance	STT; SAS; EC			
	8.00						

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/	ANCILLARY MEETING SCHEDULE Day/Group	Start Time	Continuing Through
FRIDAY, MARCH 10 - 8 am					**FRIDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →			EC as nec.		
I.		**Coastal Pelagic Species Mgmt**					
1	0.50	NMFS Rpt--Region & Science Ctr	Info	CPSAS; CPSMT			
2	0.50	Pacific Mackerel Fishery: Consider Need for Mop-up Fishery	**Action**	CPSAS; CPSMT			
3	1.25	FMP Krill Amendment: Adopt Final Preferred Alternative	**Action**	CPSAS; CPSMT; Others			
B.		**Administrative Matters**					
3	0.50	Legislative Matters	Guidance				
4	0.20	Interim Appointments to Adv. Bodies, Standing Com., & Other Forums	Decision	None			
5	0.80	3 Mtg Outlook & April Agenda: Final Guidance & Adopt April Agenda	Guidance	GMT; GAP; & as nec			
F.		**Salmon Mgmt (continued)**					
9	2.50	2005 Mgmt Options: Adopt for Public Review	**Action**	STT; SAS; EC			
10	0.10	Appoint Hearings Officers for 2005 Mgmt Option Hearings	Decision	STT; SAS			
	6.35						

1/ Anticipates each advisory subpanel will review agenda items for its particular FMP.

• Key to Council Task: Info=briefing; Guidance=formal or informal direction on issue; Decision=formal determination; Action=results in implementation by NMFS.

Candidate Agenda Items Not Scheduled

1.25	Intersector Allocation EIS: Next Steps	Guidance	GAP, GMT, EC	
1.00	Open Access Limitation: Update and Planning	Guidance	GMT; GAP, EC	
IR.	**Informational Reports (available in Briefing Book, but no time scheduled on Agenda):**			
1	Fishery Overcapacity Policy: Briefing by Joe Terry	Info	All	
2		Info		
3		Info		
4		Info		
5		Info		

Due Dates (all dates COB):

Meeting Invitation Memo Distributed:	1/20
Public Meeting Notice Mailed:	2/2
FR Meeting Notice transmitted:	2/8
Final day to receive public comments for placement in BB:	2/15
Final deadline to submit all BB materials:	2/15
Final deadline to submit cover memos for Ancillary Meetings:	2/20
Briefing Book Mailing:	2/23
Final deadline to receive public comments for distribution to Council on first day of mtg:	2/28

31.85	103%

Agenda Item B.3.b
Supplemental HC Report
November 2005

HABITAT COMMITTEE REPORT ON COUNCIL MEETING AGENDA PLANNING

The Habitat Committee (HC) reviewed the Council's three-meeting schedule and had the following comments:

- The HC believes that ecosystem management issues should be addressed in the agenda. This summer, Pacific States Marine Fisheries Commission produced a report on ecosystem approaches to fishery management. Dr. Peter Lawson of the Council's Scientific and Statistical Committee contributed to the report and has offered to provide an overview to the Council. The HC believes this would be a valuable use of Council time.
- The HC would like to meet in conjunction with the Council during the March meeting, rather than in advance of the meeting.
- In March, the HC may ask the Council to address Klamath Project flow issues associated with the Southern Oregon/Northern California Coho Biological Opinion (BO), which was recently remanded by the 9th Circuit Court back to District Court for injunctive relief (i.e. interim management measures).
- A remand to the Columbia River BO on hydropower operations has been issued with a new BO expected after one year. The Council may wish to comment on proposed interim management measures in March prior to the water management season.

PFMC
10/26/05

Agenda Item B.3
Situation Summary
November 2005

COUNCIL MEETING AGENDA PLANNING

The purpose of this agenda item is to provide initial information to Council Members early in the Council meeting to facilitate planning for future Council meeting agendas.

On Friday, November 4, under Agenda Item B.7, the Council is scheduled to provide guidance on the Council three-meeting outlook (March, April, and June), the draft agenda for the March Council meeting, and Council staff work load priorities for November 7, 2005 through April 7, 2006.

Under this agenda item, the Executive Director will review initial drafts of the three-meeting outlook and the March Council meeting agenda and respond to any questions the Council may have regarding these initial planning documents. While this agenda item is essentially informational in nature, after hearing any reports and comments from advisory bodies or the public, the Council may wish to provide guidance to the staff on any preparations for Agenda Item B.7.

Council Tasks:

1. **Receive information on potential agenda topics for the next three Council meetings.**
2. **Receive information on an initial draft agenda for the March 2006 Council meeting.**
3. **Consider providing guidance on the development of materials for Agenda Item B.7.**

Reference Materials:

1. Agenda Item B.3.a, Attachment 1: Preliminary Draft Three-Meeting Outlook for the Pacific Council.
2. Agenda Item B.3.a, Attachment 2: Preliminary Draft March Council Meeting Agenda, March 5-10, 2006 in Seattle, Washington.

Agenda Order:

a. Agenda Item Overview — Don McIsaac
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. Council Discussion of Future Council Meeting Agenda Topics

PFMC
10/18/05

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

THE DIRECTOR

AUG 26 2005

Mr. Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place
Portland, Oregon 97220-1384

RECEIVED
SEP 06 2005
PFMC

Dear Mr. Hansen:

I am happy to present to you our Draft Operational Guidelines for Development and Implementation of Fishery Management Actions (OGs) and request your assistance in implementing them on a test basis.

This draft was prepared in close conjunction with the Sustainable Fisheries Assistant Regional Administrators, and with input from the Office of Protected Resources, Office of Habitat Conservation, Office of the General Counsel for Fisheries, Office of Law Enforcement, and the regional National Environmental Policy Act (NEPA) Coordinators. My staff also reviewed the approach with regional and Fishery Management Council (Council) staff in regional workshops during 2004, and with the Council Chairs at the April 2004 meeting in Hawaii. In March 2005, we circulated a revised draft for additional internal review through the Policy Directives System review process. Based on these reviews, this draft has been modified to address concerns associated with practicability, resource constraints, and perceived effects on Council autonomy. It has also been modified to include greater detail regarding the Endangered Species Act section 7 consultation process.

Overview of Guidelines:

The philosophy and principles of the draft OGs include cooperation and shared responsibility with Councils, frontloading review, and use of the Magnuson-Stevens Fishery Conservation and Management Act and NEPA processes as a framework for necessary analyses. The draft describes the roles and responsibilities of various offices, and establishes an approach for increasing collaboration through joint planning efforts and Regional Operating Agreements (ROAs). Standards are identified to assess the adequacy of fishery management actions and a model is described for ensuring effective communication and reconciliation of statutory timelines.

The model represents a quality-based, outcome-oriented approach based on the Hazard Analysis Critical Control Point (HACCP) system that will facilitate achievement of our Regulatory

Streamlining Performance goals. It identifies steps in the regulatory process where critical errors may occur that would prevent an action from meeting the standards and requires feedback at those key steps, leaving room for discretion and flexibility in terms of working out particular staffing questions and approaches for complying with stated standards. The narrative defines new terminology used in the model, provides an overview of the key steps in the process, and describes the four key phases of rulemaking. A fundamental feature of the model is the requirement at four steps for an affirmative statement from the Regional Administrator that documentation and process are adequate and complete to proceed with the action. Barring the issuance of such a statement, actions being developed pursuant to the model should not move forward until deficiencies are corrected.

Table 1 is the heart of the model. It sets forth 16 steps and 3 substeps that potentially apply to any fishery management action, and for each step specifies who needs to be involved, what standards apply, what timing factors must be considered, and what, if any, documentation is necessary, along with additional commentary where applicable. Depending on the type of action being prepared (Fishery Management Plan vs. regulatory amendment), the type of NEPA analysis necessary, and the potential for effects on protected species or essential fish habitat, the number of steps that would be applicable could be less than 16. Steps that apply in only limited circumstances are identified. If the approach in the model is followed, the result should be an expedited review and implementation process at the end, with better litigation results and improved decision-making.

Next Steps:

Successful implementation of these guidelines will require continuing collaboration between the Councils and NOAA's National Marine Fisheries Service (NMFS). A key first step is to develop written ROAs that specify agency and Council responsibilities and steps that will be taken to prepare documentation for fisheries conservation and management decisions. I request that you immediately initiate implementation of these draft OGs on a test basis by developing an ROA with your corresponding NMFS regional office.

I also request that you begin utilizing the joint planning process to identify and prioritize upcoming needs and actions and raise issues with national policy implications to NMFS Headquarters for early guidance. I also recommend that, to the extent practicable and on a test basis, you begin applying the model contained in the Draft OGs to new actions being developed. Please be aware that NOAA General Counsel has expressed concern that full implementation of the model may not be possible under current resource constraints.

As we begin to move forward with ROA development and OG implementation, please identify any problem areas that you perceive with the current approach. I want to emphasize that the

Draft OGs are intended to function as a living document that can be modified to address changing needs. We should plan to discuss implementation progress and needs for modifications at the next meeting with Council Chairs.

Sincerely,

William T. Hogarth, Ph.D.
Assistant Administrator
for Fisheries

Enclosure

DRAFT OPERATIONAL GUIDELINES:

For Development and Implementation of Fishery Management Actions

August 23, 2005

DRAFT OPERATIONAL GUIDELINES: For Development and Implementation of Fishery Management Actions

Table of Contents

I. Introduction

A. Statement of the Assistant Administrator

In April 2001, I convened an Executive Session of NOAA Leadership to announce NMFS commitment to a new way of doing business. Recognizing a need to improve the decision-making process for fishery management actions, we set an ambitious goal for ourselves: to develop a model process for better integrating the multiple statutory mandates applicable to fisheries management, improving decision-making, and reducing litigation risks. As our project progressed, the regional fishery management councils, Congress, and others helped refine our objectives by focusing on the following specific needs: clearer definition of missions, authorities, roles, and responsibilities; assuring adequacy of decision documents; reconciling statutory timelines; elimination of unnecessary delays and unpredictable outcomes; increasing accountability; and utilization of standardized practices.

Our commitment to achieving these goals has required a sustained effort by agency leadership and staff at all levels. We have also benefited from support and cooperation from friends and resources outside the agency. As a result of this cooperative effort, I am pleased to introduce draft revised Operational Guidelines that will help us meet our stated needs.

These Operational Guidelines include a model for integrating our statutory mandates. They approach the fishery management decision-making process from a quality-based, outcome oriented perspective. They rely heavily on the concepts of cooperation and shared responsibility with councils; frontloading of review; and use of the MSA and NEPA processes as a framework for pulling together all necessary analyses. I want to emphasize that NMFS leadership is committed to ensuring frontloading by all key reviewers and early identification of issues. We are also committed to processing documents through the agency decision-making systems on an expedited basis when they have been prepared in conformance with the model. If this approach is followed, the result should be an expedited review and implementation process at the end, with better results in litigation and improved decision-making all around. I also want to stress that these guidelines are intended to function as a living document that can be updated and modified as needs arise.

Coordination with the fishery management councils is a central feature of these guidelines. Recognizing that the councils are uniquely situated to inform the development of sound fishery management measures, these guidelines take special account of the role of the councils in the process and institutionalize a spirit of collaboration. I look forward to a future of enhanced cooperation with the councils in terms of both developing fishery management measures and continually assessing the effectiveness of our process.

Many thanks to everyone who gave time and energy to help NMFS develop this approach to better fulfilling our mission as stewards of our nation's marine resources.

B. Structure of the Operational Guidelines

Parts I and II of these OGs provide background on and an overview of the philosophy of the guidelines. Parts III and IV define the roles of the various parties involved in the development and implementation of fishery management actions, and identify applicable standards. Part V provides a model for the fishery management process that is quality-based and outcome-oriented, and that identifies checks for assuring adequacy of process and analyses at critical junctures. The model is intended to serve as a tool rather than a mandate. Adherence to the model is not mandatory for the Councils.

C. Purpose and Objectives

These OGs provide an approach for establishing a formalized cooperative relationship with the Councils and set forth a model for integrating the many statutory mandates that apply to the development of fishery management actions. Consistent with our efforts under the Regulatory Streamlining Project (RSP), the approach taken in the OGs addresses problems with "unnecessary delays, unpredictable outcomes, and lack of accountability" and moves us towards the application of "standardized practices" to "improve the quality and efficiency of regulatory decisions and raise the likelihood of success in litigation" (S. RPT 107-42).

These guidelines are based on the concept of "frontloading," which refers to active participation of Council and key agency staff (e.g., Sustainable Fisheries, Protected Resources, Habitat Conservation, Economists, Social Scientists, and General Counsel) at the early stages of fishery management action development – a "no surprises" approach. The goal is to ensure that, to the extent practicable, all significant legal and policy issues will be identified early in the process.

The objective of these OGs is to facilitate development and implementation of fishery management actions under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).[1] A related goal is to facilitate development of more concise documentation. While these guidelines have been tailored to fit the MSA fishery management process for Council-developed actions, the underlying principles have broad applicability, and National Marine Fisheries Service (NMFS) will apply them to other agency actions as appropriate.

The preparation, review, approval and implementation of fishery management actions and the attendant rules and regulations under the MSA is, by its very nature, a complex process in which the Councils and the Secretary have distinct, yet overlapping roles. In many instances, the issues presented are controversial, politically charged, and difficult to analyze. In addition, a variety of other applicable laws impose even more analytical and procedural requirements on an already complex system. NMFS, with direction from Congress, initiated the RSP to improve the way the agency and the Councils integrate the multiple mandates governing fisheries management; increase efficiency in designing and implementing fishery management measures; and improve overall the decision-making process. The ultimate intent of streamlining is to ensure that the process is done correctly the first time. This implies:

- Legal and policy requirements will be identified and considered earlier in the process so that they may be dealt with more expeditiously ("frontloading"). The frontloading process may require more investment of time upfront, but should help ensure that potential problems are identified early and are not allowed to become real problems in later stages of review and implementation.

[1] The term "fishery management actions" should be interpreted broadly to include a wide range of activities taken pursuant to the MSA, including proposed and final rulemakings, Fishery Management Plans with no implementing regulations, and other substantive actions by the agency that promulgate or are expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, and advance notices of proposed rulemaking.

- The OGs will provide clear and consistent articulation of critical requirements while allowing Regional Staff flexibility to work with their Councils to achieve overall objectives for frontloading and the development of quality documentation of their decision making process.

- Quality control and assurance activities will ensure that requirements are being met, and that, if problems arise, they do not recur.

- Timely inputs and review by staff will occur as early as possible in the process.

- The ability of the Councils and NOAA to develop actions and policy will be enhanced when we work together to follow the standards and requirements set forth in the OGs.[2]

- NMFS Headquarters offices (HQ) will be involved early in substantive discussions that have implications for consistency with national policies and guidance, develop new guidance as needed and make it available via the web, facilitate the processing of decision documents, and conduct training and quality assurance.

These guidelines identify requirements and standards, while allowing maximum flexibility for the Councils and NMFS Regional Staffs to design implementation procedures that are most effective in their particular contexts. These guidelines focus on the fishery management plan (FMP)/regulation process and completely supercede the OGs prepared in 1997.

D. Philosophy and Approach

1. Fishery management decisions must be supported by documentation that adequately provides for the basis of a decision under the existing legal requirements.

2. The respective decisions of the Councils and NMFS are sufficiently interrelated that they ought to be supported by the same record. Thus, the guidelines focus on collaborative efforts by Council and NMFS staff to develop the documentation that supports their decisions.

3. Consistent with the objective of emphasizing the roles of Councils and NMFS Regional Staff, the approach is to raise, analyze and properly deal with all issues as soon as they can be anticipated. The model contained within these guidelines identifies points in the process where agency feedback is critical (Critical Feedback Points (CFPs)), and the basic documents that are required at each CFP to assure quality. The model then sets forth a system for obtaining agency feedback that the process and documents support and provide a rational basis for decision-making and are legally sufficient at that stage for the process to move forward. Details regarding how each Council and NMFS Regional Office address their particular implementation of procedures to achieve this sufficiency will be left to them to develop collaboratively through Regional Operating Agreements (ROAs). The use of feedback mechanisms at CFPs in the model is not intended to prevent the use of more frequent, or continuous, feedback loops.

> *A CFP is a step in the decision-making process at which critical decisions are made that could ultimately affect approvability of the action. The number of CFPs applicable to an action varies depending on the NEPA and MSA requirements that apply to that action. The OGs identify a full list of steps and CFPs for each type of action in the model.*

[2] NMFS Regional Staffs include both the Science Center staff and the Regional Office staff. Although Regional GC is technically part of NOAA GC rather than NMFS staff, whenever possible, Regional GC will participate as part of the Regional Staff team.

4. All relevant NOAA and DOC reviewers will participate early in the process to ensure that their concerns are raised at a point in the process where they can be addressed in such a way that progress is not delayed or halted later. In short, the intent is to avoid sequential reviews and encourage concurrent input to decisions at the earliest stage possible.

5. Councils and NMFS Regional Staffs will each undertake a joint planning process that occurs at least once annually and provides for a 12- to 24-month planning horizon. This process should provide a forum for identifying and prioritizing upcoming needs and actions. Any issues with national policy implications will be raised to NMFS HQ for early guidance.

6. Councils and NMFS Regional Offices will enter into written ROAs that specify responsibilities and steps that will be taken to prepare documentation for fisheries conservation and management decisions.

Each region will enter into written Regional Operating Agreements with its Council/s delineating specific roles, responsibilities, and timing issues necessary to conform with these OGs.

II. General Principles for the Fishery Management Process

A. Use of the MSA and NEPA Processes as an Umbrella. The open and public processes required by the MSA and the National Environmental Policy Act (NEPA) will provide the basis for implementing regulatory streamlining. Together, the MSA and NEPA require the incorporation of all relevant factors into fisheries conservation and management decisions, prescribe an open process for identifying issues and considering a range of alternatives, provide for review and participation by affected States and Indian tribes, and promote effective public review and input. The MSA requires fishery management actions to be consistent with other applicable laws. Similarly, Council on Environmental Quality (CEQ) Regulations for Implementation of NEPA require agencies to integrate the NEPA process with other planning and regulatory compliance requirements (such as the consultation requirement under Section 7 of the Endangered Species Act (ESA), and consistency determinations under the Coastal Zone Management Act (CZMA)). This integration must occur at the earliest possible time to ensure that planning and decisions take into account environmental values reflected in these other laws and regulations, avoid delays later in the process, and prevent potential conflicts with alternatives and mitigation methods required by other laws. Documents prepared under the MSA and NEPA do not replace other applicable requirements, such as the Regulatory Impact Review (RIR), which is prepared in compliance with EO 12866, or the Preliminary Regulatory Economic Evaluation (PREE) prepared in compliance with the Regulatory Flexibility Act (RFA). Rather, the public processes of the MSA and NEPA provide a venue for addressing all applicable requirements.

B. Frontloading. All relevant reviewing parties will participate early in the process to ensure that all significant legal and policy issues are identified to the extent practicable. Draft documents will be circulated to all Regional, Science Center, GC, and Council staff in key responsibilities, as well as Headquarters Staff (HQS) as appropriate, for review and comment. When the model is followed, drafts will be circulated prior to CFPs.

The term HQS refers to Headquarters staff who will be expected to review and/or clear an action. Specifically, HQS include the NOAA Office of Strategic Planning (OSP); the Office of the General Counsel (GC); the NMFS Assistant Administrator for Fisheries (AA); the Offices of Sustainable Fisheries (OSF), Habitat Conservation (OHC), and Protected Resources (OPR); the Office of Law Enforcement (OLE); and the Department of Commerce Office of General Counsel (DOC OGC), as applicable.

C. **Collaboration in the Preparation of Documents.** Beginning at the earliest planning stage, it is essential that the staffs of the Councils and the NMFS Regional Offices collaborate in the preparation and drafting of documents. It should not be assumed that either the Councils or the Regional Offices have a particular responsibility for doing all of the staff work for any given required document. How this happens in each Council/Region pairing will be established by an operating agreement between the Council and the Regional Office.

D. **Regional Operating Agreements with Councils.** Individual needs and variations among regions should be accommodated while ensuring adequacy of process and documentation nationwide. There is a need for a clear understanding of roles, responsibilities, and obligations among all parties who have a role in ultimately clearing an action. Therefore, each Region will develop ROAs with its individual Councils, via the Council Executive Directors and in consultation with the appropriate Regional Attorney, that set forth the procedures and review/clearance processes it will use to ensure the preparation of adequate and complete documents.

E. **Coordination with NMFS Headquarters.** The Regions shall ensure that NMFS HQ offices have the opportunity to consider and provide input to decisions from the earliest stages. NMFS HQ will track decisions as they progress and will be expected early in the process to advise the Regional Offices of national policy concerns. In addition they will facilitate the consideration of decisions in process by other HQ reviewers (NOAA and DOC). A formal Communication Protocol will be established to facilitate such coordination.

> *Communication Protocol: NMFS HQ will work with the regions to establish a protocol to ensure good communication between the regions and HQ on all actions. The protocol will specify how and when the AA should be advised of issues relating to actions, as well as prioritizations of actions made pursuant to the joint*

F. **Council Action/NMFS Advisory Statements.** When the model is followed, at CFPs the Regional Administrator will provide written feedback that the process and documentation are adequate and complete. These procedures are described in greater detail in section V, below.

G. **Determinations Must be Logically Supported by the Facts and Analyses in the Record.** Determinations regarding an action's legal and programmatic sufficiency must be supported by the underlying analyses. This applies to both substantive conclusions and determinations regarding procedural sufficiency.

> *Advisory Statements are letters to a Council from the RA indicating that the relevant documentation and process are adequate and complete for that step and that all necessary reviewers have been consulted. The Advisory Statement requires a determination of legal sufficiency by the Regional GC before its transmission to the Council.*

H. **Clear and Concise Documentation.** Documents to support decisions must be clearly written and easily understandable by the public. Clear and concise writing will facilitate development of a clear and complete record and will ensure the development of enforceable regulations.

I. **Expedited Approval and Implementation Process, Benefits of Conformance.** Adherence to agency guidance on standards for analytical documents will expedite the approval and implementation process. Documentation that does not adhere to agency guidance (e.g., requires additional analysis or consideration of additional issues) may not be processed in an expedited manner. To the extent that Councils and NMFS staff follow the model set forth below, Council-recommended fishery management actions will benefit from more timely review, approval, and implementation; higher likelihood of approval; and decreased risk of litigation. In some circumstances, adherence to the model may enable

NMFS to approve an FMP or amendment earlier than day 95 of the Secretarial review process (i.e, between days 61 and days 95). In addition, adherence to the model will ensure greater accountability of NMFS and GC staff charged with reviewing Council documents and providing timely advice.

J. **Concurrent Reviews.** These reviews are encouraged throughout the process of developing documentation. Sequential reviews delay the decisions from moving forward in a timely manner.

III. Roles

This section describes the general roles of various parties involved in preparation and implementation of fishery management actions. Additional details regarding specific responsibilities for analysis, drafting, and review, including provisions for assuring appropriate coordination between HQ and regional offices and ensuring consistent interpretation and application of national policies, should be specified in the ROAs and Communication Protocol.

A. Roles in General

- **The Councils** are responsible under the MSA for the preparation of FMPs. The Councils initiate documentation to support fishery conservation and management decisions, and collaborate with the NMFS Regional Offices, and state agencies and other stakeholders as appropriate.

- **The NMFS Regional Staffs** are responsible for working as part of a team with Council staff to develop adequate and complete documentation, coordinating comments from HQ and Regional Staff such that the agency presents a unified message pursuant to procedures set forth in the ROA and Communication Protocol, advising NMFS HQ of decisions being made, and forwarding documentation to HQ. When the model is followed, the Regional Administrator (RA) will provide Advisory Statements confirming the adequacy and completeness of process and documentation as provided in these guidelines, or elevate to HQ and seek to resolve any issue preventing the issuance of an Advisory Statement, including any issue preventing a determination of legal sufficiency.

- **The NMFS Science Centers,** in addition to working as part of the NMFS Regional Staffs described above, and working as part of the team cooperating with the Councils, in some instances, the Science Centers make certifications regarding certain requirements, including overfishing definitions. The specific responsibilities of each Science Center are specified in the Region's ROAs.

- **At NMFS Headquarters**, the AA is responsible for (1) deciding whether to concur in the RA's decision regarding approval of Council-recommended FMPs/amendments; (2) deciding whether to approve final rules; (3) determining that the appropriate environmental impact review, EIS, or FONSI has been completed for the action; and (4) resolving with NOAA/GC HQ any issues elevated to HQ including issues preventing issuance of an Advisory Statement and issues related to a determination of legal sufficiency. Within HQ, the Office of Sustainable Fisheries (OSF) will track Regional Council and NMFS FMP activities; consult with and advise regions on the national policy implications of decisions; package and forward regional documents to the NMFS leadership; and facilitate communications to resolve problem issues raised during HQ or NOAA/DOC/OMB reviews, either as a participant on an FMAT or as otherwise appropriate.

- **NOAA GC** will advise the Councils and NMFS Regional Offices, through the NOAA GC Regional Offices, throughout the process of developing documentation and making and reviewing decisions. GC Regional Offices will provide legal advice to the RA confirming legal sufficiency of

documentation and process, and elevate to NOAA/GC HQ any issue preventing a determination of legal sufficiency. NOAA GC will also provide legal advice, through GCF, to NMFS leadership as appropriate, and will provide final approval for legal sufficiency of regulatory packages requiring clearance from NOAA HQ or DOC/GC. NOAA GC HQ will also work with NMFS HQ to resolve legal issues elevated from the Regions.

- **NOAA's NEPA Coordinator**, in the Office of Strategic Planning, Program Planning and Integration (PPI/OSP), reviews and provides final clearance for all EISs and FONSIs. Additionally, the NOAA NEPA Coordinator is responsible for filing EISs with the Environmental Protection Agency and signing all transmittal letters that disseminate NEPA documents for public review.[3]

B. Specific Duties and Responsibilities

1. **Regional Operating Agreements (ROAs).** Each Region will enter into written agreements with its Council/s, in consultation with the appropriate Regional Attorney, delineating specific roles and responsibilities necessary to conform with these OGs. The provisions of the ROAs must be sufficient to ensure compliance with the applicable requirements. The ROAs should also specify the roles of the Science Centers and may address interactions with Regional GC. If an existing Operations Plan explains the role of the Science Center, the ROA may simply reference the existing plan. The ROA should also address timing issues associated with the need to provide draft documents with sufficient lead time to allow for quality review and comment.

2. **Communication Protocol.** NMFS HQ will work with the regions to establish a protocol to ensure good communication on all actions. The protocol will specify how and when the AA should be advised of issues relating to actions, as well as prioritizations of actions made pursuant to the joint planning process. The protocol will also establish steps that HQ will take to facilitate movement of actions through HQ review. Each HQ office that has responsibility for ensuring national consistency on fishery management activities is encouraged to develop protocols with its regional counterparts to set forth procedures for ensuring early involvement, providing opportunities for review, and communicating about how issues have been resolved. In addition, NMFS may wish to develop a Communication Protocol for communicating on issues and decisions with States, interstate commissions, and Indian Tribes that share management responsibility for affected resources.

IV. Standards

A. Standards for Assessing Adequacy of Content

NMFS currently relies on the following guidance documents that provide standards of adequacy for relevant applicable laws:

- FRA, APA: Document Drafting Handbook, OFR; Preparation of FR Documents, 2004.
- CZMA: NOS regulations at 15 CFR part 930.
- DQA: May 5, 2003, NMFS Section 515 Pre-dissemination Review Guidelines; NOAA's Information Quality Guidelines, October 1, 2002.
- ESA: ESA Consultation Handbook; ESA CFR regulations (50 CFR 402.01 et seq.).

[3] Note that the NOAA NEPA Coordinator is a separate position from the NMFS NEPA Coordinator whose job is to assist at the Fisheries level with NEPA compliance.

- MSA: National Standards Guidelines 50 CFR 600 et seq.; Essential Fish Habitat (EFH) Final Rule (67 FR 2343, Jan. 17, 2002); EFH Consultation Guidance; Social Science Guidelines.
- NEPA: CEQ Regulations; NAO 216-6; EPA Guidance, "Reviewing Environmental Impact Statements for Fishery Management Plans," Nov. 2004.[4]
- RFA, EO 12866: Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000); GCF Guidance on EO 12866 compliance (Macpherson memo, 2/06/98).
- PRA: 5 CFR 1320 et seq.

B. Standardized Format, Templates, and Examples

OSF will develop and maintain a website that contains a comprehensive set of templates and examples of documents.

V. Model for Achieving RSP Goals

This model combines outcome-oriented guidance on requirements at various stages in the decision-making process with quality control checkpoints to ensure timely feedback on whether standards are being met. As a first step, the model identifies the relevant steps in the process, then identifies those steps at which critical decisions must be made that could ultimately affect the approvability of a fishery management action, i.e., CFPs. The full range of steps is set forth in Table 1, below. The model requires feedback at certain CFPs to ensure that frontloading is occurring and that documentation and process are adequate and complete to support decision making at the following steps: Step 2, the initial determination of which NEPA document to prepare; Steps 4, and 4(c) if relevant, Council identification of preferred alternative and adoption of a Draft Environmental Impact Statement (DEIS); Step 7, Council vote to recommend agency action; and Step 9, the step at which the RA prepares a Decision Memorandum to begin Secretarial review.

The model uses new terminology to describe the quality-based approach. The terminology and procedures of the model are explained below and in Table 1.

A. Terminology and Concepts.

1. **Critical Feedback Points (CFPs).** A CFP is a step in the decision-making process at which critical decisions are made that could ultimately affect approvability of the action. The number of CFPs applicable to an action varies depending on the MSA and NEPA requirements that apply to that action. For an FMP with an EIS, there are 16 steps, and potentially three additional substeps if ESA or EFH consultations are necessary, four to five of which are CFPs. In contrast, other actions, such as a regulatory amendment for which a Categorical Exclusion (CE) is asserted, may have only ten steps, of which three are CFPs. The full list of steps and CFPs for each type of action are delineated in Table 1.

[4] In addition to the published regulations, CEQ has developed a variety of guidance documents to assist drafters in preparing environmental analyses. Guidance on issues such as conducting scoping, assessing cumulative impacts, and addressing environmental justice requirements, among other topics, are available via the CEQ website at http://ceq.eh.doe.gov/nepa/nepanet.htm. Information regarding EPA's review process is available at EPA's website, http://www.epa.gov/compliance/resources/policies/nepa/nepa_policies_procedures.pdf.

2. **Feedback Mechanisms.** In this model, feedback mechanisms are used at steps 2, 4, 4(c) (if applicable), 7, and 9, to ensure that the necessary procedural steps have been completed and the documentation and analyses are sufficient to allow the process to proceed. These checks take the form of written documentation from the RA and are described in greater detail below.

   a. **Steps 2, 4, 4(c), and 7, Advisory Statements.** At steps 2, 4, 4(c), and 7, the RA provides written feedback known as an "Advisory Statement," in the form of a letter to the Council indicating the relevant documentation and process are adequate and complete for that step and that all necessary reviewers have been consulted. The Advisory Statement is accompanied by a written determination of legal sufficiency. As described below in paragraphs 4 and 5, assessments of adequacy and legal sufficiency will be based on applicable standards and will vary according to the point in the process at which the action is being evaluated. It is likely that requisite degrees of review will also vary according to the CFP. The ROAs and the Communication Protocol will specify procedures for ensuring that all necessary parties participate and provide feedback. Timing is a factor here – in order for the RA to sign an Advisory Statement, he/she must have draft documents available for review to circulate to all relevant reviewers sufficiently in advance of planned Council action.

      The Advisory Statement is a new type of feedback mechanism created in these guidelines. It serves several important functions in RSP: (1) it ensures that concerns are raised at the points in the process where they can be addressed and corrected; (2) it makes agency reviewers accountable for raising issues early in the process; (3) it helps prevent unexpected outcomes and/or delays at the end of the process; and (4) it ensures that decisions reflect regional and national policy, thereby achieving consistency.

   b. **Step 9, RA's Decision Memorandum.** The RA's Decision Memorandum to initiate Secretarial review will serve to certify that the analyses as presented by the Council support the final decision and were reasonably considered by the Council in accordance with the procedures and requirements in the OGs. The Decision Memorandum is accompanied by a Certification of Attorney Review from the Regional GC. If the documentation does not fully reflect the action the Council took, that concern should be conveyed to the Council. The Decision Memorandum to initiate Secretarial review is not a new document. However, this model identifies it as an appropriate tool for ensuring feedback is provided at the relevant CFP.

3. **Action Plan.** Under this model, a preliminary planning and vetting document called an "Action Plan" is prepared prior to the commencement of drafting the initial NEPA document (EA, CE, or Notice of Intent (NOI) to prepare an EIS) at step 2. The Action Plan describes the problem to be addressed and the objective to be met, indicates what type of NEPA analysis will initially be undertaken, includes an estimated timeline to implementation taking into account the possible need to reconcile differences and all relevant timing requirements (e.g., APA, ESA), describes a reasonable range of alternatives, provides an estimate of staff resource requirements (if practicable), identifies the core staff who will work on development of the action (the "fishery management action team, i.e., FMAT, defined below), and includes a checklist of other applicable laws indicating which are likely to raise issues that will need to be addressed, and, if possible, an initial plan for ensuring they are addressed. The other applicable laws that are most likely to be relevant include the following: MSA, ESA, MMPA, RFA, APA, EOs 12866 and 13272 (Economic Impacts), EO 13132 (Federalism), PRA, CZMA, and the DQA. Some fishery management actions may also be subject to additional laws, such as Indian Treaty Rights. The specific laws applicable to a particular fishery management action can only be identified on a case-by-case basis.

The Action Plan is a preliminary document intended to help guide the drafting of initial documentation for the planned action. It is not intended to constrain the development or revision of alternatives and/or analysis. It is likely that the range of alternatives may change as the process progresses and public participation occurs. The acceptability of such changes will be evaluated at subsequent CFPs. Councils may choose to participate and vote on the development of all or part of the Action Plan, or they may delegate the responsibility to their staff in the interest of time.

4. **"Adequate and Complete."** The term "adequate and complete" refers to compliance with applicable standards as they relate to a particular point in the process. It includes both procedural and substantive requirements. Because different requirements will apply to different types of actions, and different requirements apply at different phases of the process, adequacy and completeness must be assessed on a case-by-case basis. A determination of "adequacy and completeness" includes a finding of "legally sufficiency" by Regional GC.

5. **"Legally Sufficient."** An action is legally sufficient if: (1) there is a credible basis to conclude that the action is within the agency's authority and consistent with any constraints imposed by statute or regulations; (2) there is a credible basis to conclude that the agency has complied with all applicable procedural requirements; and (3) the agency has articulated a rational explanation for the action in the administrative record.

6. **Other Applicable Law.** Various laws, administrative orders, and other directives must be addressed in context of fishery management action development, approval, and implementation. The relevant other applicable laws, some of which provide for specific consultative roles for States and Indian Tribes, may include the MSA, ESA, MMPA, RFA, APA, EOs12866 and 13272 (Economic Impacts), EO 13132 (Federalism), PRA, CZMA, Indian Treaty Rights, and the DQA. At each CFP, all relevant applicable law should be considered, and issues relevant to the particular CFP identified, considered, and addressed.

7. **Fishery Management Action Team (FMAT).** The FMAT is an interdisciplinary group that consists of core agency and Council staff, and others as necessary, who work on a particular action from the beginning. To the extent practicable, members of the team should be specified in the Action Plan for each action. The team should include representatives of each part of the agency that has a significant issue to address and that will be involved in review and implementation of the ultimate action, and should include or coordinate with HQS, described in greater detail below, as appropriate. The Action Plan will set forth the list of participants on the FMAT. Additional HQS will participate as specified in the Communication Protocol described below.

8. **Headquarters Staff (HQS):** The term HQS refers to Headquarters staff who will be expected to review and/or clear an action. Specifically, HQS includes the NOAA Office of Strategic Planning (OSP) and Office of the General Counsel (GC); the NMFS Assistant Administrator for Fisheries (AA) and Offices of Sustainable Fisheries (OSF), Habitat Conservation (HC), and Protected Resources (OPR); the Office of Law Enforcement (OLE); and the Department of Commerce Office of General Counsel (DOC OGC), as applicable.

9. **Technical Assistance:** The term "technical assistance" refers to the various forms of activities and advice described on pages 3-6 of the ESA Consultation Handbook. It consists of interactions between the action agency and the consulting agency concerning listed species issues prior to a consultation. In some cases, technical assistance will result in all information necessary to initiate informal consultation. In other instances, the action agency may have to provide additional information to the consulting agency.

10. **Consultation Assessment:** A "Consultation Assessment" is a new document that can be used during ESA section 7 consultations to facilitate coordination of ESA, MSA, and NEPA timelines and processes. The "Consultation Assessment" is a formal, written memorandum from the appropriate decision-maker in PR (either the RA or the PR ARA) to the SF ARA. It contains a summary of analyses and information developed during formal consultation, as well as preliminary conclusions that would form the basis for the Biological Opinion. It is not a substitute for a formal Biological Opinion.

    Specifically, the Consultation Assessment would describe the action being analyzed and summarize the data gathered during the consultation, the analysis of that information, and discussions about the analyses that occurred among PR, SF, and the Councils (as appropriate). It would provide sufficient information to facilitate meaningful discussion about (i) the probable effects of a proposed fishery management action, or its alternatives, on listed species and designated critical habitat, and (ii) additional measures that could be taken to avoid potential risks to listed species and critical habitat. The Consultation Assessment would not include PR's determinations regarding "jeopardy" or "destruction or adverse modification of critical habitat." Those determinations would be provided in the subsequent Biological Opinion.

Under the model in these OGs, the Consultation Assessment would be completed at step 4(a) to document the results of the consultation on the preferred alternative. The information set forth in the Consultation Assessment would permit SF and the Council to make informed decisions about a proposed action or alternative prior to completion of a formal Biological Opinion

B. The Phases of FMP/Rulemaking Under the Model

This model identifies four basic phases to the development and implementation of any fishery management action. Whether an action is a rule or an FMP, and whether it will be supported by an EA, an EIS, or a CE, it is developed through the following four phases: (1) Phase I, Planning and Scoping; (2) Phase II, Preparation; (3) Phase III, Council Final Action; and (4) Phase IV, Secretarial Review and Implementation. For each of these phases the model identifies one or more sequentially numbered steps that are set forth in Table 1. This section provides a description of the procedures and steps in Table 1 and highlights actions required to conform to the model.

Phase I – Phase I is the planning and scoping phase. It contains up to two steps: the initiation of scoping, and a decision about which level of NEPA analysis to undertake initially. It is important to note that the term "scoping" has a legal meaning under NEPA, and that NEPA applies certain requirements to NEPA scoping. Because NEPA scoping is similar to MSA requirements for early public notice, these guidelines use the term "scoping" to refer to the broad range of activities that may take place in the initial stages of identifying a need for management and developing alternative solutions. As part of the scoping process, regulatory analysis and information collection requirements may be examined and preliminary estimates may be made of the costs and benefits of regulations. Concerns of affected States, including potential CZMP impacts, and Indian tribes are identified and public participation is encouraged. Consideration of potential impacts relating to the ESA, MMPA, EFH, and social impacts of the FMP also begins.[5] Informal scoping activities can take place as part of informal early planning in Step 1. However, if a decision is made to publish an NOI to prepare an environmental impact statement, even if the purpose of publishing the notice is to solicit input on the appropriateness of an EIS, certain legal requirements will be triggered. Once a

[5] We note that in some cases the ESA consulting agency will be the Fish and Wildlife Service (FWS) rather than NMFS OPR. In these cases, early cooperation with FWS is encouraged, but NMFS cannot commit to FWS's adherence to the approach in the model.

decision is made to draft an NOI or another type of NEPA document, the action will be considered to fall within Step 2, "Initial Determinations," and require an Action Plan.

During step 2, the Action Plan is completed prior to publication of an NOI, if applicable, or prior to drafting other NEPA documents. If an NOI has been used, the scoping summary report is prepared at the conclusion of the scoping period set forth in the NOI. The scoping summary report may modify some of the initial plans set forth in the Action Plan. Such modifications do not require formalized agency review at this point. Feedback at subsequent CFPs will address such changes.

Phase II – Phase II is the document development phase, and results in materials ready to support a final Council recommendation. It generally contains up to four steps, but might include up to seven steps if there is a need for EFH or ESA consultation. Step 3 consists of general frontloading activities and communications and results in the development of preliminary draft analytical documents to serve as a basis for selection of a preferred alternative and the Council's adoption of the draft analyses for public review at Step 4. Depending on individual Council preferences and variations in management needs, the range of activities that take place during Step 3 can vary widely, in some cases encompassing years of iterative drafting, public hearings, public comment, and multiple options papers and white papers; in other cases consisting of a single staff-level draft. During Step 3, the Councils have broad discretion and few constraints on their ability to explore alternatives and develop recommendations. In many instances, the bulk of Council activity may take place at Step 3. Step 3 is also critically important for the frontloading of ESA and EFH information. If no EIS is being prepared and no protected resources or EFH issues are present, the Council may chose to proceed directly from Step 3 to Step 7, the vote on recommended action. However, this model encourages the circulation of all such draft analyses for public comment while at the Council level.

Because applicable laws, including the MSA, NEPA, the ESA, and the APA, encourage the identification of a preferred alternative, limit our ability to select an alternative that has not been fully analyzed, and impose strict timelines on the decision making process, in this model, the preferred alternative is identified at Step 4 (i.e., prior to the publication of the DEIS), except in limited circumstances where the RA and GC agree that there appear to be no significant environmental or economic issues. In other words, once a preferred alternative is identified, the required processes of the MSA and other applicable law should move expeditiously forward through the MSA approval and implementation system and few, if any, additional modifications should be made to the preferred alternative. The work accomplished during steps 1-3 should facilitate expeditious review and implementation later in the process. If at Step 4 the preferred alternative would trigger the need for formal consultation under the ESA or an EFH consultation, then under the model, such consultations must take place on the preferred alternative, underlying analyses must be revised as necessary, and the Council may need to take another vote to select a preferred alternative based on the revised analyses. The consultation would conclude with production of a Consultation Assessment 90 days after initiation. The 45-day period for preparing the BO would not begin until SF requests PR to begin drafting. In cases where an EIS is being prepared, the 45-day preparation of the BO could run concurrently with the 45-day public comment period on the DEIS.

Once the draft NEPA analyses have been completed, they should be circulated for public review. When an EIS is being prepared, publication of the DEIS for public comment is mandatory under NEPA. Circulating the draft EA or CE for public comment is encouraged.

Phase III – During Phase III, the Council takes its final actions to select and recommend management measures to NMFS. There are two steps in this phase: (1) the Council's vote to adopt an FMP or regulatory amendment, followed by (2) staff work to prepare the recommendation for Secretarial review. Under this model, prior to the Council's vote, draft documents are reviewed by the RA, GC, and other necessary staff to determine whether they are complete and legally sufficient to support decision-making. The analytical work must be complete prior to the Council's vote; however, some additional tasks may remain to be completed after the vote. For instance, an ROA may provide for Council staff to prepare the CZMA letters, finalize regulatory text, or perform other tasks to finalize the Council's recommendation. The degree of complexity of a recommended measure could affect the amount of time necessary to finalize a package. For instance, if regulatory text has not been completed, or must be revised, after the Council's final vote, a significant amount of time could be necessary to complete this task. This type of timing issue should be factored, to the extent possible, into the Action Plan at Step 2. Note that parts of Phase III and Phase IV may occur simultaneously in that any remaining Council responsibilities necessary to prepare the recommendation package for formal submission may be completed at the same time that agency staff complete their own responsibilities necessary to prepare the Council's recommendation for formal submission.

Phase IV – During Phase IV, the Secretary reviews and approves, or disapproves, the Councils' recommendations. This phase encompasses the full range of agency activities necessary to package, review, and conduct proposed and final rulemaking on recommended fishery management measures. After the Council has completed its recommendation, agency staff complete their responsibilities necessary to prepare the Council's recommendation for formal submission. These activities occur as part of Step 9 and may occur simultaneously with Step 8, during which Council staff make final preparations for formal submission. As in Step 8, it is important to note that the degree of complexity of a recommended measure could affect the amount of time necessary to finalize a package for review. NMFS initiates formal public review of the Council's proposed measures by publishing in the *Federal Register* the Notice of Availability (NOA) of an FMP/FMP amendment and/or the proposed rule to implement the Council's recommendation. At this step, NMFS also files the FEIS with the Environmental Protection Agency (EPA). The MSA requires that, for FMPs and FMP amendments, NMFS must publish the NOA of the FMP immediately (within 5 days) for a 60-day comment period. Within 30 days of the close of the comment period, the agency must approve, partially approve, or disapprove the Council's recommendation. NMFS will send a letter to the appropriate Council notifying it of the official start date of the Secretarial review period. After reviewing public comment received on the NOA and/or proposed rule and on the Final Environmental Impact Statement (FEIS), the RA makes his/her decision regarding approval/ disapproval of the action to the AA, and the AA determines whether to concur. The final step for implementing the approved final rule is to send it to the Office of the Federal Register for publication.

C. Tables

Table 1: Model Process for Achieving Goals of RSP

Unless otherwise noted, the procedures set forth below are appropriate to apply to all Council-recommended MSA fishery management actions. Certain provisions may not apply to actions taken directly at the agency level. If a provision applies only to a certain type of action depending on its level of NEPA analysis or status as an FMP versus regulatory amendment, such distinction will be noted.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
Phase I: Planning and Scoping						
1	Early Problem Identification and Planning (optional)[6]	All: • Council • RA/RO Staff • OSF Director signature on NOI	All: • Document Drafting Handbook, OFR • Preparation of *Federal Register* (FR) Documents • MSA public meeting requirements • CEQ Regulations • NAO 216-6 • ESA Consultation Handbook • EFH Consultation Guidance		All: • Notice of public meetings if any • ESA Technical Assistance, informal consultation or both[7]	Early input from affected States and Indian tribes should be solicited/encouraged. If ESA-listed species subject to FWS jurisdiction are present, early efforts should be made to coordinate with FWS and request their cooperation with our model, to the extent practiable. *If the decision is made to publish an NOI, even as an early planning document, proceed to step 2 before publishing. (The NOI is the first step in development of an EIS. Therefore, the NOI should be reviewed for adequacy and completeness, and appropriate parties assembled on the FMAT before publishing).

[6] The Early Planning step is an optional step that can precede the decision on what type of NEPA analysis to undertake. While the decision to engage in various types of pre-planning is optional, if these activities are undertaken, some of them involve legal requirements that must be met as set forth in this table.

[7] The term "technical assistance" refers to the various forms of activities and advice described on page 3-6 of the ESA Consultation Handbook.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
2 CFP	Initial Determination	All: • FMAT (includes Council, GC, and Regional Staff as appropriate) • Consultation with HQS[8] • Council (may approve action plan) • RA (concurs in action plan) • OSF Director signature on NOI	All: • CEQ Regulations • NAO 216-6 • Document Drafting Handbook, OFR • Preparation of *Federal Register* (FR) Documents • ESA Consultation Handbook • EFH Consultation Guidance	All: • RA provides Advisory Statement on Action Plan prior to drafting NOI, DEIS, EA, RIR/PREE, social impact assessment. EIS: • 30-day minimum comment period on NOI	All: • Advisory Statement • Action Plan[9] • ESA Technical Assistance, informal consultation, or both EIS: • NOI • Scoping Meetings/ Notices (optional) • Scoping Summary Report (encouraged)	
Phase II: Preparation of the Action						
3	Frontloading/ Communication activities	• FMAT • HQS as appropriate	• CEQ Regulations • NAO 216-6 • ESA Consultation Handbook • EFH Consultation Guidance *Although no additional standards for documentation apply at this point, drafters should be cognizant of the standards that will apply at steps 4 and 7. See below.	*Note that for EA/CE actions, this may be the last step prior to the Council's vote at Step 7.	Preliminary analysis (DEIS, EA, CE) ESA Technical Assistance, informal consultation or both.	Note that there are no specific requirements associated with this step. The range of activities during step 3 can vary widely depending on council practice and individual management needs, in some cases encompassing years of iterative drafting, public hearings, public comment, and multiple options papers and white papers; in other cases consisting of a single staff-level draft.

[8] The term HQS refers to Headquarters staff who will be expected to review and/or clear an action. Specifically, HQS include the NOAA Office of Strategic Planning, Program Planning and Integration (PPI/OSP); the NOAA Office of the General Counsel (GC); the NMFS Assistant Administrator for Fisheries (AA) and Offices of Sustainable Fisheries (OSF), Habitat Conservation (HC), and Protected Resources (PR); the Office of Law Enforcement (OLE); and the Department of Commerce Office of General Counsel (DOC OGC).

[9] The Action Plan needs to be in writing and include an Advisory Statement from the RA. The Action Plan must describe the problem to be addressed and the objective to be met, indicate what type of NEPA analysis will initially be undertaken, include an estimated timeline to implementation taking into account the possible need to reconcile differences and all relevant timing requirements (e.g., APA), describe an initial reasonable range of alternatives, provide an estimate of staff resource requirements (if practicable), identify the participants assigned to the FMAT, and include a checklist of other applicable laws indicating which are likely to raise issues that will need to be addressed, [and, if possible, an initial plan for ensuring they are addressed]. The other applicable laws that are most likely to be implicated include the following: MSA, ESA, MMPA, EFH, RFA, APA, Executive Orders 12866 and 13272 (Economic Impacts), Executive Order 13132 (Federalism), PRA, CZMA, and the DQA. Some fishery management actions may also implicate additional laws, such as Indian Treaty Rights. The laws applicable to a particular fishery management action must be identified on a case-by-case basis. The Advisory Statement from the RA indicates that GC has found the process set forth to be legally sufficient and that the RA agrees to the commitments of agency staff and resources that appear to be necessary for the development of the action.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
4 CFP	Identification of preferred alternative/ Adoption of draft analysis	All: • FMAT (includes Council, GC, and Regional Staff as appropriate) • Consultation wth HQS • Council (approves) EIS: • RA (concurrence)	All: • CEQ Regulations • NAO 216-6 • National Standards Guidelines (63 FR 24212, May 1, 1998) • Social science guidelines • Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000) • EFH Final Rule (67 FR 2343, Jan. 17, 2002) • EFH Consultation Guidance • ESA Consultation Handbook • ESA regulations, 50 CFR 402.01 et seq. • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002	All: • Advisory Statement[10] must be available to Council prior to decision. *This means that all other documents listed in the documents column must be available with sufficient lead time to allow review, and clearances if necessary.	All: • Advisory Statement • Preliminary Draft NEPA document (preliminary DEIS, EA or CE) • DFMP or Draft reg. amendment to the extent practicable • PREE • Draft RIR • Draft regulatory text (to the extent practicable or necessary) • Science Center certification as applicable • ESA Technical Assistance, informal consultation if appropriate • Draft Social Impact Assessment • DQA Predissemination review form signed at regional level	At the end of Step 4, the Council has identified a preferred alternative that is covered by the NEPA Analysis. If there are no ESA/EFH duties, proceed to step 5 and publish the DEIS, or to step 7 if appropriate. *If the preferred alternative is subject to ESA formal consultation requirements or EFH consultation requirements, initiate such consultation and proceed to step 4(a).* *EA/CE: For EAs/CEs, this step may occur simultaneously with Council recommendation of agency action (at step 7) if appropriate.
(a)	ESA/EFH consultations on preferred alternative	All: • Regional Staff • Consultation wth HQS • FWS (if appropriate)[11]	• EFH Final Rule (67 FR 2343, Jan. 17, 2002) • EFH Consultation Guidance • ESA Consultation Handbook • ESA regulations, 50 CFR 402.01 et seq.	*Note that receipt of EFH Conservation Recommendations triggers a 30 day period within which a written response must be submitted. In some instances, an "interim response" will be necessary. *Formal ESA Consultation must be completed within 90 days of initiation unless extended by mutual agreement.	• Completed Consultation phase of formal ESA § 7 consultation and documentation thereof wth "Consultation Assessment"[12] • Completed EFH assessment, and Conservation Recommendations if appropriate • Response to EFH Conservation Recommendations, or Interim Response, if appropriate	

[10] "Advisory Statements" are in the form of a letter to the Council indicating that the relevant documentation and process are adequate and complete for that step and that all necessary reviewers have been consulted. Because an Advisory Statement requires a determination of legal sufficiency, issues preventing the determination of legal sufficiency also prevent issuance of the Advisory Statement.

[11] FWS may not agree to operate according to our OGs, but we can request – especially if we contacted early via FMAT.

[12] The "Consultation Assessment" is a formal, written memorandum from the appropriate decision-maker in PR (either the RA or the PR ARA) to the SF ARA. It contains a summary of the analysis, information, and conclusions of a formal consultation that would form the basis for the Biological Opinion. Those determinations would be provided in the subsequent Biological Opinion. Under the model in these OGs, the Consultation Assessment would be produced at step 4(a) to document the results of the consultation on the preferred alternative.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
(b)	Revise analysis as necessary based on consultations	All: • FMAT (includes Council, GC, and Regional Staff as appropriate) • Consultation with HQS	All: • CEQ Regulations • NAO 216-6 • National Standards Guidelines (63 FR 24212, May 1, 1998) • Social science guidelines • Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000)			If, based on the Consultation Assessment, it appears that modifications to the preferred alternative will be necessary (RPAs likely), the revised analysis must include alternatives that incorporate such modifications. It is critical that NMFS and the Council work collaboratively in developing alternatives that will avoid a jeopardy opinion and avoid the need for repeated cycles of the consultation process.
(c) CFP	Revote on preferred alternative as necessary	All: • FMAT (includes Council, GC, and Regional Staff as appropriate) • Consultation with HQS • Council (approves) EIS: • RA (concurrence)	All: • CEQ Regulations • NAO 216-6 • National Standards Guidelines (63 FR 24212, May 1, 1998) • Social science guidelines • Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000) • EFH Final Rule (67 FR 2343, Jan. 17, 2002) • EFH Consultation Guidance • ESA Consultation Handbook • ESA regulations, 50 CFR 402.01 et seq. • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002	All: • Advisory Statement, must be available to Council prior to decision *This means that draft documents must be available with sufficient lead time to allow review, and clearances if necessary. *Note that receipt of EFH Conservation Recommendations triggers a 30 day period within which a written -response must be submitted. In some instances, an "interim response" will be necessary.	All: • Advisory Statement • Draft NEPA document (DEIS, EA or CE) • DFMP or Draft reg. amendment to the extent practicable • PREE • Draft RIR • ESA Consultation Assessment (produced at step 4(a)) • Draft regulatory text (to the extent practicable or necessary) • Science Center certification as applicable • EFH assessment and Conservation Recommendations (produced at step 4(a)) • Response to EFH Conservation Recommendations, or Interim Response, if appropriate • DQA Predissemination review form signed at regional level	All: For NEPA purposes, draft NEPA document should include for public review the information contained in the Consultation Assessment. EA: After final selection of preferred alternative, SF should request PR to initiate drafting of Draft B.O. (DBO) on preferred alternative. Drafting should be complete within 45 days
5	File DEIS w/EPA EA/CE: n/a	EIS: • RA, RO Staff • OSF (transport document to EPA) • PPI • F	EIS: • EPA filing standards • NAO 216-6 • Examples Package • CEQ Regulations	EIS: • 45-day minimum comment period begins • File with EPA by 3:30 Friday, the week prior to publishing • At least 90 days must pass after publication of DEIS before agency can take final action • PR drafts DBO within 45 days of filing DEIS with EPA	EIS: • Memo from F to NOAA PPI/OSP • Memo from NOAA PPI/OSP to EPA • "To All Interested Parties" Memo • EPA publishes NOA on DEIS in FR	

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
6	Public Comment on DEIS	EIS: FMAT and/or Council Staff EPA	EIS: • CEQ Regulations • NAO 216-6 • EPA Guidance	EIS: • Comment period on DEIS must be at least 45 days	EIS: • Public Hearings/Meetings/Written Comments • FR notices advising public of meetings	EIS: If EPA rates the DEIS at a "3" (inadequate), then a new DEIS must be prepared and circulated for public comment.
	EA/CE: Optional	EA/CE, if opted: FMAT and/or Council Staff	EA/CE, if opted: • CEQ Regulations • NAO 216-6	EA/CE, if opted: n/a	EA/CE, if opted: • Public Hearings/Meetings/Written Comments • FR notices advising public of meetings	
Phase III: Council Final Action						
7 CFP	Council Adoption of FMP or Reg. amendment	All: • Council/Staff • RA, RO Staff • HQS (consult as appropriate) • Public Comment at meeting	All: • CEQ Regulations • NAO 216-6 • National Standards Guidelines • Social science guidelines • Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000) • EFH Final Rule (67 FR 2343, Jan. 17, 2002) • EFH Consultation Guidance • ESA Consultation Handbook • ESA regulations, 50 CFR 402.01 et seq. • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002	All: • Advisory Statement, must be available to Council prior to adoption. *This means that all other documents listed in the documents column must be available with sufficient lead time to allow review, and clearances if necessary.	EIS or EA: • Advisory Statement • Preliminary Final NEPA document (either preliminary final EIS or draft EA) with summary of comments and responses thereto • PREE • Draft RIR • Consultation Assessment if preferred alternative subject to ESA section 7 (or DBO if available) • Draft regulatory text (to the extent practicable or necessary) • Final Responses to EFH Conservation Recommendations if not already provided • Social Impact Assessment CE: • All of the above except with a CE memo signed by RA with cc to OSP rather than DEIS or EA	All: "Adequacy and completeness" must be judged based on a case-by-case basis. In some cases, "completeness" may require preparation of draft regulatory text. If inadequacies are identified, including issues that prevent the determination of legal sufficiency, action must stop until corrected, and issues must be elevated for resolution. EIS: Note that for EIS- based actions subject to ESA section formal consultation, a DBO will probably be available since it is produced during the 45 day comment period on the DEIS. EA: Confirm that Draft EA supports FONSI.
8	Council Completion of recommendation package	All: • Council/Staff • RA, RO Staff • GC		All: • Steps 8 and 9 may begin simultaneously *Note that complex requirements may take more time to finalize for submission.	All: • Final FMP or Reg. amendment • Identification of APA issues and/or prepare Proposed Rule • CZMA letters For proposed rules only: • Draft IRFA or Draft RFA certification • Draft RIR	

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
Phase IV: Secretarial Approval						
9 CFP	Completion of Decision Package	All: • Council Staff • RO Staff • GC • HQS (as appropriate) • Regs unit, if possible	All: • CEQ Regulations • NAO 216-6 • National Standards Guidelines (63 FR 24212, May 1, 1998) • Social science guidelines • Guidelines for Economic Analysis of Fishery Management Actions (65 FR 65841, Nov. 2, 2000) • EFH Final Rule (67 FR 2343, Jan. 17, 2002) • ESA Consultation Handbook • ESA regulations, 50 CFR 402.01 et seq. • Document Drafting Handbook, OFR • Preparation of FR Documents • GCF Guidance on EO 12866 compliance (Macpherson memo, 2/10/98) • Examples Package • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002 • PRA Guidance	All: EO 12866: • GCF submits listings to DOC/OMB the first Wednesday of the month • OMB gets 10 days to object to significance determination • 90 days to complete review of significant rules • If subject to ESA consultation, PR has 45 days from submission of request to confirm PBO PRA: • OMB gets 90 days to complete review • CZMA-states get 90 days to respond to consistency determination • As early as possible, draft Proposed Rule should be sent to regs unit CE: • OSP must receive copies of CEs within 3 months	All: • Decision Memo and determinations , determined to be legally sufficient by Regional GC. • Certification of Overfishing Definition, if applicable • Science Center Certifications as applicable • Draft Memo, " F to DOC OGC" [approval] for package • Draft NOAA GC memo • Draft OSF to SBA memo, if applicable • E.O 12866 Submission Form, if applicable • Congressional Review Act (major/not major) • PRA document (SF 83-I) • DQA Predissemination review form signed at regional level Proposed rules only: • IRFA or RFA certification • RIR • SBA transmittal	All: RA must determine that final decision as presented is supported by final analysis and is complete, adequate and consistent with Council decision. If RA determination is negative, action stops until corrective measures are take, e.g., may have to do SDEIS and take more comment. *For actions subject to formal ESA consultation, SF must request PR to review DBO for confirmation as Final BO.
10	Begin MSA Secretarial Review Reg. Am: n/a	FMP: • RA/RO Staff • Councils	FMP: • Examples Package	FMP: • Transmit Date • Begins MSA timelines	FMP: Establish Transmit Date: • Letter establishing transmit date • RA to OSF memo transmitting NOA on FMP	*Note: ROA should establish who sends letter. If council doesn't send, then agency must ensure Council is notified.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
11	Publication of NOA (FMP), Proposed Rule File FEIS	EIS: HQS, NOAA SP, EPA EA: HQS, NOAA SP CE: HQS Proposed Rule: Regs unit	EIS: • EPA filing Standards • Examples Package EA/CE: • Examples Package Proposed Rule: • Document Drafting Handbook, OFR • Preparation of FR Documents	FMP: • NOA on FMP must publish within 5 Days of Transmittal • Publication of NOA starts 90 day clock (60 days of comment, decision on FMP within 30 days CPE) Proposed Rule: • 15-60 day comment period on PR (30 days recommended) • Final Rule to issue within 30 days CPE on Proposed Rule EIS: • The 30-day cooling off period of FEIS must be completed prior to the AA's decision on the FMP or final rule, whichever comes first.	All: • Fax copy of Federal Register to designated contact in State/Tribal offices EIS: • F to NOAA PPI/OSP memo • NOAA PPI/OSP to EPA memo • "To All Interested Parties" Memo • NOA of FEIS published in FR by EPA • Final BO, if applicable	*Note: Whenever possible, it is encouraged for the comment periods on the FMP and the proposed rule to run concurrently.
12	FMP: RA Decision to approve/ disapprove FMP Reg. Am: RA Decision to approve/ disapprove final rule.	All: • RA, RO Staff • Consult as necessary with HQS	All: Examples Package • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002	FMP: • Final Decision Memo, determined to be legally sufficient by Regional GC, on FMP and NEPA document must be signed by Day 95/30 days after CPE on NOA of FMP Reg. Am: • No final action until CZMA time has tolled • Final Rule due out within 30 days CPE on Proposed Rule	FMP/EIS: • Decision Memo and Determinations, determined to be legally sufficient by Regional GC • NEPA document as approved by RA FMP/EA: • All of the above, and • Final BO, if applicable, and • Draft FONSI Memos (F to PPI/OSP; "To All Interested Parties" memo) Reg. Am/EIS: • Decision Memo and Determinations, determined to be legally sufficient by Regional GC • Final Rule - includes responses to public comments • NEPA document as approved by RA • FRFA or certification • DQA Predissemination review form signed at regional level • Issues Advisory if applicable Reg. Am/EA: • All of the above, and • Final BO, if applicable, and • Draft FONSI Memos (F to PPI/OSP; "To All Interested Parties" memo)	*Note: The RA's approval of the EA/FONSI is not the final determination of FONSI - that authority has not been delegated.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
13	FMP: AA concurrence on RA Decision to approve/ disapprove FMP. Reg. Am: AA concurrence on RA Decision to approve/ disapprove final rule. EIS/EA: AA sign final NEPA document (ROD or FONSI)	All: HQS	All: CEQ regs and NAO 216-06	All: • Decision Memo, determined to be legally sufficient by Regional GC FMP: • Day 95 or before; No final action until CZMA time has tolled or State concurrence received w/EIS: • At least 90 days after NOA (DEIS) • At least 30 days after NOA (FEIS) w/EA: • FONSI Must be signed by Day-95/30 days after CPE on NOA of FMP w/CE: • Day 95 or before Reg. Am: • No final action until CZMA time has tolled or State concurrence received • Final Rule due out within 30 days CPE on Proposed Rule w/EIS: • At least 90 days after NOA (DEIS) • At least 30 days after NOA (FEIS)	All: • AA signed concurrence EIS: • ROD EA: • PPI/OSP concurrence on FONSI FMP only: • Letter to Council	
14	FMP: RA decision on final rule to implement FMP Reg. Am: n/a	FMP: • RA, RO Staff • Consult as necessary with HQS	FMP: • Examples Package • Document Drafting Handbook, OFR • Preparation of FR Documents • NMFS Sec. 515 Pre-dissemination review guidelines, May 5, 2003 • NOAA Information Quality Guidelines, Oct. 1, 2002	FMP: • Final Rule due out within 30 days close of comment period on Proposed Rule • No final action until CZMA time has tolled	FMP: • Decision Memo and Determinations on final rule, determined to be legally sufficient by Regional GC, to F recommending promulgation of the Final Rule • F to DOC OGC [approval] memo • F to NOAA GC [approval] memo • Final Rule - includes responses to public comments • FRFA/RFA certification • DQA Predissemination review form signed at regional level • Issues Advisory if applicable	FMP: Steps 14 and 15 may be compressed with steps 12 and 13 *If final NEPA document was signed at FMP approval, decision package on Final Rule must also address NEPA to ensure the previous determination is still applicable.

STEP/CFP	DESCRIPTION	WHO	STANDARDS	TIMING ISSUES	DOCUMENTATION	COMMENT
15	AA concurrence on final rule to implement FMP Reg. Am: n/a	FMP: HQS		All: • Decision Memo, determined to be legally sufficient by Regional GC FMP: • No final action until CZMA time has tolled FMP/EIS: • At least 90 days after NOA (DEIS) • At least 30 days after NOA (FEIS)	All: • AA signed concurrence	FMP: Steps 14 and 15 may be compressed with steps 12 and 13 *If final NEPA document was signed at FMP approval, decision package on Final Rule must also address NEPA to ensure the previous determination is still applicable.
16	Publication of Final Rule, or notice of agency decision on FMP, in FR	All: • SF5 • RA/RO and Council Staff as appropriate • OFR	All: • Document Drafting Handbook, OFR • Preparation of FR Document	All (Final rule only): • 30-day delay in effectiveness unless waived under APA • Publish within 30 days CPE on Proposed Rule	All (Final Rule Only): Submit Rule to Congress (Cong. Review Act) • Letters to Congress • Published final rule • Small entity compliance guide	*Note: Coordination with the States is encouraged. Copies of documents may be faxed to designated state contacts. NMFS and Councils may jointly request States to implement complementary measures where appropriate. *FR notice should refer to availability of ROD

TABLE 2: Summary of Steps and Feedback Points in Model Process

Step	Reg. Am w/EA or CE	FMP w/EA or CE	Reg. Am w/EIS	FMP w/EIS
1. Planning	X	X	X	X
2. Initial Draft/Action Plan	*X*	*X*	*X*	*X*
3. Frontloading	X	X	X	X
4. Preferred Alternative; DEIS (a) - (c)			*X*	*X*
*(*If consultations, substeps (a) - (c))*	*(X)*	*(X)*	*(X)*	*(X)*
5. File DEIS			X	X
6. Public Comment on DEIS			X	X
7. Council Vote	*X*	*X*	*X*	*X*
8. Council Staff Clean-up	X	X	X	X
9. Agency Preparations	*X*	*X*	*X*	*X*
10. Transmit		X		X
11. Publish Proposal	X	X	X	X
12. RA – Decision 1	X	X	X	X
13. AA – Decision 1	X	X	X	X
14. RA– Decision 2		X		X
15. AA – Decision 2		X		X
16. Publish final decision	X	X	X	X

Regulatory Streamlining Program Operational Guidelines

Pacific Fishery Management Council

November 4, 2005

San Diego, CA

RSP:
Why We Need It

- ***NOAA Fisheries Service faces a unique combination of responsibilities in managing the multiple statutory responsibilities set forth under the M-S Act, the ESA, NEPA, the RFA, and other mandates applicable to the development and implementation of fishery management actions.***
- ***A series of litigation losses led to court ordered injuctions and judicial management of fisheries.***
- ***In 2002, Senate Committee on Appropriations directed NOAA Fisheries to address "unnecessary delays, unpredictable outcomes, and lack of accountability" and to apply "standardized practices" to "improve the quality and efficiency of regulatory decisions and raise the likelihood of success in litigation."***

RSP:
What Caused the Problems

- Applicable laws impose multiple mandates that create challenges based on timing and logical sequencing of analyses.
- Multiple layers of review, and various offices charged with responsibility for administering different laws, many of which are evaluated on subjective grounds for “reasonableness.”
- Inadequate documentation of process and record to support decision.

RSP:
What Congress Mandated in 2002

1. Eliminate unpredictable outcomes
2. Increase accountability
3. Eliminate unnecessary delays
4. Apply standardized practices
5. Improve the quality and efficacy of regulatory decisions
6. Improve the likelihood of success in litigation

RSP:
How the Draft OGs Address the Problem

- Frontloading and Teamwork
- Logical Sequencing
- Quality-based Approach to Review
- Flexibility

RSP Operational Guidelines: Frontloading & Teamwork

- **Teamwork**
  - **Joint Ownership/Shared Responsibility**
  - **Cooperation and Coordination**
- **Frontloading**
  - **The earlier a problem is identified, the better**
  - **Involvement of all key players**
  - **Early input**
  - **Concurrent reviews**

Frontloading

Frontloading: **"the active participation of all regional, science center, and Council staff in key responsibilities (e.g., sustainable fisheries, protected resources, habitat, economics, legal review) at the early stages of fishery management action development -- a "no-surprises" approach"**

RSP Operational Guidelines: Logical Sequencing

- **Statutory and Regulatory Timelines**
  - MSA 95 days; ESA 135 days consultation; NEPA 90 days/30 days
- **Logical Interactions**
  - NEPA/FONSI and ESA BO; consideration of alternatives (NEPA, RFA) and Council discretion/Secretarial authority.
- **Clearance and Filing Considerations**
  - EPA files Friday after the week received; OFR schedule; NOAA, DOC, OMB…

RSP Operational Guidelines: Quality-based Approach to Review

- Standards to assess adequacy
- Recognizes subjectivity of review
  - Addressed through frontloading
  - Addressed in model through Critical Feedback Points
- Advisory Statements
  - Letters to a Council from the RA indicating that the relevant documentation and process are adequate and complete for that step.

RSP Operational Guidelines: Flexibility

- General roles and responsibilities
- Allows for Region/Council variations
  - Regional Operating Agreements
  - Action Plans
- Adaptable process model
  - Use steps that apply to a particular action

The RSP Model: Phases and Steps

- **Phase I – Planning and Scoping**
  - Problem identification; Initial determination re: NEPA
  - Action Plan, Advisory Statement, FMAT
- **Phase II – Preparation of the Action**
  - Frontloading; I.d. preferred alternative (consultations); Advisory Statement; file DEIS; public comment
- **Phase III – Council Final Action**
  - Vote on Final recommendation (Advisory Statement); Completion of Council packaging tasks
- **Phase IV – Secretarial Approval**
  - Completion of agency packaging tasks; Begin MSA review; (Decision memo); publish NOA, Proposed Rule, FEIS; Agency approval decisions; publication

RSP OGs: Next Steps

- **OGs transmitted by August 26, 2005, letter from Bill Hogarth**
- **Collaboration**
  - Regional Operating Agreements
  - Joint Planning
- **Try out the model where practicable**
  - Test basis
  - We recognize resource constraints
  - ID strengths and weaknesses of the OGs
  - OGs will be a living document – updated based on experience

REGULATORY STREAMLINING BRIEFING

Since 2001 National Marine Fisheries Service (NMFS) has been developing new operational guidelines (OGs) for the development and implementation of fishery management actions. A completed draft of these OGs was released on August 26 under a cover memo from Assistant Administrator, Dr. Bill Hogarth, which asked councils to implement them on a test basis (Attachment 1). NMFS personnel have been invited to the November Council meeting to present a briefing and answer questions the Council may have on this matter.

Key features of the OGs include:

- The development of a regional operating agreement (ROA) between a NMFS regional office and the respective council intended to tailor the principles set forth in the OGs to the circumstances of a particular council/regional office.

- The identification of critical feedback points (CFPs) in the decision-making process, at which point the Regional Administrator would transmit an Advisory Statement to the Council determining whether process and documentation is sufficient to that point.

- The development of an Action Plan at the start of any fishery management decision-making process describing procedural and regulatory requirements, initial determination of the type of documentation, staffing requirements and obligations, and the timeline.

- The formation of a Fishery Management Action Team (FMAT) composed of NMFS and Council staff that will shepard the action through the process in terms of development and review of the necessary documentation.

- A Regional Administrator Decision Memorandum at the end of the Council process, which certifies the adequacy of the analyses in support of Council decision-making and initiates Secretarial review.

The OGs lay out a general set of procedures, which are grouped in four phases encompassing up to 16 separate steps. The Council would be involved in the first three phases with up to nine steps. These procedures are intended to speed Secretarial review and approval, integrate regulatory mandates under the umbrella of the Magnuson-Stevens Act and the National Environmental Policy Act, and reduce litigation risk.

Assistant Administrator, Dr. Hogarth has asked, in the case of the Pacific Council, to develop an ROA with each of the corresponding NMFS regional offices and on a test basis to apply the OGs to new actions being developed. The Council may wish to discuss the OGs with NMFS, provide direction to Council staff on development of ROAs, and identify one or more future actions for which the OGs may be used on a test basis.

Council Task:

Discuss applicability of operational guidelines; initiation of Regional Operating Agreement(s); identify new action(s) for application of draft Operational Guidelines, if appropriate.

Reference Materials:

1. Agenda Item B.4.a, Attachment 1: Draft Operational Guidelines for Development and Implementation of Fishery Management Actions.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. NMFS Report
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. Council Discussion

PFMC
10/14/05

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

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Donald K. Hansen

EXECUTIVE DIRECTOR
Donald O. McIsaac

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October 24, 2005

Representative Richard W. Pombo, Chairman
U.S. House of Representatives Committee on Resources
H2-188 Ford House Office Building
Washington, DC 20515-6232

Dear Representative Pombo and Members of the Committee:

Thank you for this opportunity to testify before the Committee on Council operations and reauthorization of the Magnuson Stevens Fishery Conservation and Management Act (MSA). This statement is presented by Mr. Donald Hansen, Chair of the Pacific Fishery Management Council (PFMC) (Attachment 1) and Dr. Donald McIsaac, PFMC Executive Director (Attachment 2). The written portion of the testimony follows the interests of the Committee as expressed in the invitation to testify dated October 17, 2004. The oral portion of this testimony will highlight one or two key issues from the perspective of the PFMC.

1. What fisheries are under PFMC jurisdiction and how are they managed?

The PFMC is responsible for four fishery management plans (FMPs) in the Exclusive Economic Zone off Washington, Oregon, and California: groundfish, salmon, coastal pelagic species (CPS), and highly migratory species (HMS). In addition, the PFMC is involved with allocation of Pacific Halibut within our jurisdiction, although coastwide allocation, assessment and permitting responsibility reside with the International Pacific Halibut Commission. A variety of management approaches are used to manage PFMC fisheries, based on the characteristics of the stocks, fishing communities, and administrative needs. Attachment 3 is a paper extracted from the proceedings of the conference on Managing Our Nations Fisheries, November 2003 that describes in some detail the fisheries within PFMC jurisdiction. A brief outline of the fisheries follows:

Groundfish

- Limited Entry Trawl
  Whiting catcher/processor cooperative
- Limited Entry fixed gear
  Includes quasi rationalized sablefish permit stacking program
- Open Access
  Trawl, fixed gear, hook and line, troll
- Recreational
- Treaty Indian
  Commercial

Salmon
- Commercial troll
  - State license limitations, minimum and maximum
- Recreational
- Treaty Indian
  - Commercial Troll
  - Ceremonial and Subsistence

Coastal Pelagic Species (Anchovies, Sardine, Squid, etc)
- Federal Limited Entry south of Point Arena, California. State Developmental Fishery Programs in Oregon and Washington
  - Purse Seine
  - Dip Nets
- Open Access
  - Incidental catch in other gears
- Treaty Indian
  - Commercial seine being considered

Highly Migratory Species (Tunas, billfish, Sharks, etc.)
- Open Access
  - Purse Seine
  - Troll
  - Harpoon
  - Pelagic Longline
- Limited Entry
  - Drift Gillnet
  - Pelagic Longline and Albacore Troll Being Considered
- Recreational

Pacific Halibut
- Administer Catch Sharing Plan
  - Commercial Longline
  - Incidental Salmon Troll
  - Incidental Sablefish Longline
  - Treaty Indian
    - Commercial Longline
    - Ceremonial and Subsistence
  - Recreational

2. How are stock assessments developed and peer reviewed?

The process for developing stock assessments varies among the FMPs, but they are generally developed by a team of scientists from federal, state, and tribal agencies, and may include members of the PFMC Scientific and Statistical Committee (SSC) and PFMC Technical and Management Teams. First scientific peer review can occur by specialized independent panels that include an individual from the Center for Independent Experts; however, not every stock assessment goes through this independent panel review. The SSC is responsible for the final independent review process and makes its recommendations directly to the PFMC. Attachment 4 is a paper extracted from the proceedings of the conference on Managing Our Nations Fisheries II, March 2005 that describes in some detail the use of scientific review by the PFMC and the other Regional Councils. A brief outline of the PFMC processes follows:

Groundfish
- Stock assessment authors are usually National Marine Fisheries Service (NMFS) or state agency scientists.
- STAR Panel includes scientists from agencies, academia, Center for Independent Experts, SSC, and the management team, as well as a member of the advisory subpanel.
- Full SSC reviews assessment, STAR Panel report, and rebuilding analyses for species under rebuilding plans, and recommends Council approval/disapproval for use as best available and sound science.

Salmon
- Stock assessments compiled by Salmon Technical Team from NMFS, state, or tribal agency scientists, and published in Stock Assessment and Fishery Evaluation (SAFE) document.
- SSC reviews SAFE document and new assessment methodologies, and recommends Council approval/disapproval for use as best available and sound science.

Coastal Pelagic Species
- Stock assessment authors are usually NMFS scientists.
- STAR Panel includes scientists from agencies, academia, Center for Independent Experts, SSC, and management team. STAR Panels review new assessment methodologies.
- Full SSC reviews assessments and STAR Panel reports, recommends Council approval/disapproval, and recommends Council approval/disapproval for use as best available and sound science.

Highly Migratory Species
- Stock assessments authors are from parties to international agreements or commissions and assessments are published in SAFE document.
- SSC reviews SAFE document, and recommends Council approval/disapproval for use as best available and sound science.

3. How is science integrated into the management by the various entities?

The PFMC has a strong relationship with its SSC and other science teams, and relies heavily on their recommendations for decisions. For Example, the PFMC has never adopted an acceptable biological catch (ABC) above that recommended by its SSC. Attachment 4 is a paper extracted from the proceedings of the conference on Managing Our Nations Fisheries II, March 2005 that describes the structure of scientific review bodies within the PFMC. A brief outline of the PFMC processes follows:

SSC meets concurrently with Council
- Composition: agency, tribal, and at-large/independent, fishery, social, and economic scientist seats.
- Provides advice on all scientific and technical matters affecting Council decisions, including stock assessments, fishery and economic models, FMP amendments, National Environmental Policy Act (NEPA) documents, and management measures.

Each FMP has a technical or management team
- Comprised of agency and tribal scientists.
- These teams monitor and analyze fishery performance and make scientifically based recommendations on proposed management measures.
- SSC reviews methodology used by technical and management teams and the qualifications of team members.

4. How are annual harvest levels set?

In the case of groundfish and HMS, harvest levels are set biennially. Generally, a range of options are adopted for public review that meet conservation and allocation objectives in the FMP, as well as applicable Endangered Species Act consultation standards. At a subsequent Council meeting a preferred alternative is selected, and submitted to NMFS for approval. The process includes an analysis of impacts and NEPA compliance. A brief outline of the PFMC processes follows:

Groundfish – Biennial, three meeting process

- One year for science (e.g., stock assessment).
- One year for setting regulations (Nov., April and June meetings).
- Weak stock management, all stocks must meet conservation objectives or rebuilding requirements.
- Allocation recommended by the Groundfish Allocation Committee and Groundfish Advisory Subpanel.
- SSC recommends ABC and in some cases, optimum yield (OY).
- Management Team recommends OY and regulations (trip limits, seasons, etc.).

Salmon – Annual, two meeting process

- Technical Team develops SAFE document and coordinates annual abundance forecasts with federal, state, and tribal agencies in January and February.
- Advisory subpanel proposes options, technical team analyzes impacts, Council refines options in March with final action in April.
- Weak stock management, all 65 stocks must meet annual conservation objectives.
- Initial allocation is set in FMP and outside forums.

Coastal Pelagic Species – Annual Process

- Pacific mackerel assessment adopted in June for July-June fishing season.
- Pacific sardine assessment adopted in Nov. for Jan.-Dec. fishing season.
- Management team recommends OYs.
- SSC reviews assessments.
- Pacific sardine allocation framework implemented in FMP.
-

Highly Migratory Species - Biennial, two meeting process

- Management team recommends OY
- Initial allocation in other forums

5. What are the sources and levels of funding for management and scientific activities?

Funding for the PFMC is primarily from NOAA grants, both the Regional Fishery Management Council (RFMC) line item in the NMFS budget and supplemental funding provided annually from NMFS. The PFMC currently receives no funding directly from other Congressional line items. Attachment 5 is a graph showing the history of RFMC funding relative to overall NMFS funding. A brief summary of funding issues follows:

- There has been an increasing gap between the funding received by NMFS and the RFMC line item.
- Supplemental funding has been provided to RFMCs to deal with the problems symptomatic of the gap.
- In 2005, the collective funding for RFMCs from all sources is significantly less than the $23.7 million received in 2004.

6. What specific recommendations do you have for the reauthorization of the MSA?

The Chairs of the RFMC's met in April, 2005 and developed a set of recommendations on MSA reauthorization, which are included in Attachment 6, and the PFMC has commented on the Senate Commerce committee discussion draft (Attachment 7). A brief summary of the most important issues to the PFMC follow:

- Authority to develop dedicated access privilege programs.
- Retain current structure of science and management integration within the Council process.
- Councils and SSC meet concurrently.
- Councils set harvest levels within limits recommended by SSC or other scientific review body.
- Fishery management authority in National Marine Sanctuaries under Council jurisdiction.
- Design and specify MSA as functional equivalent of, and exempt from, NEPA requirements.
- Delete requirement for rebuilding depleted stocks within ten years.
- Exempt meetings of Council Chairs, Vice Chairs, and Executive Directors from FACA.
- Establish SSC as appropriate alternative review mechanism for highly influential information under the Data Quality Act.
- No additional statutory requirements for ecosystem management.
- Retain current flexibility to use existing tools to incorporate ecosystem principles.
- Establish guidelines to assist Councils in developing ecosystem based approaches.

7. What new challenges do you foresee for fisheries managed by your Council?

Development of dedicated access privilege programs, also known as rationalization, individual quota, individual fishing quota, individual transferable quota programs, is the single greatest challenge before the PFMC at this time. The Council is currently developing a comprehensive dedicated access privilege program for the West Coast groundfish trawl fishery. Guidelines for establishing programs need to be developed within a set period and in consultation with Councils.

Thank you again for this opportunity to submit testimony to the House Resource Committee. If you or your staff have any additional questions or need clarification please don't hesitate to contact either Chairman Hansen or myself.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

Donald K. Hansen
Chairman

CAT:rdd

c: Council Members
Council Staff

Attachments:

1. – Disclosure Requirement for Donald O. McIsaac to testify before the House Committee on .Resources, October 2005.
2. – Disclosure Requirement for Donald K. Hansen to testify before the House Committee on .Resources, October 2005.
3. – Proceedings from Managing our Nations Fisheries. November 2003. Pacific Council .Presentation.
4. – Proceedings from Managing our Nations Fisheries II. March 2005. Use of Scientific .Review by the Regional Fishery Management councils: The Existing process and .Recommendations for Improvement.
5. – Agenda Item D.1, Supplemental Attachment 1, 2005 CCED meeting, Graph of RFMC .funding relative to NMFS funding.
6. – Positions of the Regional Fishery Management Council Chairs on Reauthorization of the .Magnuson-Stevens Fishery Conservation and Management Act. April 2005.
7. – Pacific Fishery Management Council Letter on Senate Committee Discussion Draft Bill fro .Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act. .October 2005.

LEGISLATIVE MATTERS

The Legislative Committee is not scheduled to meet at the November Council meeting. At the September Council meeting, the Legislative Committee requested a longer session at its next meeting to allow additional time to deliberate several significant federal legislation matters. The Council determined the best way to accommodate this request was to schedule the next meeting of the Legislative Committee between the November 2005 and the March 2006 Council meetings. The date, time, and location of this meeting have not been formally arranged.

Potential federal legislation either currently distributed for review or anticipated to be released in the near future include the Administration proposed bill on reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), a House of Representatives introduced bill on MSA reauthorization anticipated from U.S. Representative Wayne T. Gilchrest (R-Maryland) and the House Committee on Resources, a U.S. Senate Committee on Commerce, Science, and Transportation introduced bill on reauthorization and a revised version of S. 1549, the *Cooperative Hake Improvement and Conservation Act of 2005* introduced by U.S. Senator Gordon Smith (R-Oregon). Additionally, the Council directed Council staff to track amendments to S. 1195, the *National Offshore Aquaculture Act of 2005*, for discussion at the next meeting of the Legislative Committee.

The Council is tasked with scheduling the next meeting of Legislative Committee and providing prioritized recommendations on legislative matters to be addressed.

Council Action:

Discussion and Guidance for the Next Legislative Committee Meeting.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Mike Burner
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. Council Discussion and Guidance for Legislative Committee Meeting

PFMC
10/13/05

REPORT OF THE BUDGET COMMITTEE

The Budget Committee met on October 30, 2005 and received the Executive Director's Budget Report from Dr. Donald McIsaac. The report included status of the 2005 budget and expenditures, and a review of potential funding for 2006 and its effect on Council programs and staffing. The following Budget Committee members were present:

Mr. James Harp, Chairman
Mr. Donald K. Hansen
Mr. Mark Helvey
Mr. Jerry Mallet
Dr. Steve Freese

Status of 2005 Budget and Expenditures

Dr. McIsaac reported that the expenditure of funds from the Council's total 2005 budget is proceeding within normal expectations. Current projections indicate a relatively small positive balance at year's end that could be used to help fund activities in 2006.

Dr. McIsaac also reported on the contract with Northern Economics, Incorporated, to prepare the first phase of the trawl individual quota (IQ) program environmental impact statement (EIS). This contract will utilize funds to be provided by the National Marine Fisheries Service (NMFS) Headquarters dedicated solely to IQ development

Funding for 2006

Dr. McIsaac reported that Council funding for 2006 is yet to be determined. Federal government funding is currently under a Continuing Resolution until such time as Congress and the President agree on a federal budget, including the Council's 2006 base funding from the regional fishery management council line item. While the amount of supplemental funding for 2006 from any other Congressional line items is also not known at this time, the NMFS has made a commitment of $300,000, or slightly more, in additional funding for the Council to prepare an EIS for the 2007-2008 groundfish biennial management specifications, to include a review of the eight current rebuilding plans as Fishery Management Plan (FMP) Amendment 16-4.

To help Budget Committee deliberations on impacts of various funding levels, Dr. McIsaac reviewed a planning document prepared for NMFS in 2004 that lists proposed programs and detailed funding needs for the Council from 2007 through 2011, discussed a list of potential issues for Council action in 2006, and provided budget benchmarks for status quo operational capabilities (about $2.9 million) and the funding level needed to provide the same management capability as in 2004 prior to recent staff and program cuts (about $3.3 million). He also reviewed potential program and staffing priorities under a range of possible funding levels.

Budget Committee Recommendations

Based on the information provided by Dr. McIsaac in his display of funding scenarios and priorities, the Budget Committee adopted recommendations to help guide Council activities for reasonably expected 2006 funding levels that are higher or lower than the status quo need of

$2.9 million (a "reasonably expected" range of $2.6 to $3.3 million). Should the actual funding exceed $3.3 million or fall short of $2.6 million, the Executive Director would convene a timely Budget Committee meeting to seek further guidance. The Budget Committee recommends:

1. In the event funding exceeds the status quo need, the sequence of Council priorities is as follows, from first use of additional funds to last priority use of additional funds:

Programmatic	Council Staffing
• Carry more of the 2007-2008 management specifications EIS process.	• Add groundfish staff officer position.
• Enhance other regular groundfish management capabilities.	
• Complete the 2007-2008 groundfish management specifications EIS, including rebuilding plan revisions (Amendment 16-4).	• Add an economist position or contracting equivalent.
• Accomplish the full highly migratory species (HMS) fishery management plan (FMP) implementation.	
• Increase state contracts to the 2004 level.	• Increase communication specialist position to full time.
• Add capability to address full marine protected area (MPA) activities, as in 2004.	

2. In the event that funding falls short of the status quo need, the sequential order of Council priorities is as follows, from first shortfall below $2.9 million to an amount of about $2.6 million:

Programmatic	Council Staffing
• Reduce or eliminate efforts for HMS FMP implementation.	
• Reduce the frequency of Habitat Committee meetings.	• Vacate communication specialist position.
• Reduce or eliminate "off year" science workshops.	
• Reduce or eliminate unanticipated committee meetings and travel.	• Vacate administrative assistant position.
• Eliminate the September Council meeting.	

PFMC
11/3/05

Agenda Item B.6
Situation Summary
November 2005

FISCAL MATTERS

The Council's Budget Committee will meet on Sunday, October 30, 2005 at 3:30 P.M. to consider budget issues as outlined in Ancillary C, Budget Committee Agenda.

The Budget Committee's report will be provided to the Council for review and approval on Friday, November 4.

Council Action:

Consider recommendations of the Budget Committee.

Reference Materials:

1. Agenda Item B.6.b, Supplemental Budget Committee Report.

Agenda Order:

a. Agenda Item Overview — John Coon
b. Budget Committee Report — Jim Harp
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Consider Recommendations of the Budget Committee

PFMC
10/14/05

IDAHO FISH & GAME
600 South Walnut
P.O. Box 25
Boise, Idaho 83707-0025

Dirk Kempthorne / Governor
Steven M. Huffaker / Director

October 31, 2005

Mr. John Coon
Deputy Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220

Dear Mr. Coon:

This is to notify the Pacific Fishery Management Council (PFMC) that we have hired a replacement for Scott Marshall, who represented Idaho Department of Fish and Game on the PFMC habitat committee. Dr. Charlie Petrosky will be attending in that position; his contact information is:

Petrosky, Dr. Charles E.
Idaho Department of Fish and Game
Fishery Program Coordinator
600 S. Walnut, P.O. Box 25
Boise, ID 83707
Phone: 208-334-3791
Fax: 208-334-2114
cpetrosky@idfg.idaho.gov

Please let me know if any further information is needed. We are looking forward to continued participation on PFMC.

Sincerely,

Sharon W. Kiefer
Anadromous Fishery Manager

Cc: Jerry Mallet, IDFG
Dave Ortmann, PFMC

s/fishery/skiefer/pfmc

OCEANA | Protecting The World's Oceans.

175 South Franklin Street, Suite 418 +1.907.586.4050
Juneau, AK 99801 USA www.oceana.org

November 2, 2005

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. Hansen and Dr. McIsaac:

I understand the Pacific Fishery Management Council is seeking a candidate to fill the conservation group vacancy on the Coastal Pelagic Species Advisory Subpanel. I respectfully submit for your consideration Ben Enticknap, Pacific Project Manager for Oceana.

Working out of our Portland, Oregon office, Ben is an integral part of Oceana's Pacific Team. We are dedicated to protecting Pacific ocean ecosystems, marine life, and habitat from pollution; and to developing alternatives to destructive human practices. Using science, law, public education, and advocacy, the Pacific Team has been instrumental in developing management and scientific tools that provide this and future generations opportunities for sustainable ocean use and healthy seafood.

Ben Enticknap has over four years of direct experience with marine science and policy. Prior to joining Oceana, Ben was the Fisheries Project Coordinator for the Alaska Marine Conservation Council (AMCC). He was instrumental in developing the organization's understanding of marine science and worked with communities, fishermen, scientists, managers and conservation organizations on a broad range of issues including habitat protection, bycatch reduction, and overfishing.

In addition to his work at AMCC, Ben has direct experience with science, management, and fisheries through research and management projects with the University of California, Berkeley, Alaska Department of Fish and Game, and as a commercial fisherman. Moreover, his work experience is built on a strong foundation from studies in biology and marine sciences at the University of Oregon and the Oregon Institute of Marine Biology at Charleston.

It would be Ben's privilege to serve the Pacific Fishery Management Council as a member of the Coastal Pelagic Species Advisory Subpanel. As we clearly demonstrated during the Essential Fish Habitat Environmental Impact Statement process, Oceana's Pacific Team has the talent, ability, and desire to be a part of the solution for ocean management challenges today. If you have questions or require further information, please do not hesitate to contact me at (907) 586-4050 or jayers@oceana.org. Thank you.

Sincerely,

Jim Ayers
Vice President and Director of the Pacific

APPOINTMENTS TO ADVISORY BODIES, STANDING COMMITTEES, AND OTHER FORUMS

The following advisory body vacancies are scheduled to be filled:

GROUNDFISH ALLOCATION COMMITTEE (GAC)

Affiliation or Representation and Nominee	Nominated/Supported By
Non-Voting Advisor Representing the Whiting Sector	
Mr. Dale Myer Arctic Storm Management Group, Seattle, WA	Self Brent Paine, Executive Director, United Catcher Boats, Seattle, WA
Mr. Pierre Marchand President, Jessies Ilwaco Fish Co., Inc., Ilwaco, WA	Self
Mr. Richard Carroll VP, Ocean Gold Seafoods, Inc., Westport, WA	Self
Mr. Dan Waldeck Executive Director, Pacific Whiting Conservation Cooperative, Portland, OR	Self

COSTAL PELAGIC SPECIES ADVISORY SUBPANEL (CPSAS)

Affiliation or Representation and Nominee	Nominated/Supported By
Processor Representative	
Mr. Darrell Kapp Owner, Astoria Pacific Seafoods, Astoria, OR	Ryan Kapp, Bellingham, WA
Mr. Mike Okoniewski Manager, Pacific Seafood, Woodland Division, Woodland, WA	Heather Mann, President, Munro Consulting, Inc. Rod Moore, Executive Director, West Coast Seafood Processors Association Craig Urness, General Counsel, Pacific Seafood Company, Clackamas, OR
Mr. Richard Carroll VP, Ocean Gold Seafoods, Inc., Westport, WA	Self

Council Action:

Appoint new members as necessary.

Reference Materials:

1. Closed Session Agenda Item A.1.a, Attachment 1: GAC Nominations.
2. Closed Session Agenda Item A.1.a, Attachment 2: CPSAS Nominations.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Public Comment
c. **Council Action:** Consider Solicitations, Appointments, and Other Advisory Body Issues as Necessary

PFMC
10/14/05

Preliminary Three Meeting Outlook for the Pacific Council

(All Candidate Agenda Items In Dotted Box; Shaded Items are Contingent and Counted in Time Estimate)

March	**April**	**June**
Seattle, WA 3/6-3/10/06	Sacramento, CA 4/3-4/7/06	Foster City, CA 6/11-6/16/06
Estimated Percent of Standard Floor Time = 114%	Estimated Percent of Standard Floor Time = ####	Estimated Percent of Standard Floor Time = 102%
Administrative	**Administrative**	**Administrative**
Closed Session; Open Session Call to Order; Min.	Closed Session; Open Session Call to Order; Min.	Closed Session; Open Session Call to Order; Min.
Legislative Committee Report	Legislative Committee Report	Legislative Committee Report
	Intitiate Research & Development Process	Fiscal Matters
Interim Appointments	Interim Appointments	Interim Appointments
3 Mtg Outlook, Final April Agenda	3 Mtg Outlook, Draft June Agenda, Workload	3 Mtg Outlook, Draft Sept. Agenda, Workload
Public Comment on Non-Agenda Items	Public Comment on Non-Agenda Items	Public Comment on Non-Agenda Items
Fishery Overcapacity Policy--Info Rpt--Mr. Terry		
Coastal Pelagic Species	**Coastal Pelagic Species**	**Coastal Pelagic Species**
NMFS Report		NMFS Rpt
Pac. Mackerel: Consider Need for Mop-up Fishery		Pacific Mackerel Harvest Guideline for 2006/07
Krill Amendment: Adopt Final Preferred Alt.		[SAFE doc provided to Council]
Enforcement Issues	**Enforcement Issues**	**Enforcement Issues**
USCG Annual Fishery Enforcement Rpt.		State Activity Rpt
Groundfish	**Groundfish**	**Groundfish**
NMFS Report	NMFS Report	NMFS Report
2006 Inseason Management (1 Session)	2006 Inseason Mgmt (2 Sessions)	2006 Inseason Management (2 Sessions)
		EFPs for 2007: Submit for Initial Adv. Bod. Review
Pac. Whiting: Adopt Final 2006 Spx & Mgmt Meas.	2007-2008 Mgmt Recommendations: Adopt	2007-2008 Mgmt Recommendations: Adopt Final
	1) Final Harvest Specs. (ABC/OY Levels)	
	2) Range of Refined Mgmt Measures for Public Review, &, if possible, a Preferred Alt.	
	3) Amendment 16-4 (Revised Rebuilding Plans): Adopt Preliminary Alts. For Public Review	***Amendment 16-4 (Revised Rebuilding Plans): Adopt Final Preferred Alt.***
"Off Year" Science Planning:	Stock Assmnts.: Adopt Final Plan for 2009-2010	
1) Science Improvements Workshops		IQ EIS: Status Report on Phase I
2) Prelim. Stock Assessment Planning for 2009-2010		***Intersector Allocation EIS: Plan Next Steps***
		Open Access Limitation: Planning
		Spiny Dogfish Longline Endorsement: Adopt FMP Amendment Alts. For Public Review

Agenda Item B.8.a
Supplemental Attachment 1
November 2005

Preliminary Three Meeting Outlook for the Pacific Council

(All Candidate Agenda Items In Dotted Box; Shaded Items are Contingent and Counted in Time Estimate)

March	April	June
Seattle, WA 3/6-3/10/06	Sacramento, CA 4/3-4/7/06	Foster City, CA 6/11-6/16/06
Estimated Percent of Standard Floor Time = 114%	Estimated Percent of Standard Floor Time = ####	Estimated Percent of Standard Floor Time = 102%
Habitat Issues	**Habitat Issues**	**Habitat Issues**
Habitat Committee Report	Habitat Committee Report	Habitat Committee Report
Highly Migratory Species	**Highly Migratory Species**	**Highly Migratory Species**
NMFS Rpt		NMFS Rpt
Bigeye Tuna OF Response: Adopt Prelim Draft FMP Amendment for Pub. Rev.	Bigeye Tuna OF Response: Adopt Final Preferred FMP Amendment Alt.	Mgmt Measures: Prelim Proposals for any Change [Prelim SAFE Doc--Info Rpt]
Drift Gillnet Mgmt: Adopt Preferred Option for Modifying Time/Area Closure for Turtles	PFMC Representation in IATTC Process	Mgmt Regime for HS Longline Fishery: Consider Adopting FMP Amendment Alts. For Public Rev.
Albacore Mgmt Considerations	Albacore Mgmt Considerations	
Marine Protected Areas	**Marine Protected Areas**	**Marine Protected Areas**
CINMS: Full MSA Response		
Pacific Halibut	**Pacific Halibut**	**Pacific Halibut**
Rpt on IPHC Annual Mtg		
Incidental Catch Regs for 2006: Adopt Options for Public Rev	Incidental Catch Regs for 2006: Adopt Final	
Salmon	**Salmon**	**Salmon**
2006 Mgmt Options: Adopt Range for Public Rev & Appt. Hearings Officers	2006 Management Options: Final Adoption	Fishery Update--Info Rpt
Ft. Bragg Commercial Fishery Opening Mar 15: Consider Opening/Closing Date & Quota	2006 Methodology Review: Establish Process & Preliminary Priorities	EFH Review Process: Next Steps
Mass Marking & CWT Information Briefing	Identify Stocks not Meeting Consv. Objectives	***FRAHM Update***
Klamath Fall Chinook Conservation Objective: Scope FMP Amendment to Allow de-minimus Impacts	Selective Fisheries Briefing (or Information Rpt)	***Klamath Fall Chinook Conservation Objective: Adopt Public Review Draft FMP Amendment Alts.***
Update on EFH Review Process		
Role of KFMC		
Special Joint Sessions	**Special Joint Sessions**	**Special Joint Sessions**
Salmon Excluder Device in Makah Whiting Fishery (Wed.)	Salmon Genetics Research Rpt ***(or on Council Agenda Monday afternoon)***	

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/
MONDAY, MARCH 6 - 8:00 am				
		Ancillary Meetings *- see Ancillary Schedule* →		→
		SPECIAL SESSIONS		
		On **Wed**. 1 pm--Salmon Excluder Device Used in Makah Whiting Fishery		GAP; SAS
CLS	1.00	**Closed Session Agenda: Personnel & Litigation--3:00 pm**		
		Adv. Body Issues - Appointments	Info	None
		Litigation Status (E. Cooney)	Info	None
A.	0.40	***General Session*** **Call to Order - 4:00 pm**		
1-3		Opening, Roll Call, ED Rpt	Info	
4		Approve Agenda	Decision	
B.		**Administrative Matters**		
1	0.20	Approve Minutes - September & November 2005	Decision	
2	0.30	Council Meeting Agenda Planning	Guidance	All
C.		**Salmon Mgmt**		
1	1.00	PSC Report on Mass Marking & CWTs: Briefing--Invite Author	Info	STT; SAS
2	0.30	Ft. Bragg Mar 15 Commercial Fishery Opening: Consider need to Modify Opening Date & Quota	**Action**	STT; SAS
D.		**Enforcement Issues**		
1	1.00	USCG Annual Fishery Enforcement Rpt	Info	EC
	4.20			
TUESDAY, MARCH 7 - 8:00 am				
		Ancillary Meetings *- see Ancillary Schedule* →		→
E.		**Pacific Halibut Mgmt**		
1	0.30	Report on International Pacific Halibut Commission Annual Mtg	Info	GAP; SAS
2	1.00	Incidental Catch Regs in Salmon Troll & Sablefish Fisheries: Adopt Pub Rev Options	**Action**	GAP; SAS
F.		**Groundfish Mgmt**		
1	0.75	NMFS Rpt (Region & Science Center)	Info	GMT; GAP; EC
2	1.50	***"Off Year" Science Planning: Consider Improved Science Workshops & Preliminary Stock Assessment Plan for 2009-2010 Season***	Guidance	GMT; GAP; SSC
C.		**Salmon Mgmt (continued)**		
3	1.00	Review of 2005 Fisheries & Summary of 2006 Stock Abundance Est.	Decision	STT; SAS; SSC
4	3.00	2006 Mgmt Options: Identify Mgmt Objectives & Prelim Definition	Decision	STT; SAS; EC
	0.50	**Public Comment Period for Non-Agenda Items**	Info	

ANCILLARY MEETING SCHEDULE

Day/Group	Start Time	Continuing Through
MONDAY:		
A. GMT	8:00 AM	Thur.
B. GAP	8:00 AM	Thur.
C. HC	***8:00 AM***	***Mon.***
D. SAS	8:00 AM	Fri.
E. STT	8:00 AM	Fri.
F. SSC	8:00 AM	Tue.
G. Legislative	8:30 AM	Mon.
Chair's Briefing	10:30 PM	Mon.
H. HMSAS	1:00 PM	Tue.
I. HMSMT	1:00 PM	Tue.
J. EC	5:30 PM	Fri.
TUESDAY:		
EC; GAP; GMT; SAS; STT; SSC; HMSAS; HMSMT continue		

Agenda Item B.8.a
Supplemental Attachment 2
November 2005

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/	ANCILLARY MEETING SCHEDULE Day/Group	Start Time	Continuing Through
	8.05						
WEDNESDAY, MARCH 8 - 8 am					**WEDNESDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →			EC; GAP; GMT; SAS; STT continue		
F.		**Groundfish Mgmt**					
3	2.50	Pacific Whiting: Adopt Final 2006 ABC, OY, & Mgmt Measures	**Action**	GMT; GAP, EC, SSC			
G.		**Habitat**					
1	0.50	Habitat Committee Rpt	Decision	HC			
H.		**Coastal Pelagic Species Mgmt**					
1	0.50	NMFS Rpt--Region & Science Ctr	Info	CPSAS; CPSMT			
2	0.50	Pacific Mackerel Fishery: Consider Need for Mop-up Fishery	**Action**	CPSAS; CPSMT			
3	2.00	FMP Krill Amendment: Adopt Final Preferred Alternative	**Action**	CPSAS; CPSMT; Others			
C.		**Salmon Mgmt (continued)**					
5	2.00	2006 Mgmt Options: Council Recommendations for Analysis	Guidance	STT; SAS; EC			
	8.00						
THURSDAY, MARCH 9 - 8 am					**THURSDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →			GAP; GMT; EC; SAS; STT continue		
I.		***Marine Protected Areas***					
1	2.00	***Channel Island NMS: Adopt Full MSA Response***	**Action**	All			
F.		**Groundfish Mgmt**					
4	2.00	Inseason Adjustments: Final Adoption of Appropriate Changes	**Action**	GMT; GAP; EC			
J.		**Highly Migratory Species Management**			10 am Briefing--Salmon Excluder Device		
1	0.50	NMFS Rpt--Region & Science Ctr	Info	HMSAS; HMSMT	Used in Makah Whiting Fishery		
2	1.00	Bigeye Tuna Overfishing Response: Adopt Final Preferred FMP Amendment Alt.	Decision	HMSAS; HMSMT			
3	2.00	Drift Gillnet Mgmt: Adopt Final Regulatory Amendment to Closed Area	Decision	HMSAS; HMSMT; EC			
C.		**Salmon Mgmt (continued)**					
6	1.00	2005 Mgmt Options: Further Council Direction, If Necessary	Guidance	STT; SAS; EC			
	8.50						

PRELIMINARY DRAFT COUNCIL MEETING AGENDA, MARCH 5-10, 2006, SEATTLE, WA

AG#	Hours	AGENDA TOPICS/COMMENTS	COUNCIL TASK	ADVISORY BODY PRIORITY 1/	ANCILLARY MEETING SCHEDULE Day/Group	Start Time	Continuing Through
FRIDAY, MARCH 10 - 8 am					**FRIDAY:**		
		Ancillary Meetings *- see Ancillary Schedule* →		→	SAS; STT; EC as necessary.		
C.		**Salmon Mgmt (continued)**					
7	2.00	Klamath Fall Chinook Conservation Obj.: Scope FMP Amendment to Allow *de minimis* Impacts	Decision	STT; SAS; SSC			
B.		**Administrative Matters**					
3	0.50	Legislative Matters	Guidance				
4	0.20	Interim Appointments to Adv. Bodies, Standing Com., & Other Forums	Decision	None			
5	0.80	3 Mtg Outlook & April Agenda: Final Guidance & Adopt April Agenda	Guidance	GMT; GAP; & as nec			
C.		**Salmon Mgmt (continued)**					
8	2.90	2005 Mgmt Options: Adopt for Public Review	**Action**	STT; SAS; EC			
9	0.10	Appoint Hearings Officers for 2005 Mgmt Option Hearings	Decision	STT; SAS			
	6.50						

1/ Anticipates each advisory subpanel will review agenda items for its particular FMP.

• Key to Council Task: Info=briefing; Guidance=formal or informal direction on issue; Decision=formal determination; Action=results in implementation by NMFS.

Candidate Agenda Items Not Scheduled

0.75	1 Role of Klamath Fishery Mgmt Council	Decision	SAS; STT
0.50	2 Albacore Mgmt: Consider Possible Actions	Guidance	HMSAS; HMSMT
0.75	Update on EFH Review Process	Guidance	STT; SAS; HC

IR.	**Informational Reports (available in Briefing Book, but no time scheduled on Agenda):**		
1	Fishery Overcapacity Policy: Briefing by Joe Terry	Info	All
2		Info	
3		Info	
4		Info	
5		Info	

Due Dates (all dates COB):

Meeting Invitation Memo Distributed:	1/20
Public Meeting Notice Mailed:	2/2
FR Meeting Notice transmitted:	2/8
Final day to receive public comments for placement in BB:	2/15
Final deadline to submit all BB materials:	2/15
Final deadline to submit cover memos for Ancillary Meetings:	2/20
Briefing Book Mailing:	2/23
Final deadline to receive public comments for distribution to Council on first day of mtg:	2/28

35.25	114%

COUNCIL WORK LOAD PRIORITIES NOVEMBER 7, 2005 THROUGH APRIL 7, 2006

(**Bolded** tasks represent a Core Program Responsibility)

	Salmon	Groundfish	CPS	HMS	Other
ACTIVE	**Safe Documents:** **Annual Review** **Preseason Rpts** **Annual Specs** **Public Hearings on Options** Klamath Fall Chinook FMP Amendment Scoping Update Historic DataSets STT Mtgs--Jan & Feb STT Mtgs--Mar & Apr SAS Mtgs--Mar & Apr	**SAFE 2005: Volume I** **Inseason Mgmt** **Final Adoption of Whiting Specs** **2007-08 Biennial Specification Tasks** **VMS transmittal** Trawl IQ Program: Coordinate Analyses & Drafting of Program Structure & Intersector Allocation EISs; hold workshop Amendment 16-4 Rebuilding Plans *Spiny Dogfish & Pac Cod 2006 Spx EA* Off Year Science Planning, Including 2007 Stock Assessments Amendment 18/19 transmittal & update FMP Allocation Com mtg--Nov GMT Mtg/Allocation Com mgt--Jan GMT & GAP Mtgs--Mar & Apr	**Sardine Ann. Specs Trans** **SAFE 2006 Prep** *Amendment 12: Krill* Trinational Sardine Forum in Nov CPSMT & CPSAS Mtgs Prior to or at March CM	Drift Gillnet Fishery Mgmt Options *Bigeye Overfishing Response Amend.* HMSMT Mtg--Feb & Mar HMSAS Mtg--Mar	**Admin Necessities (Briefing Book, minutes, Newsletter, COP; convert Safe Docs to WORD; etc.)** **Pacific Halibut Mgmt** **Implement CS Plan Changes & Incidental Catch Regs** **IPHC Annual Mtg** **CINMS: Full MSA Response** **MSA Reauthorization** Leg. Com Mtg - Over winter Regulatory Streamlining
CONTINGENT	Model Eval Work Group EFH Update (5 year review)	*Spiny Dogfish Endorsement FMP Amend.*		Joint WPFMC-PFMC Mtg Albacore Mgmt Concerns	Ecosystem-Based Mgt. PacFIN/RecFIN/EFIN issues MPA Coordination
DELAYED	Amendments: OCN Coho Matrix SOF Coho Allocation Cons. Objectives: Puget S. Chinook & Coho LCR Coho Sacramento River Chinook	SAFE 2002-2004: Volume II (review info) (to complete in April for EIS) *Amendment 10 (Monitor Shore-based Whiting)* Open Access Limitations Alternative Mgmt Approaches GF Strategic Plan Formal Review SSC Bycatch Workshop II	International Mgmt	FMP Amendment: Mgmt Regime for HS Longline Fishery International HMS Forum Participation	Research & Data Needs Economic Data Collection Program Communication Plan

Agenda Item B.8
Situation Summary
November 2005

COUNCIL THREE MEETING OUTLOOK, DRAFT MARCH 2006 COUNCIL MEETING AGENDA, AND WORK LOAD PRIORITIES

This agenda item requests guidance from the Council on the following three matters:

1. The Council three-meeting outlook (March, April, and June).
2. The draft agenda for the March 2006 Council meeting.
3. Council staff work load priorities for November 7, 2005 through April 7, 2006. (The workload priorities include the period through the April Council meeting because of the short period between the March and April meetings.)

Items 1 and 2 above were the subject of an informational briefing under Agenda Item B.3 on Monday, October 31. The Executive Director will review proposed drafts of the three items listed above and discuss any other matters with the Council relevant to this agenda item. After considering any reports and comments from advisory bodies and public, the Council is scheduled to provide guidance as appropriate. The Council also has the opportunity to identify priorities for advisory body consideration for the March Council meeting.

Council Tasks:

1. **Provide guidance on potential agenda topics for the next three Council meetings.**
2. **Provide guidance on the draft agenda for the March 2006 Council meeting.**
3. **Provide guidance on priorities for Council workload management between the November and April Council meetings.**
4. **Identify priorities for advisory body consideration at the next Council meeting.**

Reference Materials:

1. Agenda Item B.8.a, Supplemental Attachment 1: Preliminary Three-Meeting Outlook for the Pacific Council.
2. Agenda Item B.8.a, Supplemental Attachment 2: Preliminary Draft Council Meeting Agenda, March 5-10, 2006, Seattle, WA.
3. Agenda Item B.8.a, Supplemental Attachment 3: Council Work Load Priorities November 4, 2005 through April 7, 2006.

Agenda Order:

a. Agenda Item Overview — Don McIsaac
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. Council Guidance on Council Three Meeting Outlook, March Council Agenda, Council Staff Work Load, and Priorities for Advisory Body Consideration

PFMC
10/17/05