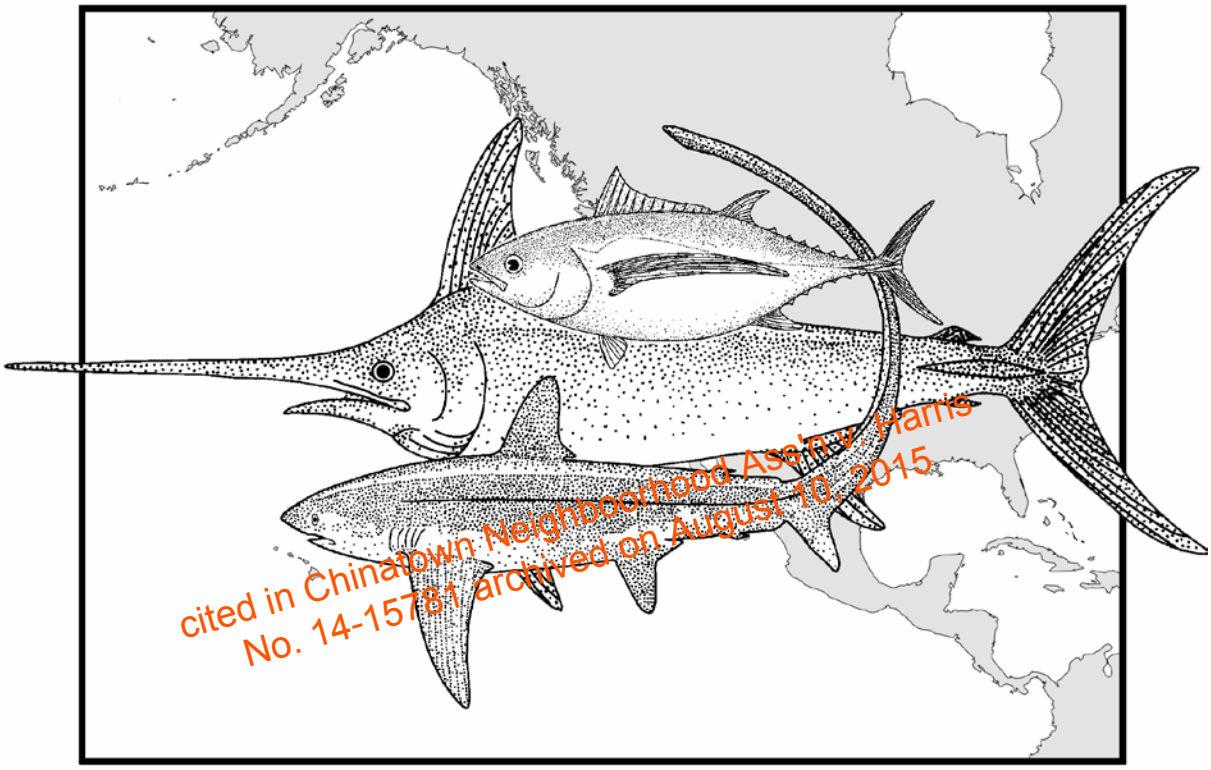
FISHERY MANAGEMENT PLAN FOR U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES



AS AMENDED THROUGH AMENDMENT 2

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 101
PORTLAND, OREGON 97220
WWW.PCOUNCIL.ORG

JULY 2011

Cover illustration by Roy Allen, Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, California.

Printed: July 15, 2011
Filename: HMS FMP_Jul11.docx

This document is published by the Pacific Fishery Management Council; current r National Oceanic and Atmospheric Administration award number NA05NMF441008.

Preface
Reorganization of the FMP under Amendment 1

The Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) was originally published as a combined document with the Final Environmental Impact Statement (FEIS), required by the National Environmental Policy Act in August 2003. That document contains detailed descriptions of the biological and socioeconomic environment affected by implementation of the Plan and an analysis of alternatives for implementing different components of the Plan, along with discussion of critical issues, such as stock status, protected species interactions, bycatch, and the management regime in place prior to FMP implementation.

Amendment 1 made substantive changes to the FMP to address bigeye tuna overfishing and also reorganized the FMP to excerpt elements specific to the FMP, as adopted and approved, from the combined FMP/FEIS. Descriptive material in the original FMP/FEIS has been moved to a series of appendices.

The original FMP/FEIS remains a publicly available document. The information and analysis contained therein are a valuable resource to support future management actions and amendments to this FMP.

Table of Contents

Tables

Figures

Definition of Terms as used in the HMS FMP

Biomass

The estimated amount, by weight, of a HMS population. The term biomass means total biomass (age one and above) unless stated otherwise.

Bycatch

Fish that are harvested in a fishery, but are not sold or kept for personal use and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch-and-release fishery management program.

California Bight

The region of concave coastline off southern California between the headland at Point Conception and the U.S. Mexican border, and encompassing various islands, shallow banks, basins and troughs extending from the coast roughly 200 km offshore.

Commercial fishing

Fishing in which the fish harvested, either in whole or in part, are intended to enter commerce through sale, barter, or trade.

Council

The Pacific Fishery Management Council, including its HMSMT, HMSAS, SSC, and any other committee established by the Council.

Epipelagic

The vertical habitat within the upper water column from the surface to depths generally not exceeding approximately 200 m (0-109 fm), i.e. above the mesopelagic zone.

Essential fish habitat

Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Exclusive economic zone

The zone established by Presidential Proclamation 5030, 3 CFR part 22, dated March 10, 1983, and is that area adjacent to the United States which, except where modified to accommodate international boundaries, encompasses all waters from the seaward boundary of each of the coastal states to a line on which each point is 200 nautical miles (370.40 km) from the baseline from which the territorial sea of the United States is measured. Off the West Coast states, the EEZ is the area between 3 and 200 miles offshore.

Far offshore

All waters beyond the EEZ of the United States and beyond any foreign nation's EEZ, to the extent that such EEZ is recognized by the United States.

Fishery Management Area

The EEZ off the coasts of Washington, Oregon, and California between three and 200 nautical miles offshore, bounded in the north by the Provisional International Boundary between the United States and Canada, and bounded in the south by the International Boundary between the United States and Mexico.

Fishing:

(1) the catching, taking, or harvesting of fish;

(2) the attempted catching, taking, or harvesting of fish;

(3) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or

(4) any operations at sea in support of, or in preparation for, any activity described above.

This term does not include any activity by a vessel conducting authorized scientific research.

Gear conflict

Any incident at sea involving one or more fishing vessels: (1) In which on fishing vessel or its gear comes into contact with another vessel or the gear of another vessel; and (2) That results in the loss of, or damage to a fishing vessel, fishing gear or catch.

Harvest guideline

A numerical harvest level or range of levels that is a general objective and is not a quota. Attainment of a harvest guideline does not require a management response, but it does prompt review of the fishery.

Harvesting vessel

A vessel involved in the attempt or actual catching, taking or harvesting of fish, or any activity that can reasonably be expected to result in the catching, taking or harvesting of fish.

Highly Migratory Species

Species managed under the HMS FMP, specifically:

Tunas:

North Pacific Albacore (*Thunnus alalunga*)

Yellowfin tuna (*Thunnus albacares*)

Bigeye tuna (*Thunnus obesus*)

Skipjack tuna (*Katsuwonus pelamis*)

Northern bluefin tuna (*Thunnus thynnus*)

Sharks:

Common thresher shark (*Alopias vulpinus*)

Pelagic thresher shark (*Alopias pelagicus*)

Bigeye thresher shark *(Alopias superciliosus*)

Shortfin mako shark (*Isurus oxyrinchus*)

Blue shark (*Prionace glauca*)

Billfish/Swordfish:

Striped marlin (*Tetrapturus audax*)

Swordfish (*Xiphias gladius*)

Other:

Dorado or Dolphinfish (*Coryphaena hippurus*)

Highly Migratory Species Advisory Subpanel (HMSAS)

The HMSAS is comprised of members of the fishing industry and public appointed by the Council to review proposed actions for managing the highly migratory species fisheries.

Highly Migratory Species Fishery Management Plan (HMS FMP)

The Fishery Management Plan for the Washington, Oregon, and California Highly Migratory Fisheries developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce, and as it may be subsequently amended.

Highly Migratory Species Management Team (HMSMT)

The individuals appointed by the Council to review, analyze, and develop management measures for the HMS fishery.

High seas

All waters beyond the EEZ of the United States and beyond any foreign nation's EEZ, to the extent that such EEZ is recognized by the United States (Note, this differs from the definition in the Magnuson-Stevens Act which defines high seas as waters beyond the territorial sea).

Incidental catch or incidental species

Species caught and retained while fishing for the primary purpose of catching a different species (Note, this differs from bycatch which are discarded at sea).

Incidental take

The take of marine mammals, sea turtles, or sea birds during fishing operations.

Local depletion

Occurs when localized catches are in excess of replacement from local and external sources of production (via net immigration). Local depletion can occur independently of the status of the overall stock. The local depletion of abundance can be greater than stock-wide decreases.

Maximum sustainable yield

The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

Mesopelagic

The vertical habitat within the mid-depth ocean water column, from depths between 200 and 1000 m (109-547 fm) i.e., below the epipelagic zone.

Neritic

Inhabiting coastal waters primarily over he continental shelf; generally over bottom depths equal to or less than 183 m (100 fm) deep.

Oceanic

Inhabiting the open sea, ranging beyond continental and insular shelves, beyond the neritic zone.

Optimum yield (OY)

The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and, taking into account the protection of marine ecosystems; that is prescribed on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor; and, in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery.

Overfished

Stock or stock complex whose size is sufficiently small that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding.

Overfishing

To fish at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.

Owner of a vessel or vessel owner

A person identified as the current owner in the Certificate of Documentation (CG-1270) issued by the U.S. Coast Guard for a documented vessel, or in a registration certificate issued by a state or the U.S. Coast Guard for an undocumented vessel.

Pan-Pacific

Throughout the entire Pacific region.

Pelagic

Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1000 meters (547 fm). (See also epipelagic and mesopelagic)

Person

Any individual, corporation, partnership, association or other entity (whether or not organized or existing under the laws of any state), and any federal, state, or local government, or any entity of any such government that is eligible to own a documented vessel under the terms of 46 U.S.C. 12102(a).

Processing or to process

The preparation or packaging of HMS to render the fish suitable for human consumption, pet food, industrial uses or long-term storage, but does not mean heading and gutting unless there is additional preparation.

Prohibited species

Those species and species groups whose retention is prohibited unless authorized by other applicable law (for example, to allow for examination by an authorized observer or to return tagged fish as specified by the tagging agency).

Quota

A specified numerical harvest objective for a single species of HMS, the attainment (or expected attainment) of which causes the complete closure of the fishery for that species.

Recreational fishing

Fishing with authorized recreational fishing gear for personal use only, and not for sale.

Regional Administrator

The Administrator, Southwest Region, NMFS, or designee.

Sustainable Fisheries Division (SFD)

The Assistant Regional Administrator for Sustainable Fisheries, Southwest Region, NMFS, or a designee.

Take

The term is used with respect to protected species (marine mammals, sea turtles, and seabirds), is defined by the applicable statute (Marine Mammal Protection Act, Endangered Species Act, or the Migratory Bird Treaty Act), and its implementing regulations.

Acronyms

ABC	allowable biological catch
AIDCP	Agreement on the International Dolphin Conservation Program
ATCA	Atlantic Tunas Convention Act
BO	Biological Opinion
CalCOFI	California Cooperative Oceanic Fisheries Investigations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFGC	California Fish and Game Commission
CFR	Code of Federal Regulations
Council	Pacific Fishery Management Council
CPFD	catch per fishing day
CPFV	commercial passenger fishing vessel
CPS	coastal pelagic species
CPUE	catch per unit of effort
CWP	central-western Pacific
CYRA	Commission (IATTC) yellowfin regulatory area
CZMA	Coastal Zone Management Act
DAH	domestic annual harvest
DAP	domestic annual processing
DEIS	draft environmental impact statement
DGN	drift gillnet
DML	dolphin mortality limit
DOS	U.S. Department of State
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EFL	eye-to-fork length
EIS	environmental impact statement
EFP	exempted fishing permit
ESA	Endangered Species Act
ESU	evolutionarily significant unit

EPOTFA	Eastern Pacific Ocean Tuna Fishing Agreement
ETP	eastern tropical Pacific
EPO	eastern Pacific Ocean
FAO	Food and Agriculture Organization of the United Nations
FAD	fish aggregating devices
FEAM	Fishery Economic Assessment Model
FFA	(South Pacific) Forum Fishery Agency
FL	fork length
FMP	fishery management plan
FY	fiscal year
GIS	geographic information system
HAPC	habitat area of particular concern
HMS	highly migratory species
HMSAS	Highly Migratory Species Advisory Subpanel
HMS FMP	Highly Migratory Species Fishery Management Plan
HMSMT	Highly Migratory Species Management Team
HSFCA	High Seas Fishing Compliance Act
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IDCPA	International Dolphin Conservation Program Act
IPOA	International Plan of Action
ISC	Interim Scientific Committee for Tuna and Tuna-like Species in the North Pacific
ITQ	individual transferable quota
IUCN	World Conservation Union
JFL	jaw-to-fork length
JVP	joint venture processing
LOS	Law of the Sea
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MFMT	maximum fishing mortality threshold
MHLC	Multi-Lateral High Level Conference for Conservation and Management of Highly Migratory Species of the Central and Western Pacific
MMC	Marine Mammal Commission

MMPA	Marine Mammal Protection Act
MRFSS	marine recreational fisheries statistics survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	maximum stock size threshold
MSY	maximum sustainable yield
MUS	management unit species
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NNB	net national benefits
NOAA	National Oceanic and Atmospheric Administration
NPDES	national pollutant discharge elimination system
NPFMC	North Pacific Fishery Management Council
NPOA	National Plan of Action
NPTZ	North Pacific transition zone
NS	National Standards (of the Magnuson-Stevens Act)
NWI	National Wetlands Inventory
ODFW	Oregon Department of Fish and Wildlife
OMB	Office of Management and Budget
OY	optimum yield
PacFIN	Pacific Fisheries Information Network
PBR	potential biological removal
PFMC	Pacific Fishery Management Council
PGR	population growth rate
POCTRP	Pacific Offshore Cetacean Take Reduction Plan
POCTRT	Pacific Offshore Cetacean Take Reduction Team
POFI	Pacific Oceanic Fishery Investigations
PRA	Paperwork Reduction Act
PRBO	Point Reyes Bird Observatory
PSMFC	Pacific States Marine Fisheries Commission
RA	Regional Administrator (of NMFS)
RecFIN	Recreational Fisheries Information Network
RIR	Regulatory Impact Review

RFA	Regulatory Flexibility Act
RPA	reasonable and prudent alternative
SAC	Sportfishing Association of California
SAFE	stock assessment and fishery evaluation
SCB	Southern California Bight
SCTB	Standing Committee on Tuna and Billfish
SDC	status determination criteria
SFA	Sustainable Fisheries Act of 1996 (amendment to the Magnuson-Stevens Act)
SIC	Standard Industrial Classification
SPC	Secretariat of the Pacific Community
SPTT	South Pacific Tuna Treaty
SSC	Scientific and Statistical Committee
SST	sea surface temperature
SWFSC	Southwest Fisheries Science Center (NMFS)
TALFF	total allowable level of foreign fishing
TRP	(Pacific Offshore Cetacean) Take Reduction Plan
TRT	(Pacific Offshore Cetacean) Take Reduction Team
UNIA	United Nations Implementing Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VMS	vessel monitoring system
WCBA	Westport Charter Boat Association
WDFW	Washington Department of Fish and Wildlife
WPRFMC	Western Pacific Regional Fishery Management Council
YPR	yield per recruit
ZMRG	zero mortality rate goal

1.0 INTRODUCTION

1.1 Purpose of This Document

The FMP includes important species of tunas, billfish and sharks which are harvested by West Coast HMS fisheries. A complete list of species in the management unit is provided in Chapter 3. The FMP has been amended once. Amendment 1, approved in 2007, addresses overfishing of bigeye tuna, a management unit species. Amendment 1 also reorganized the FMP, which in its prior form was combined with the Final Environmental Impact Statement evaluating the effects of its implementation. The reorganized FMP is a more concise document containing those elements required by the Magnuson-Stevens Fishery Conservation and Management Act describing the management program. Amendment 2, approved in 2011, makes FMP provisions (principally in Chapters 3-5) consistent with the revised National Standard 1 Guidelines (50 CFR 600.310) adopted pursuant to the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006.

The FMP is intended to ensure conservation and promote the achievement of optimum yield of HMS throughout their ranges, both within and beyond the U.S. Exclusive Economic Zone (EEZ), to the extent practicable. Effective conservation and management in most cases will require concerted U.S. and international action. The FMP may serve as a vehicle for fulfilling the West Coast portion of U.S. obligations under international conservation agreements, if domestic U.S. implementing legislation authorizes its use.

This FMP is a "framework" plan, which includes some fixed elements and a process for implementing or changing regulations without amending the plan (flexible measures). Ongoing management of highly migratory species, and the need to address new issues that arise, make it impossible to foresee and address all regulatory issues in the initial plan. Some framework adjustments can be implemented more quickly than plan amendments, allowing for more timely management response. Changes to any of the fixed elements in the plan require a plan amendment. The framework procedures are described in Chapter 5.

This document also specifies the initial management measures, which are implemented through federal regulations affecting one or more fisheries for highly migratory species. They may be modified in the future, or new regulations may be implemented, using the framework adjustment procedures in the plan.

This FMP provides the vehicle to address issues of regional, national and international concern. The conservation community has raised concerns about the status of HMS, essential fish habitat, and bycatch of fish and capture of protected species in HMS fisheries. International and U.S. policies reflect these concerns. The 1995 Agreement on Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks provides that nations will cooperate in regional management bodies to establish and ensure compliance with conservation measures for HMS. The 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, adopted by the Food and Agriculture Organization of the United Nations (FAO), requires nations to maintain a registry of authorized vessels fishing on the high seas and ensure that such vessels are marked for identification and that they report sufficient information on their fishing activities. The High Seas Fishing Compliance Act is the domestic legislation enacted in 1995 to implement the FAO Agreement. The FAO also was the forum for the negotiation of a non-binding "Code of Responsible Conduct of Fisheries" which establishes principles for national and international fishery management. The final text of this code was negotiated in September 1995 and the NMFS has completed an implementation plan for the U.S. In 1999, the FAO adopted an International Plan of Action for the Conservation and Management of Sharks, which encourages nations to assess the status of shark stocks within their EEZs and those fished on the high seas. The U.S. has developed a National Plan of Action for conservation and management, and an FMP can help by focusing research and data collection efforts to support the

National Plan. Within the U.S., the Magnuson-Stevens Act requires councils to describe and identify essential fish habitat, minimize to the extent practicable adverse effects on habitat caused by fishing, and identify other actions to encourage conservation and enhancement of habitat. The Act requires that conservation and management measures, to the extent practicable, minimize bycatch and to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. Finally, the Marine Mammal Protection Act, Endangered Species Act and Migratory Bird Treaty Act provide protections for special resources. An FMP serves as a mechanism to address these critical issues in an open process and with the advice of all concerned.

This FMP provides a basis to increase federal investment in research, data collection and stock assessments for Pacific HMS. Knowledge of stock status is quite limited for many species. Increased funding is necessary to make sure that overfishing is prevented and that sustainable yields are provided for the long term. An FMP also can help to make sure that fishery data gaps and inconsistencies for HMS are addressed.

This FMP provides a mechanism for collaboration with the other Pacific area councils to achieve more consistent management of fisheries which harvest stocks in common. In particular, there is a need to ensure that some or all restrictions on Hawaii-based longliners to protect turtles and birds also apply to West Coast-based longliners. Also, the councils and the NMFS science centers in both regions should work together in the preparation of stock assessment and fishery evaluation (SAFE) reports on a regular basis. The councils should receive consistent scientific advice concerning the status of stocks which vessels from the different council areas harvest in common.

1.2 How This Document is Organized

This FMP is organized in 10 chapters and several appendices.

- Chapter 1 (this chapter) describes the rationale for HMS management and provides background information on the management context.
- Chapter 2 describes the management philosophy, recognizing the international nature of HMS management, and lists the goals and objectives of the FMP.
- Chapter 3 describes the species in the management unit, including ecosystem component (EC) and prohibited species.
- Chapter 4 describes the framework for determining management thresholds, control rules for management, and measures to prevent overfishing and rebuild overfished stocks.
- Chapter 5 describes the process for periodically modifying applicable harvest specifications and management measures. This FMP is a framework plan, meaning that most management measures may be changed through regulatory action without a need to amend the FMP.
- Chapter 6 describes general and fishery specific management measures in place at the time of FMP adoption. Many of these measures can be changed through the management framework described in Chapter 5. This chapter also describes required specifications for any foreign fishing in the West Coast EEZ targeting HMS. Currently, HMS within the West Coast EEZ are considered fully utilized and no foreign fishing is permitted.
- Chapter 7 describes essential fish habitat (EFH) for HMS, fishing and non-fishing effects on this EFH and mitigation measures that may be applied.
- Chapter 8 lists research and data needs identified at the time of FMP adoption. This list may be periodically updated in the annual stock assessment and fishery evaluation (SAFE) reports.

There are eight appendices to the FMP containing descriptive material relating to fisheries, stock status,

bycatch, protected species, EFH, critical habitat, and management costs. Descriptive information may be periodically updated in SAFE reports. Furthermore, because these appendices do not describe the management framework or Council HMS management policies and procedures and only supplement the required and discretionary provisions of the FMP described in §303 of the Magnuson-Stevens Act, they may be periodically updated without being subjected to the Secretarial review and approval process described in §304(a) of the Magnuson-Stevens Act. These appendices are published under separate cover.

1.3 Application of Federal Authority

The management unit in this FMP consists of highly migratory species and their associated fisheries which occur within the West Coast EEZ and on the high seas with the catch being landed on the West Coast. This is consistent with National Standard three of the MSFCMA, which requires that "To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." It also is consistent with Section 102 of the Act which states that, "The United States shall cooperate directly or through appropriate international organizations with those nations involved in fisheries for highly migratory species with a view to ensuring conservation and shall promote the achievement of optimum yield of such species throughout their range, both within and beyond the exclusive economic zone."

This FMP applies to all U.S. vessels that fish for management unit species within the EEZ off California, Oregon or Washington. This FMP also applies to U.S. vessels that fish for management unit species on the high seas (seaward of the EEZ) and land their fish in California, Oregon or Washington. However, pelagic longline vessels that are registered for use under a Western Pacific longline limited entry permit and fish on the high seas and land their fish in California, Oregon and Washington will continue to be subject to the requirements for vessel monitoring system units, observer coverage, Western Pacific longline logbook forms, seabird avoidance gear, time and area closures, gear restrictions, and other measures at 50 CFR 660 Subpart C. U.S. vessels that fish with longline gear for management unit species on the high seas and land their catch solely in western Pacific ports (Hawaii, American Samoa, Guam, Northern Mariana Islands) likewise are subject to the western Pacific regulations at 50 CFR 660 Subpart C.

The FMP does not apply to U.S. vessels that fish for management unit species on the high seas and land into a non-U.S. port. However, those vessels are subject to the requirements of the High Seas Fishing Compliance Act (HSFCA, 16 U.S.C. 5501 et seq.), including permit and reporting requirements.

U.S. vessels that fish for tuna and associated species in the eastern tropical Pacific Ocean also may be subject to management measures under the Tuna Conventions Act (16 U.S.C. 951 et seq.) which implemented the agreement that established the Inter-American Tropical Tuna Commission. There also is the potential for regulations to be promulgated in the future pursuant to other international arrangements such as the U.S.-Canada Albacore Treaty. Section 1.6 provides more information about the relationship of fishery management under this FMP with fishery management under international arrangements.

The application of federal authority as described above promotes the achievement of many of the objectives of the FMP (Section 2.2), including:

- ensure or contribute to international cooperation in the long-term conservation and sustainable use of highly migratory fish stocks that are caught by West Coast-based fishers.
- promote inter-regional collaboration in management of fisheries for species which occur in the Pacific Council's managed area and other Councils' areas.

- promote effective monitoring and enforcement.
- establish procedures to facilitate rapid implementation of future management actions, as necessary.
- ensure that fisheries are in compliance with laws and regulations to conserve and restore species listed pursuant to the ESA, MMPA and MBTA.

This application of authority is appropriate for the following reasons:

- To ensure consistent application of conservation and management measures applying to U.S. fishers on the high seas under other FMPs (e.g., Hawaii longline restrictions);
- To implement measures adopted by international management organizations in which the U.S. participates; if authorized by domestic U.S. implementing legislation;
- To promote consistent and coordinated data collection and management throughout the range of HMS; and
- To promote cooperative and reinforcing management of U.S. HMS fisheries throughout the Pacific such that vessels cannot avoid conservation requirements simply by relocating their operations.

1.4 Complexity of HMS Management

The management of highly migratory species presents formidable challenges, particularly in the Pacific area. There are numerous species of tuna, billfish, oceanic sharks and others which range throughout vast areas of the Pacific Ocean. Knowledge of stock distribution and status is limited. There is a moderate amount of information for the commercially important tunas, lesser amounts for swordfish and other billfishes, and scant information for sharks and other highly migratory fishes. Regular and comprehensive stock assessments are needed for certain species. These species are harvested by numerous coastal and distant-water fishing nations throughout the Pacific. The FEIS for this FMP (PFMC 2003, Chapter 2 Section 2.6) documents 36 nations harvesting HMS in the Pacific. United States fisheries harvest HMS in the EEZ of the U.S., in the zones of other nations and on the high seas.

Conservation of HMS is contingent on effective international management institutions and measures. There is no single, pan-Pacific institution that manages all HMS throughout their ranges. The Inter-American Tropical Tuna Commission (IATTC) adopts conservation measures for yellowfin and bigeye tunas in the eastern Pacific Ocean. Member nations, including the U.S., are obligated to implement these measures for their national fisheries. On September 5, 2000, the Convention on Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean was adopted. The international Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean entered into force on April 19, 2004. The Convention establishes a Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, now more commonly referred to as the Western and Central Pacific Fishery Commission. Initial staffing for the Commission is in progress at its site in Pohnpei, Federated States of Micronesia. A noteworthy aspect of the Convention is the fact that it will exercise management control into the high seas zones outside national EEZs in contrast to some other regional fishery management organizations.

In 1981, the United States and Canada signed the Treaty on Pacific Coast Albacore Tuna Vessels and Port Privileges, which permits fishing vessels of each nation to fish for albacore tuna in waters of the other nation beyond 12 miles. Recently, U.S. albacore fishermen became concerned about the increased effort by Canadian vessels in U.S. waters and the lack of information on the amount of albacore taken by Canadian vessels. The U.S. and Canada have agreed to Treaty changes to resolve these issues. See section 1.6.2 for more information on this issue.

Within the U.S., HMS fishery management in the Pacific area is the responsibility of three regional fishery management councils, the Western Pacific Regional Fishery Management Council (WPRFMC), North Pacific Fishery Management Council (NPFMC) and PFMC, and the adjacent states. Some form of coordination among councils is required because fishers from the different council areas are harvesting the same stocks of HMS, and in some cases are fishing in the same areas, but landing in different locations. This is complicated by the fact that the council regions have different fishery traditions in addition to different management objectives, measures and concerns. The WPRFMC manages HMS fisheries pursuant to the FMP for the Pelagic Fisheries of the Western Pacific Region. The NPFMC does not manage HMS, except that sharks, including some migratory species, are included in the Gulf of Alaska Groundfish FMP and Bering Sea and Aleutian Islands Groundfish FMP. Currently, the NPFMC is not contemplating development of an FMP for HMS fisheries in their management area. However, the Pacific Council intends to keep the NPFMC informed of its proposed actions. Procedures for coordination with the WPRFMC and NPFMC are described in Section 5.1. This process ensures that WPRFMC and NPFMC are informed of and provided opportunity to comment on Pacific Council management actions affecting fisheries in their respective management areas, and it promotes consistent management of HMS fisheries.

Until now, there has been no FMP for West Coast-based fisheries for HMS. The fisheries have been managed by the States of Washington, Oregon and California, although some federal laws also apply. Federal statutes include the High Seas Fishing Compliance Act, Tuna Conventions Act, Marine Mammal Protection Act, Migratory Bird Treaty Act and Endangered Species Act. The lack of a single FMP covering all U.S. vessels in the Pacific created a situation where U.S. vessels fishing on the high seas may be subject to different regulations, depending on where they start their trip or where they land. This created inequities and frustrated achievement of management goals. In addition, foreign vessels and U.S. vessels may be subject to different regulations.

Within the U.S. West Coast-based fisheries, HMS are harvested by five major commercial gear groups and various recreational fisheries. The commercial gears include surface hook and line, pelagic drift gillnet, pelagic longline, purse seine and harpoon, and are used in the EEZ, in state waters and on the high seas. Anglers pursue HMS from commercial passenger fishing vessels as well as private boats. There are sport fisheries targeting albacore, mixed tunas and dorado, billfish, and sharks. At the time of FMP adoption, there were no quotas or allocations among gear groups, however user conflicts have arisen, particularly in California, where state regulations prohibit longlining within 200 miles and control time and area for the drift gillnet fishery.

Representatives of the drift gillnet fishery have proposed a limited longline fishery in the EEZ to target tunas and swordfish. Longliners currently may land HMS in California if the fish are harvested outside 200 miles. The proposers' intent is to evaluate longline gear as an alternative to drift gillnet gear to reduce bycatch or bycatch mortality, and determine if a longline fishery is an economically viable substitute for drift gillnet gear. The recreational community, particularly in southern California, is concerned about the status and availability of tunas, billfish and sharks and the impacts of the commercial fisheries on the recreational fisheries for these species. Anglers oppose a longline fishery in the EEZ off California targeting tunas and swordfish. They are concerned about increased fishing mortality and commercial effort in general and increased bycatch of striped marlin, sharks and other species.

In addition, a growing conservation community is concerned about the management of HMS, including sharks, which are particularly vulnerable to overexploitation. This community also is concerned about increasing bycatch and bycatch mortality of HMS and other fish, and protected species. Longline and drift gillnet gears targeting HMS also capture protected species such as marine mammals, seabirds and turtles. There is substantial information on the catch and bycatch of fish and the capture of protected species in the West Coast drift gillnet fishery, which has been observed since 1990 under the auspices of

the Marine Mammal Protection Act. This fishery is subject to a Take Reduction Plan, and more restrictive gear measures have been in effect since 1997 to reduce the take of marine mammals.

1.5 History of the Fishery Management Plan

The Pacific Council was created in 1976 pursuant to the Magnuson-Stevens Act, and began to develop FMPs for all of the major fisheries in its area of authority, including a draft FMP for billfish (including swordfish) and oceanic sharks (PFMC 1981). At that time, tunas were not included in the Magnuson-Stevens Act and thus could not be managed by councils. The draft billfish FMP and several others were not adopted by the Council, because it became clear that federal management of all West Coast fisheries was not necessary nor cost-effective. With limited resources, the Council decided to concentrate its efforts on those which required federal management, such as salmon and groundfish. In the case of billfish and oceanic sharks, the Council concluded that effective stock conservation required international management efforts and that there was little the Council could accomplish. The fishery management problems were primarily in California, and the State was addressing these problems.

In 1990, the Pacific States Marine Fisheries Commission (PSMFC) adopted an interjurisdictional fishery management plan for thresher shark (PSMFC 1990) pursuant to the Interjurisdictional Fisheries Act, 16 U.S.C. 4101 et seq. The fishery for thresher shark began off California in 1977. Thresher sharks are harvested in drift gillnets in California along with swordfish and mako sharks. Incidental catches of thresher shark also occur in set gillnet fisheries. Drift gillnet fisheries for thresher shark began off the coasts of Oregon and Washington in 1983 under experimental fishing permits. This permit fishery in Oregon and Washington continued through 1988, when it was terminated due to bycatch of marine mammals and leatherback turtles, declining interest in the fishery and concerns about the abundance of thresher shark. The PSMFC plan established a management panel comprised of one member each from the states of Washington, Oregon and California, which makes management recommendations to the state agencies. The plan proposed an annual coastwide thresher shark harvest guideline of 750,000 pounds (340 mt dw) and discouraged catches of juvenile sharks. No quotas were established but states did agree to this harvest guideline, which since 1991 has never been approached. There have been no additional management actions since the plan was adopted.

In December 1994, the Western Pacific Council requested that the Secretary of Commerce designate it as the single council responsible for management of domestic pelagic fisheries in the Pacific.[1] This request was based on a paper developed by the Western Pacific Council which evaluated several alternatives, including status quo, coordinated data collection, a joint FMP, Secretarial management, and single council designation (WPRFMC 1994). The Western Pacific Council argued that one FMP was necessary to "ensure the ability to monitor and manage the fisheries throughout their range, to the extent practicable, in a consistent and efficient manner." The initial focus of the comprehensive FMP would be to address data gaps and inconsistencies. The Council concluded that the single designation alternative was most efficient and effective. The Council already had an FMP for tunas and other large pelagic fishes, which could be amended to include fisheries in the other two council areas. The Western Pacific Council did not favor a joint FMP because of the requirement that all councils must approve all measures and the need for joint meetings, and it felt that Secretarial management was undesirable because it removed regional control over management. Under the Western Pacific proposal, the North Pacific and Pacific Councils would make management recommendations for fisheries in their areas and submit them to the Western Pacific Council, which would take final action on all measures for approval by the Secretary of

[1] Under the Magnuson-Stevens Act, for fisheries under the authority of more than one council, the Secretary of Commerce may designate one council to prepare the plan or may require the plan be prepared jointly by the concerned councils. In the latter case, the plan must be approved by a majority of the voting members of each council.

Commerce.

The Western Pacific Council consulted the Pacific and North Pacific Councils on the proposal for single council designation. The Pacific Council opposed this approach. At that time, the Pacific Council was not convinced of the need to alter management arrangements for HMS, and was concerned that the decision process might be neither convenient for, nor in the best interest of, fishery interests on the West Coast. Since the principal issue at the time was the need for coordinated and comprehensive data collection, the Pacific Council recommended that data collection gaps be documented and filled.

In July 1996, after receiving input from the affected councils and industry groups, the NMFS concluded that single council designation was not necessary at that time to achieve effective management under the Magnuson-Stevens Act or to support the Department of State in carrying out U.S. obligations. With regard to data needs, NMFS stated that recent international agreements and implementing domestic legislation (High Seas Fishing Compliance Act, 16 U.S.C. 5501 et seq.) provided authority for NMFS to require U.S. vessels fishing for HMS to report their fishing activities. The Western Pacific Council continued to maintain that a comprehensive FMP with single council designation was necessary, and the issue was raised again at the Council Chairs' meeting in June 1997. As a result of this discussion, the Director of NMFS asked the Southwest Regional Administrator to work with the three Pacific area councils to develop a recommendation on how to proceed.

At the September 1997 Pacific Council meeting, the Southwest Region of NMFS presented a paper outlining options for Pacific Council involvement in HMS management. Options included no action, the Western Pacific proposal, Secretarial management, a joint FMP and a separate West Coast FMP. The paper summarized numerous activities at the national and international levels affecting HMS fisheries based on the West Coast. NMFS argued that the regional councils should play an active role in planning U.S. participation in future internationally managed HMS fisheries, and that the Pacific Council has unique capabilities for reaching the diverse fishing industry of the West Coast and involving them in the development of management policy. At that meeting, the Pacific Council established an HMS Policy Committee to address HMS issues and coordinate with the other councils. At the November 1997 meeting, the Council appointed a representative to attend meetings of the IATTC and MHLC and recommended establishment of an inter-council coordinating committee. In June 1998, the Council appointed members to a West Coast HMS Advisory Subpanel comprised of representatives of constituent groups.

In September 1998, representatives of the three Pacific area councils and NMFS met to discuss collaboration in HMS management. The NMFS Southwest Region presented a "straw man" approach for coordinated management. The objectives of this approach were:

- to achieve effective conservation and management of HMS fisheries throughout the EEZ and adjacent waters to the extent practicable consistent with the Magnuson-Stevens Act and other applicable law, including international agreements;
- to ensure comprehensive collection of comparable and compatible data throughout the range of U.S. HMS fisheries;
- to ensure the ability to take action on a timely basis as the need arises; and
- to ensure that those who would be affected by management have ample notice of prospective action and opportunity to advise the decision makers about their interests and needs.

Under this approach, the existing Western Pacific Council FMP would serve as the foundation for the comprehensive plan. It would be amended to include, among other things, framework management procedures for the Pacific Council. Each council would manage its respective fisheries independently,

except when an action might affect the other council. In the latter case, both councils would vote. If there were disagreement, the councils would ask the Regional Administrator of NMFS to mediate the issue.

The Western Pacific Council did not support the collaborative approach proposed by NMFS, because it believed that joint actions would increase the work load, increase costs, delay implementation of regulations, and weaken the authority of the Western Pacific Council.

In June 1999, the Pacific Council voted to begin development of an FMP for HMS fisheries. The Council preferred that some form of comprehensive FMP be developed with all three councils involved and wrote the other two councils inviting their participation. While the Council recognized the difficulties associated with joint FMPs, it was optimistic that framework procedures and operational mechanisms could be developed to allow either independent or joint council actions as necessary and appropriate to achieve FMP objectives. While the North Pacific Council expressed support for a joint FMP, the Western Pacific Council stated that it was not inclined to participate at that time. The Pacific Council decided to begin development of a separate FMP for West Coast-based HMS fisheries, holding open the alternative of a comprehensive FMP in the future should the Western Pacific decide to participate.

In March 2001, NMFS wrote the Council to provide updated information on recent domestic HMS fishery management issues that had a bearing on the development of the FMP. NMFS Regional Administrator Rebecca Lent stated:

> When the decision was made to develop the FMP, there was no clear and pressing need for consideration of management measures that would immediately go into effect. It was envisioned that the FMP could include some reporting requirements and perhaps some changes in permit requirements, and it would almost certainly establish framework procedures for implementing regulations in the future if new information or conditions warranted it. The FMP also could conceivably incorporate under Magnuson-Stevens Act authority a variety of regulations currently in effect under other Federal law or State laws and regulations. However, the legal and programmatic environment for the FMP changed substantially as a result of the following factors:
>
> 1. Drift Gillnet Fishery Management - This fishery has been managed under a mix of State laws (time/area closures, limited entry, mesh size, logbooks) and Federal regulations (net depth, pingers, observers) under the Marine Mammal Protection Act. As a result of a new Section 7 consultation under the Endangered Species Act (ESA), NMFS is requiring that new restrictions be imposed on the fishery by August 2001. NMFS will promulgate these regulations by that time under the authority of the ESA. However, I would urge the Council to be sure that the draft FMP, when cleared for public review and comment, include an alternative under which the drift gillnet fishery would be managed through the FMP rather than under the anticipated mix of State laws and regulations and Federal regulations under the MMPA and ESA. Consolidating the management program under a single authority should greatly simplify the ability of fishers and managers to adjust to changing conditions in the future.
>
> In addition, the changes being required under the ESA will likely make it very difficult for some fishers to maintain profitable operations. This adds to the feeling on the fleet's part that there should be some form of relief, and a proposal has been made to allow the vessels to fish with longline gear subject to a variety of restrictions, possibly including an experimental fishery process. This is a very contentious proposal, but the drift net fleet owners definitely want the Council to address it in the FMP process. I would strongly encourage that the plan include a full evaluation of the pros and cons of allowing longline fishing in the EEZ so that the final decision can be based on that evaluation.

2. Hawaii Longline Fishery Restrictions - As a result of court actions, a number of restrictive regulations have been promulgated for the Hawaii-based longline fishery. In addition, NMFS prepared and distributed for public comment and hearings a Draft Environmental Impact Statement (DEIS) that reviewed the history and performance of that fishery and analyzed several alternatives for management of the fishery. I believe the Council has received a copy of that DEIS. While final action has not yet been taken, the preferred alternative would further constrain the fishery, including prohibiting a fishing strategy that targets swordfish and setting time/area closures for the fishery. NMFS also is completing a Section 7 consultation to determine if the fishery jeopardizes the continued existence of any species of sea turtle and if conditions should be set for the fishery to ensure that there will be no jeopardy and to mitigate or reduce the potential for interactions. NMFS recognizes that longline fishing in the EEZ, or on the high seas seaward of the EEZ, off the West Coast might not have the exact same impacts on fish and protected species as longlining out of Hawaii. However, NMFS also believes it would be inappropriate to allow fishing by vessels out of the West Coast in times and areas that would be closed to vessels out of Hawaii or using strategies that would not be available to Hawaii-based vessels until further information is available to indicate that the impacts would be different. At the least, the draft FMP should include an alternative that would establish the same measures for West Coast-based longliners as for Hawaii-based longliners. This also would include provisions to minimize interactions with seabirds and to authorize the Regional Administrator to require that observer accommodations be made and to require the use of automated vessel monitoring system units at vessel expense.

3. U.S.-Canada Albacore Treaty - During the scoping process for the FMP, there was sufficient force of recommendations from the public that the Council established a control date for possible use in setting up a limited entry program in the future. Most of the interest came from the troll albacore fishery which is concerned that further restrictions in other fisheries (especially groundfish) might result in vessels shifting into the albacore fishery, possibly adversely affecting present participants and exacerbating marketing problems that have sometimes occurred when catches are too high and markets are flooded with landings. Also of concern was that additional effort could result in lower catch rates for historic participants. A more recent concern, however, is that there has been a dramatic increase in the participation of Canadian vessels in U.S. waters under the Treaty, so much so that the Western Fishboat Owners Association has promoted suspension of the Treaty unless the Canadians agree to some limit on their vessels' fishing in U.S. waters. We have now scheduled a negotiating session with Canadian authorities April 10-11, 2001, in Seattle, to discuss changes in Annex A to the Treaty under which there would be a process for annually determining fleet or fishing limits and to discuss potential limits in 2001.

In discussing the matter with NOAA General Counsel and industry, we have identified a broader issue. That is, there is no statute to implement the Albacore Treaty; thus there is no statute authorizing NMFS (or anyone else) to issue regulations to carry out the Treaty. Before we can propose legislation, however, we need to consider and agree on how the FMP and Treaty interrelate. We need to consider what kinds of measures would best be handled by different agencies and through different procedures. We will be discussing with industry and General Counsel the manner in which different possible future fishery management measures might be carried out under the FMP or under the Albacore Treaty, or even under laws implementing other future international management agreements (e.g., IATTC). For example, if there were a total allowable catch of north Pacific albacore with an allocation to the U.S., the internal allocation between sectors could be done through the Council as with Pacific halibut; or it could be done by the Secretary of Commerce in consultation with the Council and the member States.

The consequence of these conditions or actions is that the Council needed to address immediate HMS fishery management regulation issues rather than to prepare only a framework plan. The Council agreed

that it might not be sufficient to simply leave in place existing state or federal regulations (under other authorities) or simply defer to state regulations.

1.6 Management Context

1.6.1 Inter-American Tropical Tuna Commission (IATTC)

The U.S. is a member of the IATTC, which was established in 1950. Pursuant to the Tuna Conventions Act, NMFS promulgates regulations to carry out IATTC recommendations that have been approved by the Department of State. NMFS has implemented procedural regulations by which to announce IATTC quotas and associated management measures (e.g., incidental catch allowances when directed fishery quotas have been reached). Other IATTC recommendations take longer to implement through full rule-making procedures, including provision for a public hearing, under the Tuna Conventions Act. While the IATTC Convention does not specify the geographic boundaries of the eastern Pacific Ocean, under regulations at 50 CFR Part 300, Subpart C, NMFS has defined the "Convention Area" to consist of the waters bounded by the coast of the Americas, the 40° N and 40° S parallels, and the 150° W meridian.

Historically, the IATTC focused almost exclusively on tropical tuna species (and especially yellowfin tuna) taken in purse seine, baitboat and longline fisheries. Stock assessments are conducted regularly on tropical tunas and occasionally on albacore and northern bluefin tuna and striped marlin. The species under IATTC purview include all HMS in the Convention Area, and the scope of interest of the IATTC has expanded in recent years to include conservation measures to address additional species (e.g., bigeye tuna), fleet capacity (with focus on the purse seine sector), bycatch concerns in purse seine and longline sectors, the use of fish aggregating devices, and compliance.

In the past several years, NMFS has finalized regulations to carry out IATTC recommendations of special interest to this FMP. First, a regulation was implemented to collect vessel information for a regional register of all vessels that have harvested HMS in the IATTC Convention Area. The vessel register is intended to assist the IATTC in monitoring the international fisheries and supporting efforts to enhance compliance with IATTC conservation measures. The register will likely also prove very useful to the Council in its monitoring of West Coast-based HMS fisheries.

Second, a regulation was implemented to carry out a pilot bycatch reduction program. Under this program, purse seine vessels are required to retain and land all tuna brought on board the vessel, while releasing safely to the extent practicable all non-tuna species brought on board and taking special measures to minimize harm to any sea turtles caught in the purse seine. This approach was undertaken to deal with bycatch concerns. It is hoped that the full retention requirement will encourage the development of gear or techniques that will reduce the amount of low-value tuna (especially small yellowfin and bigeye tuna) brought on board so that the vessels will not be economically disadvantaged by the full retention program. This pilot program is to run through 2004, at which point IATTC will evaluate the effects and effectiveness of the program.

The regulations currently implementing this convention also require that U.S. purse seine vessel operators maintain logbooks of catch and effort and to make them available to U.S. enforcement and fishery officials for inspection. If IATTC logbooks are maintained and submitted to IATTC, then the federal reporting requirement is met.

In addition, at its 2002 meeting, the IATTC went one step further and adopted a recommendation to use the vessel register as the authoritative source of identified purse seine vessels qualified to fish for tuna in the Convention Area in the future. NMFS will be required to promulgate regulations to implement this measure if the Department of State approves it.

The IATTC Convention is not entirely consistent with the Magnuson-Stevens Act. The Convention establishes a simple goal of achieving maximum sustainable yields from the tuna stocks and not optimum yield from the complex of HMS species in the Convention Area. It is only in the Convention Area that regulations to implement IATTC recommendations generally apply; NMFS has not attempted to apply IATTC recommendations beyond these waters. Further, the Tuna Conventions Act does not provide authority to manage U.S. fisheries for tuna in the Convention Area except as called for by IATTC recommendations approved by the Department of State. However, the IATTC and FMP management programs can support each other. In the future, the FMP could provide a mechanism to implement certain measures agreed to by the IATTC or to ensure that regulations adopted to apply in the Convention Area are complemented if necessary and appropriate by regulations to apply to U.S. vessels fishing the same stocks in waters beyond the Convention Area. The Council HMS management process also can serve to help in formulating or evaluating management recommendations that the U.S. delegation (headed by the Department of State) can take to the IATTC for consideration or possibly to comment formally on IATTC proposals and actions. Any permits and data reporting required by this FMP can aid the U.S. in being responsive to IATTC requests for information. Conversely, data collected or reported under the Tuna Conventions Act can be provided to support implementation of this FMP. It is noted that the Department of State is restructuring its general public advisory committee, and there may be some overlapping interests in both that committee and the Council's HMS advisory subpanel or Council membership.

The International Dolphin Conservation Program Act (IDCPA) was established in 1992 by the Agreement on the Conservation of Dolphins and was revised and extended in 1999 by the Agreement on the International Dolphin Conservation Program. The IATTC provides the secretariat for the Program. The objectives of the Program are: 1) to progressively reduce incidental dolphin mortalities in the purse-seine fisheries in the Agreement Area to levels approaching zero by setting annual limits; 2) to seek ecologically sound means of harvesting large yellowfin tuna not in association with dolphins; and 3) to ensure the long term sustainability of tuna and other species and to avoid, reduce and minimize bycatch and discards of juvenile tunas and non-target species. The bycatch provisions referred to above are consistent with the IDCPA.

1.6.2 U.S.-Canada Albacore Treaty

In 1981, the United States and Canada entered into a treaty regarding fishing for albacore tuna in the eastern Pacific. Under the treaty, U.S. albacore vessels are authorized to fish for albacore in waters under the jurisdiction of Canada and more than 12 miles from the baseline from which the territorial sea is measured and to use certain port facilities in Canada. Albacore may be landed in that port for sale, export, or transshipment back to the U.S. Similarly, Canadian vessels are authorized to fish in waters under U.S. jurisdiction more than 12 miles from the baseline from which the territorial sea is measured and to use certain U.S. ports to obtain supplies and other services. Albacore may be landed in those ports for sale, export, or transshipment back to Canada. The parties annually exchange lists of vessels that may fish in the other nation's zone, though these lists are not binding (that is, a vessel on a list is not obliged to fish in the other nation's waters). Logbooks of catch and effort are to be maintained, and the nations are to exchange data on the fisheries. There is no legislation to implement the Treaty.

The implementation of the treaty has been sporadic. Vessel lists have been exchanged, but there have not been regular exchanges of data, nor has there been an effective monitoring program to determine the level of fishing by each nation's vessels under the treaty at the time of plan adoption. In recent years, there has been much more fishing by Canadian vessels in U.S. waters than fishing by U.S. vessels in Canadian waters. In fact, in 2000, the level of fishing by Canadian vessels and the consequent crowding on the grounds resulted in calls by some in the U.S. troll industry to convene a meeting to discuss the treaty with Canadian officials. Such a meeting was held in November 2000. There was agreement on a number of immediate steps, including a need for cooperative efforts to establish a better data collection and

exchange program and action to establish "check-in, check-out" procedures so that the level of fishing in each zone by the vessels of the other nation can be monitored effectively. There also was general agreement that future meetings would be necessary to consider negotiation of amendments to the treaty to address the U.S. troll industry concerns as well as to ensure full exchange of information about management problems and possible solutions. Both nations are developing management programs for albacore fisheries and both parties recognize that effective albacore conservation will require international cooperation, whether through the IATTC, the WCPFC (see Section 1.6.3), or some other mechanism.

There were three negotiating sessions (April and June 2001 and April 2002), and agreement was reached at the last session on changes in the Treaty. Under that agreement, limits on reciprocal fishing would be implemented and there would be a gradual decrease over three years in the allowable foreign fishing by vessels of one party in the waters of the other party. Specifically, beginning in 2004, there would be a three-year regime for reciprocally limiting effort by U.S. and Canadian troll albacore fishing vessels' activities in each other's waters. Canadian effort would be limited in terms of numbers of vessels; U.S. effort would be limited in terms of vessel months. This is intended to provide relatively equal fishing opportunity. The limits would gradually be reduced over the 3-year period, though the agreement provides some flexibility to carry over "unused" effort from one year to the next.

The limits would be as follows:

Year	Canadian boats in the U.S EEZ	U.S. effort in Canadian EEZ
2003	170 vessels	680 vessel-months
2004	140 vessels	560 vessel-months
2005	125 vessels	500 vessel-months

After the third year, the Parties can extend the agreement for one year or more, but if no agreement is reached, then a default of 75% of the third year would be implemented. Further meetings of the Parties and industries will be necessary to develop and implement effective reporting and monitoring mechanisms to ensure that fishing remains within the limits.

1.6.3 Western and Central Pacific Fisheries Commission

The FMP could provide a mechanism for implementation of U.S. responsibilities under an international agreement to conserve central and western Pacific HMS. The U.S. participated in negotiation of and signed the new international agreement developed through the Multi-Lateral High Level Conference for Conservation and Management of Tuna and Tuna-Like Species of the Central and Western Pacific (MHLC). This effort was undertaken to develop an international arrangement to achieve long term conservation and management of HMS in the central and western Pacific. The international Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean entered into force on April 19, 2004. The Convention establishes a Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, now more commonly referred to as the Western and Central Pacific Fishery Commission (WCPFC). A noteworthy aspect of the Convention is the fact that it will exercise management control into the high seas zones outside national EEZs in contrast to some other regional fishery management organizations. While West Coast interests may seem only peripherally involved, it should be noted that there is a Northern Committee that may make recommendations for management of such species as swordfish, albacore, and bluefin, all of which are of interest to West Coast fisheries. It will be important for the WCPFC to coordinate with the IATTC on stocks that occur in waters of both entities' purview. It

is expected that scientists from both areas will frequently meet and will develop protocols for exchanging information and collaborating on stock and fishery assessments for shared stocks.

1.6.4 United Nations Agreements

The FMP may provide a mechanism for implementing U.S. responsibilities under the United Nations Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (known as the UNIA) under the Law of the Sea Treaty. The UNIA interprets the duty of nations to cooperate in conservation and management of fishery resources. Measures adopted in the EEZ of a coastal state and by any international arrangement for HMS in the region should be compatible. A coastal state should not adopt measures that would undermine the effectiveness of regional measures to achieve conservation of the stocks. In the case of the Pacific Council, for example, while the UNIA does not dictate how management of HMS fisheries in the U.S. EEZ should be carried out, the UNIA requires that EEZ management be compatible with management under any international arrangement (such as the IATTC, for species that are under IATTC conservation measures). The UNIA is now in force as the requisite number of nations has ratified it.

The U.S. also has participated in deliberations and decisions of the Food and Agriculture Organization of the United Nations (FAO) that have implications for HMS management under the FMP. The Committee on Fisheries of FAO has agreed to international plans of action dealing with shark conservation, seabird interactions with longline gear, and fishing capacity. In turn, the United States has developed national plans of action (NPOAs) to carry out the objectives of the international plans of action. The FMP can provide a mechanism for considering and implementing specific actions that support these national plans of action. In fact, the seabird avoidance measures proposed in this FMP are consistent with the seabird NPOA.

1.6.5 High Seas Fishing Compliance Act (HSFCA)

The FMP also may provide an implementing mechanism for the U.N. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, which was adopted by the U.N. Food and Agriculture Organization (FAO) in November 1993. It establishes the responsibility of each nation for the actions of vessels fishing under that nation's flag on the high seas. The agreement requires that vessels have specific authorization from their flag nation to participate in high seas fishing. Further, nations must maintain a registry of authorized vessels, ensure that those vessels are marked for identification according to international standards, and ensure that they report sufficient information on their fishing activities. The High Seas Fishing Compliance Act (HSFCA) is the domestic legislation enacted in 1995 to provide authority to the Secretary of Commerce to implement this FAO Agreement.

NMFS has implemented regulations requiring U.S. vessel operators fishing on the high seas to maintain and submit records of catch and effort on their high seas fishing activities. The reporting requirement would be met if a vessel operator is reporting in compliance with regulations under another federal statute (e.g., MSFCMA requirements). Thus, longline vessel operators fishing outside the EEZ, but based on the West Coast, must maintain and file the new federal logbook, and West Coast albacore trollers must maintain and file a troll logbook. NMFS provides the required forms or logbooks. Fishermen are not required to report catch and effort within the EEZ under this requirement, although NMFS has asked that all activity be recorded. The FMP can supersede the HSFCA reporting requirements and thus provide a mechanism to harmonize eastern and western Pacific fishery reporting and monitoring mechanisms.

1.6.6 Western Pacific Pelagics FMP

The initial Western Pacific FMP was adopted in 1987 and included initial estimates of maximum sustainable yield (MSY) for the stocks and set optimum yield (OY) for these fisheries in the EEZ. The regulations applied to domestic and foreign fishing for billfishes, wahoo, mahimahi, and oceanic sharks. Among the original regulations were a prohibition on drift gillnet fishing within the region's EEZ and provisions for experimental fishing permits. The FMP prohibited foreign longline vessels from fishing within certain areas of the EEZ. Additional areas up to 150 nm from Guam and the main Hawaiian Islands and up to 100 nm from the Northwestern Hawaiian Islands may be closed to foreign longline vessels if their fishing activity is causing adverse impacts on domestic fishery performance, excessive waste of catch, excessive enforcement costs, or adverse effects on stocks. No legal foreign longline fishing has occurred under the FMP.

The initial FMP defined optimum yield as the amount of each species in the management unit that will be caught by domestic and foreign vessels fishing in the EEZ in accordance with the measures in the FMP. At that time, the principal concern was regulation of the foreign longline fishery in the EEZ to ensure that foreign catches of billfish, mahimahi, wahoo, and oceanic sharks would not adversely affect domestic commercial and recreational fisheries for these species.

The initial FMP specified domestic annual harvest and total allowable level of foreign fishing in non-numeric terms, i.e. the amount of fish that could be caught while fishing in accordance with the management measures in the FMP. The FMP also addressed joint venture processing for billfish and other non-tuna species by stating that practically all fish caught be vessels in the EEZ are landed in a whole or dressed state without processing, and processors handle whatever processing that is performed; thus, there is no allowance for joint venture processing.

The FMP has subsequently been amended numerous times to revise definitions, establish a limited entry program for the Hawaii domestic longline fishery, establish a variety of additional management measures, address protected species interactions, and address overfishing. (These amendments may be accessed at http://www.wpcouncil.org/pelagic.htm.)

Protected Marine Resources and Longline Fishery Interactions

Twelve federally protected marine animals are known to have interactions with Hawaii-based longline vessels within or beyond the EEZ surrounding the Hawaiian archipelago. (1) Marine Mammals: Hawaiian monk seal (*Monachus schauinslandi*) - endangered; Humpback whale (*Megaptera novaeangliae*) - endangered; False killer whale (*Pseudorca crassidens*) - protected; Dolphin spp. - protected. (2) Sea Turtles: Green turtles (*Chelonia mydas*) - threatened; leatherback turtle (*Dermochleys coriacea*) - endangered; Olive ridley turtle (*Lepidochlys olivacea*) -endangered; Loggerhead turtle (*Caretta caretta*) - threatened; Hawksbill turtle (*Eretmochelys imbricata*) - endangered. (3) Sea Birds: Laysan albatross (*Phoebastria immutabilis*) - protected; Black-footed albatross (*P. nigripes*) - protected; Short-tailed albatross (*P. albatrus*) - endangered; Booby (*Sula sp.*) - protected.

Species in the Management Unit

The Western Pacific FMP, as amended through Amendment 7, includes the following fish species:

mahimahi (dolphinfish) *Coryphaena spp.*
marlin and spearfish *Makaira spp.*
Tetrapturus spp.
oceanic sharks family Alopiidae

family Carcharhinidae	
family Lamnidae	
family Sphyrnidae	
sailfish	*Istiophorus spp.*
swordfish	*Xiphias sp.*
tuna and related spp.	*Allothunnus sp.*
Auxis spp.	
Euthynnus spp.	
Gymnosarda sp.	
Katsuwonus sp.	
Scomber spp.	
Thunnus spp.	
wahoo	*Acanthocybium sp.*
moonfish (opah)	*Lampris sp.*
pomfret	family Bramidae
oilfish (walu)	family Gempylidae

Longline Fishery Restrictions to Protect Sea Turtles and Seabirds as of 2003

On December 27,1999 (64 FR 72290), NMFS issued, under the authority of the Magnuson-Stevens Act, an emergency interim rule, effective for 180 days, closing certain waters to fishing by the Hawaii based longline fishery. The intent was to reduce adverse impacts to sea turtles resulting from the fishery while NMFS prepared a comprehensive EIS for the FMP. The objective was to have appropriate time and area closures based upon the greatest benefit to sea turtles while considering the costs to the longline fishery. Subsequently, NMFS issued a proposed rule (65 FR 8107, February 17, 2000), requiring possession and use of line clippers and dip nets aboard vessels registered for use under a Hawaii longline limited access permit. Line clippers and dip nets were to be used to disengage sea turtles hooked or entangled by longline fishing gear. The rule required specific methods for handling, resuscitating, and releasing sea turtles. The final rule was published on March 28, 2000 (65 FR 16346). The December 27, 1999, emergency interim rule was extended on June 19, 2000 (65 FR 37917). The temporary area closure was maintained until December 23, 2000, or until new time and area closures, as imposed by the Court, were implemented by NMFS.

On July 5, 2000 (65 FR 41424), NMFS issued a proposed rule to require Hawaii-permitted operators to use two or more of six specific bird mitigation techniques when fishing with pelagic longline gear north of 25° N latitude; annually attend a protected species workshop conducted by NMFS; and release all hooked or entangled sea birds in a manner that maximizes their post-release survival. The rule was intended to reduce fishery impacts on black-footed and Laysan albatrosses that are accidentally hooked or entangled and killed by Hawaii pelagic longliners during the setting and hauling of longline gear. The rule was also expected to reduce the potential for interactions between pelagic longline fishing vessels and endangered short-tailed albatrosses, which are known to occasionally visit the Northwestern Hawaiian Islands.

On August 16, 2000 (65 FR 49968), NMFS published a notice of an August 4, 2000, order of the United States District Court for the District of Hawaii (65 FR 49968), which amended the Court's earlier Orders Of Injunction. The order would remain in effect until NMFS completed an EIS by April 1, 2001, analyzing the effect of fishing activities regulated under the Western Pacific Pelagics FMP. Under the order, certain areas were closed year-round to fishing by vessels engaged in the Hawaii-based pelagic longline fishery and other areas are seasonally closed. In certain areas, limitations were placed on fishing effort and 100 percent observer coverage was required. In the remaining area, fishing for swordfish was

prohibited, observer coverage had to be increased to 10 percent by September 21, 2000, and to 20 percent by November 2, 2000, and vessel operators were required to submit written reports to NMFS within 5 days of returning to port of any swordfish taken during that trip. NMFS had be make observer reports available to the court by the first of each month, continue to require Hawaii longline vessels to carry and use NMFS-approved line clippers and dip nets, and continue its research into the effects of several different gear modifications to reduce or eliminate the incidental catch of sea turtles. On August 25, 2000 (65 FR 51992), NMFS published an emergency interim rule replacing the previous emergency rule and implemented the court's August 4th order. On November 3, 2000 (65 FR 66186), NMFS published changes to the emergency interim rule restricting fishing for swordfish in a specific area, established requirements for setting longline gear, and prohibited light sticks. On February 22, 2001 (66 FR 11120), NMFS published an extension to the emergency rule. On March 19, 2001 (66 FR 15358), NMFS published an emergency interim rule that closed the longline fishery during a specific period and clarified closure requirements. On April 19, 2001 (66 FR 20134), NMFS published a notice that announced the terms of the March 30, 2001, order of the court, which modified the previous order of August 4, 2000. The order restricted the Hawaii-based longline fishery based on the preferred alternative of the Final FEIS, which had been completed according to the court's order.

On June 12, 2001 (50 CFR Part 660, 66 FR 31561), NMFS issued an emergency interim rule, effective for 180 days, applicable to vessels registered for use under a Hawaii longline limited access permit. The rule: prohibits the targeting of swordfish north of the equator by Hawaii longline vessels; prohibits longline fishing by Hawaii longline vessels in waters south of the Hawaiian Islands (from 15° N latitude to the equator, and from 145° W longitude to 180° longitude) during the months of April and May; allows re-registration of vessels to Hawaii longline limited access permits only in October; imposes additional sea turtle handling and resuscitation measures; and requires all Hawaii longline vessel operators to attend an annual protected species workshop. This rule implements the order issued on March 30, 2001, by the court and supersedes the court's order of August 4, 2000, and the rule supersedes the emergency rules published on August 25, 2000; November 3, 2000; February 22, 2001; and March 19, 2001. Other parts of this emergency interim rule implement the terms and conditions contained in the November 28, 2000, Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service on the effects of the Hawaii-based longline fishery on the endangered short-tailed albatross. To protect albatrosses, thawed, blue-dyed bait and practicing strategic discard of offal are required while fishing north of 23° N latitude. Observer coverage of 20% also is required. The rule is effective through December 10, 2001. On December 10, 2001 (66 FR 63631), the emergency rule was extended to June 8, 2002. This emergency rule also established basket-style longline gear as approved gear for the fishery.

On April 5, 2002 (67 FR 16323), NMFS published an emergency interim rule, also effective until June 8, 2002, which prohibits longline fishing north of 26° N latitude, and prohibits the retention or landing of more than 10 swordfish per trip by Hawaii longline vessels that fish north of the equator.

On April 29, 2002 (67 FR 20945), NMFS published a proposed rule establishing sea turtle take mitigation measures in the Hawaii-based longline fishery. The regulations would implement gear specifications for longline gear, prohibit targeting swordfish north of the equator, prohibit landing or possessing more than 10 swordfish per trip by longline vessels fishing north of the equator, establish a closed area during April and May south of Hawaii between the equator and 15° N latitude, and require all longline vessel operators to attend a protected species workshop annually. This rule would implement the reasonable and prudent measures of the March 29, 2001, biological opinion issued by NMFS under the Endangered Species Act. This proposed rule contains the 10 swordfish possession restriction that appears in the April 5, 2002, emergency interim rule mentioned above, but does not propose prohibiting longline fishing north of 26° N latitude.

On May 6, 2002 (67 FR 30346), NMFS published a proposed rule that would establish permit and

reporting requirements for any U.S. fishing vessel that uses troll or handline fishing gear to harvest pelagic management unit species in waters around certain U.S. possessions in the western Pacific, referred to as Pacific Remote Island Areas.

On May 14, 2002 (67 FR 34408), NMFS published a final rule governing seabird mitigation measures in the Hawaii-based longline fishery. The regulations require fishermen to use line-setting machines and thawed blue-dyed bait and strategic offal discards during setting and hauling of longline gear. This rule codifies the terms and conditions of a biological opinion issued by the U.S. Fish and Wildlife Service on November 28, 2000, to protect the endangered short-tailed albatross. The rule also implements measures recommended by the Western Pacific Council in a proposed rule published on July 5, 2000 (mentioned above).

1.6.7 Relationship to Existing Fishery Management

As indicated in Section 1.6.6, the FMP will provide a basis for harmonizing management of fisheries by U.S. vessels that fish in both the western and eastern Pacific. However, in addition, the FMP can be a mechanism for consolidating federal marine resources management responsibilities under a single set of rules. For example, the drift gillnet fishery is currently subject to controls under California law and regulations and under Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) regulations. To obtain the complete set of regulations, a fisher would have to go to three sources. Under the FMP, additional regulations would be implemented under Magnuson-Stevens Act authority. It would be reasonable to seek an approach under which at the least, all federal regulations could be found in one place and under a single statutory authority. If the MMPA and ESA regulations were essentially integrated into the FMP process, then this could be accomplished. This would be consistent with the provision of the Magnuson-Stevens Act that a FMP must be consistent with other applicable law. It also would be consistent with the ESA mandate to use all available authorities to further the purposes of that law. Further, by incorporating these regulations into the FMP process, the Council and NMFS would effectively provide an open and continuing process for considering the possible need for changes in those regulations as conditions change or new information becomes available. Under this approach, fishery participants might find it easier to understand what is required and why.

1.6.8 Treaty Indian Fishing Rights

Legal Considerations

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations ("u & a grounds") in common with all citizens of the United States. See U.S. v. Washington, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974).

The National Marine Fisheries Service recognizes four tribes as having u & a grounds in the marine areas managed by this FMP: the Makah, Hoh, and Quileute tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinault, et al. (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374 (Quinault). The tribes' u&a grounds do not vary by species of fish. U.S. v. Washington, 157 F. 3d 630, 645 (9th Cir. 1998).

The treaty fishing right is generally described as the opportunity to take a fair share of the fish, which is interpreted as up to 50 percent of the harvestable surplus of fish that pass through the tribes' u&a grounds. Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 685-687 (1979) (salmon); U.S. v. Washington, 459 F. Supp. 1020, 1065 (1978) (herring); Makah v. Brown,

No. C85-160R, and U.S. v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993) (halibut); U.S. v. Washington, 873 F. Supp. 1422, 1445 and n. 30 (W.D. Wash. 1994), aff'd in part and rev'd in part, 157 F. 3d 630, 651-652 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376 (1999) (shellfish); U.S. v. Washington, Subproceeding 96-2 (Order Granting Makah's Motion for Summary Judgment, etc. at 4, November 5, 1996) (Pacific whiting). The court applied the conservation necessity principle to federal determinations of harvestable surplus in Makah v. Brown, No. C85-160R/ United States v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1, Order on Five Motions Relating to Treaty Halibut Fishing, at 6-7, (W.D. Wash. Dec. 29, 1993); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718-719 (9th Cir. 2002).

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now recognized as applying to all species of fish and shellfish within the tribes' u&a grounds. U.S. v. Washington, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376; Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 717 (9th Cir. 2002) ["The term 'fish' as used in the Stevens Treaties encompassed all species of fish, without exclusion and without requiring specific proof. (citations omitted)"]

The original 1974 District Court decision in U.S. v. Washington specifically references a Makah tuna (albacore) vessel:

There are presently eight [Makah] boats of commercial size fishing on the high seas. Three of these boats are gill netting in the Strait of Juan de Fuca, four are trolling, and one is tuna fishing. The commercial boats are thirty-six feet in length except that the tuna boat is fifty-four feet in length. (citation omitted) These boats were obtained by the tribe using its resources to acquire the boats and are managed by a tribal corporation. (citation omitted) These commercial boats go as far as fifty miles out to sea, east to Puget Sound and south to Westport and the Columbia River. (citation omitted)

U.S. v. Washington, 384 F.Supp. 312, 364-365 (W.D. Wash. 1974).

The National Marine Fisheries Service recognizes the areas set forth in the regulations cited below as marine u&a grounds of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984); see also Makah Indian Tribe v. Verity, 910 F.2d 555, 556 (9th Cir. 1990); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718 (9th Cir. 2002). The u&a grounds of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 67 Fed. Reg. 30616, 30624 (May 7, 2002) (u&a grounds for salmon); 50 C.F.R. 660.324(c) (u&a grounds for groundfish); 50 C.F.R. 300.64(i) (u&a grounds for halibut). The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

The legal principles described above support the conclusion that treaty Indian fishing rights apply to highly migratory species that pass through the coastal tribes' ocean u&a grounds. The quantity of this right has not yet been determined or adjudicated.

Prospective Tribal Fisheries for HMS at the Time of FMP Adoption

Three Makah boats are presently reported to fish for albacore. They fish mostly beyond the EEZ, but sometimes within the EEZ. Landings are either in Ilwaco, Washington, or in Canada pursuant to the "Treaty Between the Government of the United States of America and the Government of Canada on Pacific Coast Albacore Tuna Vessels and Port Privileges (1981)." One Makah fisherman is currently planning to fish for thresher shark. In addition, two Quinault boats and one Quileute boat plan to fish for

HMS. Currently there is no regulatory impediment to the tribes' pursuit of HMS fisheries. However, it is possible that specific treaty Indian allocations may be necessary in the future. To anticipate this eventuality, and to establish an orderly process for implementing treaty fisheries, this FMP authorizes adoption of procedures to accommodate treaty fishing rights in the implementing regulations (see Chapter 8).

1.6.9 Other International Entities

Standing Committee on Tuna and Billfish (SCTB)

The SCTB evolved from a committee of international scientists charged with review of the work of the Offshore Fisheries Program of the Secretariat of the Pacific Community (SPC; formerly the South Pacific Commission) to a more general committee with the following terms of reference:

- Coordinate fisheries data collection, compilation and dissemination according to agreed principles and procedures;
- Review research on the biology, ecology, environment and fisheries for tuna and associated species in the western and central Pacific Ocean;
- Identify research needs and provide a means of coordination, including the fostering of collaborative research, to most efficiently and effectively meet those needs;
- Review information pertaining to the status of stocks of tunas and associated species in the western and central Pacific Ocean, and to produce statements on stock status where appropriate; and
- Provide opinion on various scientific issues related to data, research and stock assessment of western and central Pacific Ocean tuna fisheries.

Participation on the SCTB is open to scientists and others with an interest in the tuna fisheries of the western and central Pacific Ocean. The participation of scientists from coastal states and territories of the region, scientists from countries whose vessels fish in the region, and scientists from international tuna fishery management organizations is encouraged.

The 1999 annual meeting of the SCTB included 81 participants from American Samoa, Australia, Canada, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Japan, Kiribati, Korea, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Philippines, Samoa, Taiwan, Tonga, Tuvalu, USA, Vanuatu, Wallis & Fortuna, Forum Fisheries Agency, Inter-American Tropical Tuna Commission, and the SPC.

To perform its functions the SCTB formed a Statistics Working Group, and various species research groups which include skipjack, yellowfin, bigeye and albacore, and a research group for billfish and bycatch species.

Reports and information are available from the Secretariat of the Pacific Community, Noumea, New Caledonia.

Interim Scientific Committee (ISC)

The ISC evolved through a series of consultations between the U.S. and Japan with a twofold purpose:

- To enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the north Pacific Ocean during a part or all of

their life cycle; and

- To establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational utilization of these species in this region.

The ISC membership can include coastal states/economies of the region and states/economies with vessels fishing for these species in the region. Observer participants include relevant intergovernmental fishery organizations, relevant intergovernmental marine science organizations and other entities with vessels fishing for these species in the region. Current membership includes Canada, Chinese-Taipei, Japan, Korea, Mexico, People's Republic of China, U.S., IATTC and SPC.

The functions of the ISC are to:

1. Regularly assess and analyze fishery and other relevant information concerning the species covered;
2. Prepare a report on its findings or conclusions on the status of such species such as trends in population abundance of such species, developments in fisheries, and conservation needs;
3. Strive to adopt reports and findings by consensus of all Members, however, it is not necessary that consensus is achieved on all matters, and reports and findings may reflect options and differing views when a consensus has not been achieved;
4. Formulate proposals for conduct of and, to the extent possible, coordinate international and national programs of research addressing such species; and
5. Consider any other matters, as appropriate, at the request of one of the members.

Species currently considered by the ISC include swordfish, bigeye tuna, northern bluefin tuna, yellowfin tuna, blue and striped marlins, and north Pacific albacore. Additional species such as sharks, wahoo, and sailfish may be considered at a later date.

2.0 MANAGEMENT PHILOSOPHY

2.1 Management Philosophy and Approach

Highly migratory species are wide-ranging, likely to be fished by multi-national fleets beyond U.S. waters, have productivity potentials ranging from very low to very high, and can seldom be directly surveyed for abundance. Their management usually requires international cooperation, for which there must be active U.S. participation at international forums. The management should be precautionary and multidimensional in approach.

Precautionary management should be the guiding theme in managing HMS species. It is called for by National Standard 1 of the Magnuson-Stevens Act, FAO's Code of Conduct for Responsible Fisheries, the United Nations' "UNIA" or "Highly Migratory Species and Straddling Stocks" Agreement, and regional agreements, such as MHLC. Precautionary management is proactive, i.e., it seeks to minimize the likelihood of attaining the overfished condition by accounting for uncertainties and by establishing preventive procedures. Other aspects of this concept are discussed in Sections 4.1–4.6. Precautionary management of HMS species should include:

1. Consideration of the biological limitations of species. Due to different and unique life histories, HMS species have differing vulnerabilities to exploitation that require differing management. For example, most tunas are wide-ranging and productive while many sharks, with delayed sexual maturity and low fecundity, are not. Precautionary quotas may be more appropriate for vulnerable species, as maintenance of healthy levels of their reproductive potential is more the concern than is maximization of yields.

2. Control of the growth rate of fisheries. Rapidly expanding fisheries are likely to overshoot management goals, both biological and economic. Uncontrolled growth can produce excess fishing capacity that is difficult to withdraw. The lower the productivity of a species, the greater the need for this control.

Multidimensional management, within the context of the above two precautionary concepts, refers to methods that are complementary and which are often applied in combination in actual management. There are at least four methods:

1. Management by Catch and Effort Limits. The limits for this traditional approach should be determined with express consideration of species' life histories and productivity potentials and applied within the context of control rules (Section 4.2). These limitations should also extend to controlling the rate of fishery expansions (#2 above).

2. Management by protecting reproductive potential. Season and/or area closures should be considered for times and places occupied by significant portions of populations that are reproducing females, especially for low-productivity species.

3. Management by Limiting Access. To prevent rapid increase in fishing effort, excess fishing capacity, and boom-bust exploitation, and to promote stable and long-term fishing investment and thereby incentives for resource conservation, limited entry systems should be considered.

4. Management by Limiting Bycatch. Under the Magnuson-Stevens Act, bycatch must be minimized and avoided to the extent practicable. Increased utilization to reduce bycatch discards can be promoted, but with the productivity potentials of the species involved considered. Incentives should be provided to promote gears with low bycatch.

Whatever the method or approach, specific management actions in this plan are to be in accordance with a control rule (Sections 4.2–4.4), which focuses on biomass relative to that for MSY (the B/B_{MSY} ratio) and on biomass relative to MSST (the B/B_{MSST} ratio - for the overfished condition). Thus in managing to maintain MSY, specific corrective action is not mandatory unless biomass giving B_{MSST}, or the overfished ratio, is reached. If MSY is exceeded, managers must bear in mind that MSY and other reference points refer to the equilibrium or long- term average stock condition, and that any year's catch can be above or below the target level depending on variations in stock availability or stock size as affected by recruitment. It is for this reason that the overfished state is specified as biomass reduced to B_{MSST} (not B_{MSY}), and not simply catch being greater than MSY. Moreover, when MSY is a proxy estimate, managers need to recognize its interim nature. There will be uncertainty in all cases, so quotas or harvest guidelines must be developed with care.

2.2 Management Goals and Objectives

The preceding approaches for managing the management unit species of this plan are to be implemented by specific management actions that are described in Chapter 6. The general goals and objectives of this FMP are listed below to provide context for these actions . They are not listed in order of priority:

1. Promote and actively contribute to international efforts for the long-term conservation and sustainable use of highly migratory species fisheries that are utilized by West Coast-based fishers, while recognizing these fishery resources contribute to the food supply, economy, and health of the nation.
2. Provide a long-term, stable supply of high-quality, locally caught fish to the public.
3. Minimize economic waste and adverse impacts on fishing communities to the extent practicable when adopting conservation and management measures.
4. Provide viable and diverse commercial fisheries and recreational fishing opportunity for highly migratory species based in ports in the area of the Pacific Council's jurisdiction, and give due consideration for traditional participants in the fisheries.
5. Implement harvest strategies which achieve optimum yield for long-term sustainable harvest levels.
6. Provide foundation to support the State Department in cooperative international management of highly migratory species fisheries.
7. Promote inter-regional collaboration in management of fisheries for species which occur in the Pacific Council's managed area and other Councils' areas.
8. Minimize inconsistencies among federal and state regulations for highly migratory species fisheries.
9. Minimize bycatch and avoid discard and implement measures to adequately account for total bycatch and discard mortalities.
10. Prevent overfishing and rebuild overfished stocks, working with international organizations as necessary.
11. Acquire biological information and develop a long-term research program.
12. Promote effective monitoring and enforcement.
13. Minimize gear conflicts.
14. Maintain, restore, or enhance the current quantity and productive capacity of habitats to increase fishery productivity for the benefit of the resource and commercial and recreational fisheries for highly migratory species.
15. Establish procedures to facilitate rapid implementation of future management actions, as necessary.

16. Promote outreach and education efforts to inform the general public about how West Coast HMS fisheries are managed and the importance of these fisheries to fishers, local fishing communities, and consumers.
17. Manage the fisheries to prevent adverse effects on any protected species covered by MMPA and MBTA and promote the recovery of any species listed under the ESA to the extent practicable.
18. Allocate harvest fairly and equitably among commercial, recreational and charter fisheries for HMS, if allocation becomes necessary.

2.3 Unilateral Management, Harvest Guidelines and Quotas, and Overfishing

2.3.1 Unilateral Management

For most MUS in this FMP, U.S. harvest by West Coast-based vessels represents only a small fraction of total fishing mortality out of the overall range of the species, and any unilateral action, such as a reduction in the U.S. West Coast harvest or effort, would not likely have a significant biological effect on the stock. However, as discussed in the section on overfishing (see "overfishing" below), the MSA requires unilateral action when the Secretary of Commerce (Secretary) determines a stock is subject to overfishing or overfished, and the Secretary has not determined that these conditions are due to excessive international fishing pressure. Furthermore, unilateral management of U.S. vessels may also be appropriate under some circumstances apart from overfishing. This is particularly true for vulnerable stocks, defined, in part, as stocks that will require more than ten years to recover from depletion (see Section 4.1). Circumstances where unilateral management may be appropriate, not necessarily because a stock is overfished, include, but are not limited to, the following situations:

1. Where a stock is regionally distributed, and a significant portion of the regional distribution is subject to harvest by U.S. West Coast fisheries;
2. Where the ESA, the MMPA, or the MBTA mandate that a species be protected in both United States' and international waters; or
3. Where unilateral action is needed to address domestic issues such as local depletion, protection for essential fish habitat in United States' waters, bycatch reduction, catch allocations, or conflicts among user groups.

2.3.2 Precautionary harvest guidelines and quotas

A quota is a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. A harvest guideline is a specified numerical harvest objective that is not a quota. Attainment of a harvest guideline does not require closure of a fishery.

No U.S. harvest quotas were recommended at the time of FMP adoption. A U.S. harvest guideline (to replace the current PSMFC guideline) is initially recommended for the common thresher shark, since thresher shark is regionally distributed, its population occupies a significant portion of the EEZ every year, and it is harvested by West Coast-based U.S. fishing vessels. A harvest guideline is also recommended for the shortfin mako shark because of the stock's vulnerability, and the possible importance of the U.S. West Coast EEZ as nursery habitat. The recommended harvest guidelines for these sharks are given in Chapter 4 and Table 4–3.

2.2.3 Overfishing

Sections 304(e) and 304(i) of the Magnuson-Stevens Act, 16 U.S.C. §1854(e) and (i), govern the response

to overfishing and rebuilding of overfished stocks. At any time, if the Secretary determines that a fishery is overfished or approaching a condition of being overfished, the Secretary must immediately notify the Council and request that actions be taken to end overfishing and rebuild the affected stock(s). For those fisheries managed under an FMP or an international agreement, the status is determined using the criteria for overfishing specified in the FMP or the agreement. If the Secretary determines that overfishing is due to excessive international fishing pressure the requirements of MSA Section 304(i) apply; otherwise, the requirements of Section 304(e) apply. Once an HMS stock is determined to be overfished and subject to the requirements of Section 304(e), the Council must prepare, within two years, an FMP amendment or proposed regulations to end overfishing and rebuild the affected stock (see Section 4.1.5). The Council's rebuilding plan will reflect traditional participation in the fishery, relative to other nations, by fishers of the United States, consistent with Section 304(e)(4)(C) of the Magnuson-Stevens Act, 16 U.S.C. §1854(e)(4)(C).

Because of the widespread distribution of HMS stocks outside the U.S. EEZ, it is recognized that unilateral action by the U.S. will likely provide little or no biological benefit to most of the stock(s) managed under this FMP, and that concerted international efforts will be required in order to achieve rebuilding. Therefore, the Secretary may invoke the provisions of MSA Section 304(i) (also 50 CFR 600.310(k)) in cases where a fishery is overfished or approaching a condition of being overfished due to excessive international fishing pressure. Under Section 304(i) within one year after the Secretary's determination, the Council shall develop recommendations for domestic regulations to address the relative impact of U.S. fishing vessels and provide to Congress and the Secretary of State recommendations for international actions that will end overfishing and rebuild affected stocks It is expected that the Department of State and U.S. delegation, in coordination with NMFS, will consider the Council's recommendation in developing U.S. positions for presentation to the international body, and will keep the Council informed of actions by the international body to end or prevent overfishing. These actions may be taken into account by the Council when developing its recommendation to NMFS for any additional U.S. regulations necessary to address the relative impact of U.S. fishing vessels on HMS stocks subject to the provisions of Section 304(i).

2.4 Fixed Elements of the Fishery Management Plan

Fixed elements are the long-standing elements of a fishery management program that direct how it is applied and for what purpose. FMP amendments are required when fixed elements of the FMP are changed, as well as for major or controversial actions outside the scope of the original FMP.

Examples of fixed element actions that would require an FMP amendment include:

- changes to management objectives;
- changes to the species in the management unit (actively managed species);
- changes to the methods for determining MSY, OY and SDC;[2]
- amendments to any procedures required by the FMP;
- implementation of limited entry programs. This FMP does not propose a federal limited entry program for any HMS fishery at this time. The Council adopted a control date of March 9, 2000 for commercial and party/charter fisheries for HMS, in anticipation that a limited access program may be needed in the near future. Meanwhile, existing state limited entry programs for HMS

[2] Numerical estimates of these reference points may be periodically revised, based on the best scientific information, without requiring an FMP amendment. Any such revised determinations, after approval by NMFS, will be published in the annual SAFE report (see Section 4.3).

fisheries will remain in effect when the FMP is implemented; and

- allowing a longline fishery in the EEZ (other than through approved activities under an EFP).

3.0 SPECIES IN THE MANAGEMENT UNIT

Numerous species are caught in HMS fisheries. Those to be actively managed are the Management Unit Species (MUS) listed in Section 3.1. Other species, caught incidentally to targeted species, were originally classified in the FMP as monitored; under revised National Standard 1 Guidelines, some of those species have been reclassified as ecosystem component (EC) species.

HMS fishing gears catch an assortment of tunas, billfish, sharks and other fishes, and some protected species as well. Important species, which meet certain criteria described below, are designated as management unit species, that is, they are subject to active management by the FMP. The management unit species are addressed in Section 3.1.

In addition to management unit species, the incidental catch of at least fifty other fish species has been recorded. It is recommended that data be collected for these and any others caught by HMS gears to assess the amount and type of bycatch as required by the Magnuson-Stevens Act.

EC species are discussed in Section 3.3. Any of these species could be added to the management unit through a plan amendment, if warranted by changes in west coast HMS fisheries.

Species designated by this FMP as prohibited because of their status are addressed in Section 3.4. These species, if intercepted, must be released immediately, unless there are other provisions for their disposition, or unless permits are held for their capture.

Protected species caught incidentally to HMS fisheries include various species of seabirds, sea turtles and marine mammals. Protected species are addressed in Appendix D by HMS fishery type, and in Section 6.1.5.

3.1 Management Unit Species (Actively Managed)

The Plan Development Team and the Council examined a number of different criteria and alternatives for species to be included in the management unit. Public testimony covered a wide range of alternatives, from a relatively short list of target species in West Coast HMS fisheries, to a long list of species harvested by HMS fisheries. The Council assumed that species placed in the management unit would be candidates for active management, i.e., the fisheries for these species may need to be managed through the Council process resulting in Federal regulations to implement adopted management measures. The Council also understood that maximum sustainable or optimum yield (bio-analytically-based or proxy) is the basis of management and would have to be specified for each species in the management unit, and that a definition of overfishing is required. The Council considered various combinations of the following criteria for including species in the management unit, with the stipulation that any species that met the first three criteria would be strongly considered for inclusion:

1. the species occurs in the Pacific Council management area
2. the species occurs in west coast HMS fisheries
3. the species is defined as highly migratory in the Magnuson-Stevens Act or the Law of the Sea Convention
4. the species is important (moderate to high value) in the landings or to the fishery
5. the species is managed by the Western Pacific Fishery Management Council
6. sufficient data exists to calculate a bio-analytically based MSY, including a reasonable MSY proxy that is based, e.g., on catches and yields that are stable over time
7. the species occurs in fisheries which the Pacific Council wants to actively manage
8. the species possesses special biological characteristics (e.g., low productivity)

The Magnuson-Stevens Act defines highly migratory species as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.) and swordfish (*Xiphias gladius*). The term "tuna species" includes albacore tuna (*Thunnus alalunga*), bigeye tuna (*T. obesus*), bluefin tuna (*T. thynnus* and *T. orientalis*), skipjack tuna (*Katsuwonus pelamis*), and yellowfin tuna (*T. albacares*). The inclusion of these definitions establishes the authority of the Secretary of Commerce to manage directly the above species in the Atlantic Ocean and Gulf of Mexico, without the need for a regional fishery management council FMP.

The United Nations Convention on the Law of the Sea, Annex I, defines "highly migratory species" to include: albacore tuna, bluefin tuna, bigeye tuna, skipjack tuna, yellowfin tuna, blackfin tuna (*Thunnus atlanticus*), little tuna (*Euthynnus alletteratus; E. affinis*), southern bluefin tuna (*T. maccoyii*), frigate mackerel (*Auxis thazard; A. rochei*), pomfrets (family Bramidae), marlins (*Tetrapturus angustirostris; T. belone; T. pfluegeri; T. albidus; T. audax; T. georgei; Makaira mazara; M. indica; M. nigricans*), sailfishes (*Istiophorus platypterus; I. albicans*), swordfish, sauries *(Scomberesox saurus; S. saurus scombroides; Cololabis saira; C. adocetus*), dorado (*Coryphaena hippurus; C. equiselis*), oceanic sharks (*Hexanchus griseus; Cetorhinus maximus; Rhincodon typus*; family Alopiidae; family Carcharhinidae; family Sphyrnidae; family Lamnidae), cetaceans (family Physeteridae; family Balaenopteridae; family Balaenidae; family Eschrichtiidae; family Monodontidae; family Ziphiidae; family Delphinidae).

Species in the management unit of the Pelagic Fisheries FMP adopted by the Western Pacific Fishery Management Council are listed in Section 1.7.6.

The management unit includes:

Tunas:

North Pacific albacore (*Thunnus alalunga*)
yellowfin tuna (*Thunnus albacares*)
bigeye tuna (*Thunnus obesus*)
skipjack tuna (*Katsuwonus pelamis*)
northern bluefin tuna (*Thunnus orientalis*)

Sharks:

common thresher shark (*Alopias vulpinus*)
shortfin mako or bonito shark (*Isurus oxyrinchus*)
blue shark (*Prionace glauca*)

Billfish/Swordfish:

striped marlin (*Tetrapturus audax*)
swordfish (*Xiphias gladius*)

Other:

dorado or dolphinfish (*Coryphaena hippurus*)

The management unit includes all five species of tuna which are important to commercial and recreational fisheries in the north Pacific (albacore, bluefin) and eastern tropical Pacific (yellowfin, bigeye, skipjack). Striped marlin is included because of its importance to the recreational fishery in California. Swordfish is a major target in commercial drift gillnet, harpoon and longline fisheries, and is pursued by anglers. Blue shark is an abundant bycatch species in drift gillnet and longline fisheries. It has been the target of some directed shark fisheries in the past, and currently is caught by anglers. Common thresher shark and

shortfin mako shark are important species in the drift gillnet fishery and also are targeted by recreational fishers. Dorado is an important component of the suite of species targeted by recreational fishers, especially in southern California.

The species are to be managed aiming for consistency in both regional and international management. Since the MUS tunas and billfishes are fished ocean-wide and are already assessed or reviewed regularly at international forums, the Council's main task would be to ensure that their local management is neither inconsistent with, nor is abrogated by, international management. The more regionally distributed sharks not currently under international management require more direct, regional or local assessments of stock status and possibly regional management (common thresher and shortfin mako sharks). Where production potentials cannot be estimated accurately (e.g., because only small fractions of the stocks are taken), the species, as MUS, will still be regularly reviewed under Council guidance (e.g., pelagic and bigeye thresher sharks; dorado).

3.2 Determining the Primary FMP for Managed Stocks

National Standard 1 Guidelines state if a stock is identified in more than one fishery, Councils should choose which FMP will be the primary FMP in which management objectives and reference points (see Chapter 4) will be established. Conservation measures in the FMP that is not the primary FMP should be consistent, to the extent practicable, with those established in the primary FMP. Since, as discussed above, a criterion for choosing the managed species in this FMP is their management by the WPFMC, the PFMC and WPFMC will coordinate to identify the primary FMP for Pacific stocks of the managed species. Generally, the WPFMC's FMPs will be primary for stocks occurring in the Western and Central Pacific Ocean and this FMP will be the primary FMP for stocks occurring in the Eastern Pacific Ocean (with the jurisdictional boundaries of the WCPFC and IATTC serving to define these regions). Another important criterion in considering the primary FMP is the relative importance of the stock to fisheries managed under the respective FMPs. This consideration is especially important for stocks where stock structure is poorly understood or the stock is considered a single stock across the North Pacific. Identification of the primary FMP does not preclude either Council from developing recommendations and participating in international forums related to the management in the Pacific Ocean of the species herein.

3.3 Species Included in the FMP as Ecosystem Component Species

One of the reasons given for including EC species in an FMP is for data collection purposes. EC species are not considered "in the fishery" but Councils should consider measures to mitigate and minimize bycatch of these species, to the extent practicable, consistent with National Standard 9. MSY, OY, and other reference points (see Chapter 4) do not need to be specified for EC species. Identification of EC species will help the Council to track these species over time, periodically evaluate their status, and assess whether any management is needed under the FMP, in which case an EC species could be reclassified as a managed species. Identification of EC species also allows the Council to consider measures to minimize bycatch and bycatch mortality of EC species and to protect their associated role in the ecosystem.

EC species and prohibited species (see below and Section 6.1.6) are:

Bigeye thresher shark *(Alopias superciliosus*)
Common mola, *Mola mola*
Escolar, *Lepidocybium flavobrunneum*
Lancetfishes, Alepisauridae
Louvar, *Luvarus imperialis*

Pelagic sting ray, *Dasyetis violacea*
Pelagic thresher shark (*Alopias pelagicus*)
Wahoo, *Acathocybium solandri*

Bigeye and pelagic thresher sharks are landed by the drift gillnet fishery but in small amounts compared to common thresher and mako sharks. Originally included in the FMP as managed species, largely because of concern that they have poor resilience to fishing, they were re-designated EC species under FMP Amendment 2, because of the low number caught in west coast commercial and recreational fisheries.

As outlined in Section 4.3 of this FMP, each year the HMS Management Team will deliver one combined SAFE report for all species in this FMP to the Council. The SAFE report will follow the guidelines specified in National Standard 2 and will be used by the Council and NMFS to develop and evaluate regulatory adjustments, if necessary, under the framework procedure or the FMP amendment process. The SAFE will track and report on significant trends or changes in EC species over time, and assess the relative success of existing state and federal fishery management programs. The SAFE report will also make recommendations to the Council concerning conservation and management of bycatch and incidental catch.

3.4 Prohibited Species

A few species are considered for inclusion under the category Prohibited Species in this Plan. In general, prohibited species must be released immediately if caught, unless other provisions for their disposition are established, including for scientific study. Striped marlin, now allowed for sport-only and not commercial fishing by California, is prohibited by specific allocation and is discussed separately in Section 6.2.4. Pacific halibut and salmon are managed separately from this Plan, but are important in some HMS fisheries and so are provided for here with respect to how they can be caught. Prohibited species in HMS fisheries are:

Great white shark (*Carcharodon carcharias*)
Basking shark (*Cetorhinus maximus*)
mega mouth shark (*Megachasma pelagio*)
Pacific halibut (*Hippoglossus stenolepis*)
Pink salmon (*Onchorhynchus gorbuscha*)
Chinook salmon (*O. tshawytscha*)
Chum salmon (*O. keta*)
Sockeye salmon (*O. nerka*)
Coho salmon (*O. kisutch*)

4.0 PREVENTING OVERFISHING AND ACHIEVING OPTIMUM YIELD

The concepts of control rules and status determination criteria for management and the default and alternative management control rules for this FMP, are discussed below. Control rules for managing MUS are required under the Magnuson-Stevens Act.

4.1 Reference Points Including MSY, OY, and Status Determination Criteria

These reference points are guideposts for managing exploited stocks and require being able to determine and monitor the effects of fishing. But such effects are not always clear, e.g., catch per unit of effort trends may not only reflect the abundance of HMS, but also how fishing success is affected by schooling or wide-ranging behaviors, fishing efficiency, and environmental effects on the availability of species. Estimated population status of management unit species is discussed in Section 4.8 and summarized in Tables 4–4 and 4–5. The SAFE Report (see Section 4.3), produced annually, provides periodic updates to the information found in this FMP.

Many of the more productive HMS species support large and widespread international fisheries that are best managed cooperatively with other nations. In particular, rebuilding programs, required unilaterally by the Magnuson-Stevens Act for overfished stocks, would be ineffective without international cooperation, especially if domestic catches are only small fractions of the stock-wide harvest (see Table 4–5 for West Coast catch fractions). For such species, regional remedial actions must be, to the extent practicable, concurrent with recommendations/resolutions adopted at international forums for cooperative action (see Section 4.5 on stock rebuilding).

Still other HMS species possess life histories characterized by low productivity, thus supporting smaller fisheries that tend to be more regional than international. They have more localized distributions and life stage needs, often within the EEZ. Not only are they more easily overfished, but recovery takes longer, i.e., the species are less resilient to overfishing. Their management should be more conservative, and may require more proactive and targeted regional leadership.

Managing conservatively means being precautionary, especially when there are large uncertainties in how a stock is being affected by fishing. Besides lowering the threshold for taking remedial action, it could mean preventing rapid growth of fisheries to prevent overshooting of management goals, or taking steps to protect the reproductive potential of stocks.

The goal of the Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 and Magnuson-Stevens Conservation and Management Reauthorization Act of 2006, is to ensure the long-term sustainability of fisheries and fish stocks by halting or preventing overfishing and by rebuilding overfished stocks. The Act requires developing fishery management plans for exploited species of U.S. seas including shelf, anadromous, and highly migratory species whose ranges extend beyond the EEZ. By its National Standard 1, optimum yield is the ultimate goal for each fishery.

National Standard 1 Guidelines, as required by the Magnuson-Stevens Act and published in the Code of Federal Regulations (50 CFR 600.310) were developed to assist in implementing the Act. The Guidelines state that the following items should be included in the FMP:

Maximum sustainable yield (MSY): MSY is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets.

MSY fishing mortality rate (F_{MSY}): The fishing mortality rate that, if applied over the long term, would

result in MSY.

MSY stock size (B_{MSY}): The long-term average size of the stock or stock complex, measured in terms of spawning biomass or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at Fmsy.

Status determination criteria (SDC): Quantifiable factors or their proxies, that are used to determine if overfishing has occurred, or if the stock or stock complex is overfished. "Overfished" relates to biomass of a stock or stock complex, and "overfishing" pertains to a rate or level of removal of fish from a stock or stock complex. SDC are:

> Maximum fishing mortality threshold (MFMT): The level of fishing mortality (F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.
>
> Overfishing limit (OFL): The annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish. The OFL is an estimate of the catch level above which overfishing is occurring.
>
> Minimum stock size threshold (MSST): The level of biomass below which the stock or stock complex is considered to be overfished.

Optimum yield (OY): The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems.

Acceptable biological catch (ABC): A level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty, and should be specified based on the ABC control rule.

ABC control rule: A specified approach to setting the ABC for a stock or stock complex as a function of the scientific uncertainty in the estimate of OFL and any other scientific uncertainty (see paragraph (f)(4) of this section).

Annual catch limit (ACL): The level of annual catch of a stock or stock complex that serves as the basis for invoking AMs. ACL cannot exceed the ABC, but may be divided into sector-ACLs.

Annual catch target (ACT): An amount of annual catch of a stock or stock complex that is the management target of the fishery, and accounts for management uncertainty in controlling the actual catch at or below the ACL. ACTs are recommended in the system of accountability measures so that ACL is not exceeded.

ACT control rule: A specified approach to setting the ACT for a stock or stock complex such that the risk of exceeding the ACL due to management uncertainty is at an acceptably low level.

This FMP adopts the default MSY (or MSY proxy) and OY control rules (Sections 4.1.1.4 and 4.1.2.1), but additionally uses an OY (instead of MSY) target for vulnerable species (Section 4.1.2.2). The default MSY control rule was chosen because it is the standard recommended in technical guidance for implementing National Standard 1 of the Magnuson-Stevens Act, and it is consistent with the WPRFMC's rule for pelagic fisheries. The vulnerable species OY control rule is applied to sharks

because of their low productivity, and to bluefin tuna and striped marlin because of uncertainties concerning total catches and stock structures.

To be precautionary, at the time of FMP adoption the OY for vulnerable species was set at 0.75MSY (from the relationship shown in Figure 4–1). Any harvest guideline for vulnerable species is set equal to that OY.

The status of the MUS in this FMP is discussed in terms of this default control rule in the annual HMS SAFE document.

4.1.1 MSY, SDC, and Determining Overfishing and Overfished

4.1.1.1 MSY

Because MSY is a long-term average, it need not be estimated annually, but it must be based on the best scientific information available, and should be re-estimated as required by changes in long-term environmental or ecological conditions, fishery technological characteristics, or new scientific information.

As part of the biennial process (see Chapter 5) the HMSMT will review recent stock assessments or other information as described below and submit a draft SAFE document for review at the June Council meeting containing MSY estimates, noting if they are a change from the current value. The SSC will review these estimates and make a recommendation to the Council on their suitability for management. Based on this advice the Council may recommend a revision to a current MSY estimate to NMFS.

MSY is estimated based on the amount of information available about the stock. The following categories show the relationship between available information and the estimation of MSY:

Category 1, regularly assessed stocks: An estimate of MSY (and other MSY-based reference points) may be determined from the assessment. In the event that the Council determines, based on advice from the SSC, that MSY estimates derived from an assessment are not suitable for management, the Council may recommend changes in the way that MSY is estimated in the assessment. Because HMS assessments are generally conducted by working groups outside of the Council process, such recommendations would be forwarded to the RFMO conducting or sponsoring the stock assessment through the U.S. delegation for consideration when conducting future assessments. In that event the Council could recommend to retain any current MSY estimate in the FMP or regulations, or propose an alternate estimate.

Category 2, unassessed stocks with catch history and additional information on relative abundance or stock productivity: The HMSMT compiles the best available stockwide catch data, or if not available, regional catch data and all additional information on a stock's productivity including relative abundance or catch/effort data if available. MSY or proxy estimates will be developed based on the catch time series and additional information. The relative impact of U.S. west coast fisheries may help to inform decisions on selecting appropriate reference points.

Category 3, unassessed stocks with catch history but lacking further information on relative stock abundance or productivity: The HMSMT compiles the best available stockwide catch data, or if not available, regional catch data. A catch-based method such as the Depletion Corrected Average Catch (DCAC), Depletion Based Stock Reduction Analysis (DB-SRA), or in the case of a relatively stable catch history without indications of stock depletion, an average of selected catch levels may be chosen to represent a proxy MSY.

4.1.1.2 MFMT and OFL

The **MFMT mortality threshold** is the ratio $F_{MFMT}/F_{MSY} = 1.0$; it is the mortality threshold for all stock levels above the MSST threshold (described below). It is illustrated schematically in Figure 4–1, where the x and y axes are in relative measure, the biomass and fishing mortality ratios $\mathbf{B/B_{MSY}}$ and $\mathbf{F/F_{MSY}}$, respectively. With this MFMT ceiling emplaced, a stock would not be reduced to levels any lower than $\mathbf{B_{MSY}}$ that produces MSY (on average). It is to be noted, however, that the Technical Guidance for precautionary compliance with NS 1 (Restrepo, *et al.* 1998) allows that MFMT can be occasionally and temporarily exceeded at some level of probability that depends upon the variability of fishing mortality. The **OFL** is the annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish. The OFL is an estimate of the catch level above which overfishing is occurring.

4.1.1.3 MSST

The **MSST biomass threshold**, the minimum biomass at which recovery measures are to begin, is the ratio B_{MSST}/B_{MSY}. It specifies a lower biomass level that allows remedial action not to be triggered each time B drops below B_{MSY}, simply from natural variation. In terms of B_{MSY}, the recommended level of $\mathbf{B_{MSST}}$ is:

$B_{MSST} = (1\text{-}M)B_{MSY}$ when M (natural mortality) ≤ 0.5, and
$B_{MSST} = 0.5B_{MSY}$ when $M > 0.5$

(i.e., whichever is greater). B_{MSST} must not be less than $\mathbf{B_{MIN}} = 0.5B_{MSY}$ and should allow recovery back to B_{MSY} within 10 years when F is reduced to zero (to the extent possible).

4.1.1.4 MSY Control Rule

The **MSY control rule** specifies how a fishery is to be managed depending upon stock status relative to the SDCs. By control rule definition, **over*fishing*** occurs when fishing mortality F is greater than the MFMT mortality. Similarly, a stock is **over*fished*** when its size falls below the MSST stock biomass. MSA Section 304(e) and 304(i) describe required responses when a stock is subject to overfishing, approaching the overfished condition (i.e., if there is overfishing and the stock is expected to be overfished within two years) and when it is overfished. Fishery managers must then take appropriate remedial action in relation to the applicability of Sections 304(e) and 304(i). If Section 304(e) applies, in the case of approach to being overfished, action must be taken to prevent overfishing; if overfishing is occurring, harvest rates must be reduced below MFMT; in the case of being overfished, a rebuilding plan must be prepared within one year to rebuild the stock. The rebuilding plan must bring the stock back to the level producing maximum (or optimal) sustainable yield within a specified time period. If the Secretary determines overfishing is due to excessive international fishing pressure pursuant to Section 304(i) a different response is called for. The Council then develops recommendations for domestic regulations to address the relative impact of U.S. vessels and recommendations for international actions to end overfishing and rebuild affected stocks. The Guidelines call for precautionary management, i.e., use of conservative control rules with remedial action to begin even if the overfishing/overfished status cannot be established with certainty.

4.1.1.4 Determining if Overfishing is Occurring or a Stock is Overfished

The Council will monitor each managed HMS stock and determine annually, if possible, if overfishing is occurring and whether the stock is overfished. Overfishing is occurring if the fishing mortality rate exceeds MFMT or catch exceeds the OFL for 1 year or more.

The MSST or a reasonable proxy must be expressed in terms of spawning biomass or other reproductive potential. Should the estimated size of an HMS stock in a given year fall below this threshold, the stock is considered overfished.

4.1.2 Optimum Yield

OY is defined as MSY reduced by relevant socioeconomic factors, ecological considerations, and fishery-biological constraints so as to provide the greatest long-term benefits to the Nation. Therefore, OY cannot be set greater than MSY, and must take into account the need to prevent overfishing and rebuild overfished HMS stocks. To the extent possible, the relevant social, economic, and ecological factors used to establish OY for an HMS stock or fishery should be quantified and reviewed in historical, short-term, and long-term contexts. National Standard 1 Guidelines includes examples of factors that may be considered when determining OY. Normally, OY should not be greater than the ABC or ACL, if identified (see below). However, since OY is a long-term average and ABCs and ACLs are set annually there may be instances where the ABC or ACL could exceed the OY on a short-term basis. The OY specifications in Table 4-3 shall remain in effect until changed by recommendation of the Council, after considering recommendations of the SSC, and approval by NMFS. The OY for any management unit species not listed in Table 4-3 shall be determined preferably concurrently with addition to the management unit, or as soon as possible thereafter by recommendation of the Council, after considering input by the SSC, and approval by NMFS.

4.1.2.1 Default OY Control Rule for Species Not Considered Vulnerable

As a default control rule, OY(proxy) = equals MSY or MSY(proxy) is used for species not considered vulnerable.

Alternatively, OY may be reduced from MSY based on the range of considerations described in National Standard 1 Guidelines and using various methods. For example, a precautionary default value of OY may be defined in terms of fishing mortality as 0.75MFMT. Simulation studies have indicated that management according to the OY default value will often allow biomasses (**B_{OY}**) to be maintained at about $1.25B_{MSY}$, with yields of about 95% of MSY. This alternative default calculation is shown in Figure 4-1 (based on Restreop et al. 1998). A **Minimum Biomass Flag (B_{FLAG})** may be identified equal to $(1\text{-}M)B_{OY}$ or $0.5B_{OY}$ (whichever is greater) (Boggs et al. 2000). B_{FLAG}, which would then be equivalent to $1.25(B_{MSST}/B_{MSY})$, serves as a warning call to halt biomass reduction that would jeopardize obtaining OY on average.

These control rules involve the concept of target and limit reference points. It can be seen that B_{MSY} and B_{OY} are target reference points for the long-term management goals of MSY or OY. But B_{MSST} and B_{FLAG} are limit thresholds for the respective control rules that should not be exceeded, or exceeded only at some level of probability. A stock that is reduced below those biomass limits would normally require remedial action, because the target goals would then be jeopardized. Similarly, F_{OY} is a target reference point. However, F_{MSY} could be a target reference point *or* a limit threshold; it could be the target point for the MSY control rule or it could be the limit threshold for the OY control rule. If $B < B_{FLAG}$ is expected with the latter rule, remedial action may be recommended even though the stock could still be far above B_{MSST}.

4.1.2.2 Alternative OY Control Rule for Vulnerable Species

A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce MSY and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery

(e.g., loss of habitat quality). In consultation with the SSC, the HMSMT may analyze the vulnerability of HMS stocks from time to time.

Since the management unit species vary from vulnerable to very productive an alternative OY specification may be considered for vulnerable species.

Vulnerability of species can stem from many reasons, and any species that has been depleted to 50% below B_{MSY} (for the logistic production model, to 25% of unfished level B_0) that is incapable of recovering back to that B_{MSY} level within 10 years (with fishing removed) is to be considered vulnerable in this FMP. The productivities (potential per capita rates of population increase *r*) of such species would have to be 5% or less per year, assuming recovery time is determined by a linear compensatory increase in *r* with population decline (logistic model). Only the sharks among the MUS, including common thresher, are likely to have such low rates and long recovery times (see Table 4–1), and they are therefore considered vulnerable by this criterion. Vulnerable OYs are also appropriate for other fish species for other reasons of stock health concern (see bluefin tuna, Section 4.8.1, and striped marlin, Section 4.8.3).

In this FMP, where OY is not determined analytically, an OY or OY proxy may be defined according to vulnerability, starting with consideration of a value of 0.75*(MSY or MSY(proxy).

The rationale for using this approach to set the OY for vulnerable species follows from the recommended $F_{OY} = 0.75F_{MSY}$ (see Figure 4–1). Then since $MSY = F_{MSY}B_{MSY}$, $OY=0.75F_{MSY}B_{MSY}= 0.75MSY$ when estimated from the same B_{MSY} biomass. Starting from this consideration of an alternative OY specification, the Council may take into account other factors relating to the stock's vulnerability (biological productivity and susceptibility to fisheries) in determining an appropriate OY for the stock. Likewise, the OY control rule can be adjusted for more vulnerable species. The more vulnerable a species is to being overfished, the more conservative should management be. And since the maximum value of OY is MSY, then the more should the catch ratio OY/MSY be reduced from unity (while B_{OY}/B_{MSY} is increased from unity).

Since the default alternative rule is defined with MFMT and MSST as ratios relative to MSY (as in Figure 4–1), its resulting generality allows management according to specific criteria even without estimates of the absolute biomass or exploitation status of a stock. This allows all the MUS, diverse with respect to productivity, scientific understanding, and stock status, to be managed by the same rule and in accordance with the requirements of the Magnuson-Stevens Act. This control rule is the most straight-forward of the possible rules discussed by Restrepo et al. (1998) and is the one they recommend. The reduction in fishing mortality it calls for to rebuild depleted populations is intermediate with respect to the degree of depletion that can be remedied at acceptable rates of recovery.

4.1.4 ABC, ACLs, ACTs, and Accountability Measures

According to the National Standard 1 Guidelines an ABC and a related ACL must be set for stocks managed under an FMP. However, the Guidelines include an exception to this requirement for stocks subject to management under an international agreement, which is defined as "any bilateral or multilateral treaty, convention, or agreement which relates to fishing and to which the United States is a party" (50 CFR 600.310(h)(2)(ii)). The Council has determined that all the managed stocks in this FMP meet this criterion. Therefore, the Council will not normally set ABCs and ACLs for managed HMS stocks. However, application of this exception does not preclude the Council from setting an ACL (and identifying an associated ABC to facilitate setting the ACL) if circumstances warrant.

The ABC is a level of a stock's annual catch that accounts for scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC may not exceed the OFL. The HMSMT will develop

ABC control rules for those managed stocks for which they are required. The ABC control rule will be reviewed by the Council's SSC. Based on that review the Council will adopt the ABC control rule judged suitable by the SSC. Through this process the ABC control rule may be revised from time to time based on the best scientific information available. The ABC will be expressed in terms of catch, or landings if the ABC control rule incorporates an estimate of bycatch or other sources of fishing mortality.

The Council will establish ACLs for those managed stocks for which they are required. ACTs and ACT control rules may be established if they would help ensure the ACL is not exceeded. The ACL may not exceed the ABC. ACLs will be established for each year in the biennial management cycle (see Chapter 5). ACLs are established, reviewed, and may be adjusted as part of the periodic management cycle described in Section 5.2. No "sector ACLs" are identified (see 50 CFR 660.310(f)(5)(ii)) in this FMP, but may be established as part of the biennial management process.

The biennial management process will be used to implement accountability measures (AMs) should they be required. AMs are management controls to prevent ACLs from being exceeded and to correct or mitigate overages of the ACL if they occur.

Annually, the HMSMT will gather the requisite information needed to determine whether an ACL has been exceeded as soon as possible after the end of the fishing year (March 31). If catch exceeds the ACL more than once in the last four years, the system of ACLs and AMs will be reevaluated and modified if necessary. For the purposes of this evaluation a 3-year moving average or other multi-year approach may be used, if there are insufficient data to conduct the evaluation based on a single year's catch.

4.1.5 Council Response to Overfishing

If a stock is subject to overfishing, approaching being overfished, or overfished fishery managers must then take appropriate remedial action.

4.1.5.1 International Overfishing

If the Secretary determines that a stock is overfished or approaching the condition of being overfished due to excess international fishing pressure, and for which there are no measures (or no effective measures) to end overfishing under an international agreement to which the United states is a party, then the Council will respond according to the procedures described in Section 304(i) of the MSA (and 50 CFR 600.310(k)).

4.1.5.2 Rebuilding Stocks when International Fishing Pressure is not the Cause

When stock size B falls below its MSST level, F must be reduced below its fishing mortality threshold to allow stock rebuilding at least back to B_{MSY}. The amount of mortality reduction would depend upon the severity of stock depletion below MSST, the stock's capacity to rebound, and the desired recovery time of the stock. In rebuilding according to the default MSY control rule Figure 4–1), F is reduced linearly by the amount that B is determined to be below MSST. After the stock has been rebuilt back to MSST, maintaining F at the MFMT level will allow the stock to continue its increase until at equilibrium at B_{MSY}. With the OY Control Rule, the decrease from F_{OY} is shown beginning at B_{MSY}, rather than at B_{FLAG}, to enable faster rebuilding back to B_{OY}.

Under NMFS's National Standard Guidelines, a number of factors enter into the specification of the time period for rebuilding. The lower limit of the specified time period for rebuilding is determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem, and is defined as the amount of time that would be required for rebuilding if fishing mortality

were eliminated entirely. If the lower limit is less than 10 years, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can result in the specified time period exceeding 10 years, unless management measures under an international agreement in which the United States participates dictate otherwise. If the lower limit is 10 years or greater, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can exceed the rebuilding period calculated in the absence of fishing mortality plus one mean generation time or equivalent period based on the species' life-history characteristics. Overfishing restrictions and recovery benefits must also be fair and equitable among fishery sectors. Rebuilding of internationally managed fisheries must reflect traditional U.S. participation in those fisheries relative to that of other nations.

Fishery management councils actually have considerable latitude in how they rebuild depleted stocks. The rebuilding rules illustrated in Figure 4–1 and also Figures 4–2 and 4–3 (the F ramps) are examples of just some of the possible approaches to F-reduction. Actual rebuilding could proceed through a combination of ways, e.g. a series of stepped increases in F or series of increasing catch quotas as the biomass rebuilds back toward B_{MSY} (such quotas can be shown only indirectly in terms of the F and B dimensions of Figure 4–1).

Rebuilding of overfished stocks is a unilateral requirement by the Magnuson-Stevens Act, but, as already noted, internationally fished stocks require cooperative catch reductions among the fishing nations for this rebuilding to be effective. U.S. responsibility in the rebuilding, however, will be greater the more localized the stock and the greater the domestic take of the stock's production (see unilateral/international management, Section 2.2).

In general, rebuilding is to remedy stock depletion, but there can also be rebuilding to remedy **local depletion**. The latter rebuilding could be domestic and unilateral. Local depletion occurs when localized catches are in excess of replacement from local and external (via net immigration) sources of production. As such, it can occur independently of the status of the overall stock. The local depletion of abundance can be stronger than the concurrent stock-wide decrease (Squire and Au 1990). In all cases, the degree and extent of this depletion must be assessed relative to the health of the overall stock and the resiliency of the species.

4.2 Assessment of Stock Status

National Standard 2 requires using the best scientific information in managing management unit species. This requires periodic updating of stock status for comparing against their control rules. Status updating will be through Stock Assessment and Fishery Evaluation (SAFE) reports (Section 4.3). In the case of species under international management, the control rule approach must be promoted so that status in terms of SDCs (e.g., F/F_{MSY}, B/B_{MSY}) can be described (see also Section 2.1).

The control rule approach implies an ability to determine the level of biomass B relative to its initial level B_0 and (at least conceptually) relative to B_{MSY}, and to determine the level of mortality F relative to some target level like F_{MSY}. Relative biomass level could be estimated by the decline in catch rate (CPUE) or, with sufficient information on stock and recruitment, by percent spawning potential ratio (SPR), or proxies based on SPR, e.g., $B_{50\%}$ or $F_{50\%}$. Non-empirical MSY levels of B or F can be estimated as fractions of B_0 or multiples of M, respectively, e.g., $B_{MSY}=0.5B_0$ or $F_{MSY}=1.0M$.

In many cases estimates of MSY or OY themselves are the only information available for management,

and the F/F_{MSY} and B/B_{MSY} ratios must be derived from those estimates. This does not abrogate the control rule, because MSY and OY *are* the management goals. Where MSYs have not been determined, average stock-wide catch levels over appropriate time periods can be proxies.

Both MSY and OY refer to a species' sustainable catch, stock-wide. For some species there is no stock-wide catch information, and some (e.g., mako shark, dorado) occur within the management area as the edges of wider distributions, so even their maximum, regional catch levels are unlikely to reflect stock production. While MSYs remain unknown for those species, the local catches can be used to estimate a local or regional level of MSY.

4.3 Stock Assessment and Fishery Evaluation Report

National Standard 2 of the Magnuson-Stevens Act requires that the best scientific information available be used in developing FMPs and implementing regulations. For HMS, except dorado and sharks, NMFS and the Pacific Council rely on analyses and assessments adopted by various international bodies (of which U.S. is an active participant), such as the Inter-American Tropical Tuna Commission (IATTC), International Scientific Committee for Tuna and Tuna-like Species in the North Pacific (ISC), Standing Committee on Tuna and Billfish (SCTB) and others. For other species such as dorado and sharks, the HMS Management Team and NMFS develops stock and fishery assessments, provides peer reviews and presents the results to the Council. The guidelines for implementation of NS 2 require preparation of an annual Stock Assessment and Fishery Evaluation (SAFE) report. The SAFE report will largely rely on international body assessments, NMFS directed assessments, and any new fishery information. The NS 2 guidelines for a SAFE report, adapted for this FMP, are below.

The SAFE report is a document or set of documents that provides the Council with a summary of information concerning the most recent biological condition of stocks and the marine ecosystems in the management unit and the social and economic condition of the recreational and commercial fishing interests, fishing communities, and the fish processing industries. It summarizes, on a periodic basis, the best available scientific information concerning the past, present, and possible future condition of the stocks, marine ecosystems, and fisheries being managed under federal regulation.

The Secretary of Commerce has the responsibility to assure that a SAFE report or similar document is prepared, reviewed annually, and changed as necessary. The Secretary or Council may utilize any combination of talent from Council, state, Federal, university, or other sources to acquire and analyze data and produce the SAFE report.

The SAFE report provides information to the Council and Southwest Region of NMFS for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, and assessing the relative success of existing state and Federal fishery management programs. Information on bycatch and safety for each fishery should also be summarized. In addition, the SAFE report may be used to update or expand previous environmental and regulatory impact documents, and ecosystem and habitat descriptions.

Each SAFE report must be scientifically based, and cite data sources and interpretations.

Each SAFE report should contain information on which to base harvest specifications, including ABCs, ACLs, and ACTs, if appropriate.

Each SAFE report should contain a threshold estimate of the MFMT or OFL, and MSST for each stock or stock complex, along with information by which the Council may determine:

- Whether overfishing is occurring with respect to any stock or stock complex; if any stock or stock complex is overfished; if the rate or level of fishing mortality applied to any stock or stock complex is approaching the maximum fishing mortality threshold, and if the size of any stock or stock complex is approaching the minimum stock size threshold.
- Any management measures necessary to provide for rebuilding an overfished stock or stock complex (if any) to a level consistent with producing the maximum sustainable yield in such fishery.

The SAFE will also report any changes to numerical estimates of MSY and OY adopted by the Council as a recommendation to NMFS as part of the biennial process described in Chapter 5.

Each SAFE report may contain additional economic, social, community, essential fish habitat, and ecological information pertinent to the success of management or the achievement of objectives of each FMP.

Each year, in June and September, the HMS Management Team will deliver one combined SAFE report for all species in this FMP to the Council. The SAFE report will follow the guidelines specified in NS 2 and will be used by the Council and NMFS to develop and evaluate regulatory adjustments under the framework procedure or the FMP amendment process. This information will provide the basis for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, the bycatch, and the fishery over time, and assessing the relative success of existing state and federal fishery management programs. In addition, the SAFE report will be used to update or expand previous environmental and regulatory impact documents, and ecosystem and habitat descriptions, including EFH. The SAFE report will also make recommendations to the Council on matters concerning bycatch and incidental catch.

4.4 Status of Management Unit Stocks at the Time of FMP Adoption

The health status of management unit stocks is determined mainly by use of standard stock assessment techniques found in the scientific literature, but also from examination of their fisheries. The conclusions, summarized in Tables 4–2 and 4–3, should be reasonably accurate, but should also to be taken with caution. Assessments of stock status always involve assumptions, use of uncertain parameters, and particular interpretations of fishery statistics. There are no universally-accepted standards by which to determine confidence for particular assessments, and "ground truthing" will probably never be possible for HMS species. Confidence arises mainly from long management experience with ample perspective from long time-series of the fishery trends.

Management will involve comparing a stock's recent catch levels against its target reference levels, in most cases, MSY. These catch guideposts are listed in Table 4–2. For some stocks or populations, a **harvest guideline** is also listed. A harvest guideline if surpassed, calls for review of the stock/population and its fishery. The purpose is to alert the Council to the possibility that catches under its jurisdiction are at or near a particular target level.

Basic life history characteristics and other important stock indicators for HMS MUS are provided in (Table 4–1) for a comparative overview of the spectrum of productivities, exploitation limitations, and recovery capabilities of those species. The productivity estimate *r*, the potential, fractional rate of population growth, is central, and is calculated as the rate at which a population, initially at equilibrium with some total mortality, could rebound if the fishing mortality were removed (Smith et al. 1998). These productivities are comparable among species and approximately the productivity at MSY, because for each the total mortality used in the calculation is the same multiple of natural mortality (M) that produces MSY (approximately). The procedure thus standardizes productivity estimates of all the species to that at

B_{MSY}. Accuracy depends mainly upon the precision of the age-at-maturity estimate, which is the parameter that drives *r* (Smith et al. 1998). Uncertainty in *r* is greater for high productivity species (but they are more accurately aged as they are short-lived), and less for low productivity species (their productivities are less sensitive to age at maturity). The derived statistics of maximum rate of population growth and doubling time are standardized similarly, by assuming a same production function - for simplicity, the logistic model. In Table 4–1 age at maturity, fecundity, M, and maximum age are given for each species, from which are estimated productivity *r* (at B_{MSY}), maximum annual fractional Population Growth Rate (PGR_{MAX}) (which exploitation should not exceed to prevent population collapse), and the time needed (T_D) for a population to double (recover) after being depleted to $0.5B_{MSY}$ (see Table 4–1 footnotes for details). The productivity parameter *r* affects growth rate exponentially, so moderate changes in its value have large effects, as reflected in the PGR_{MAX} and T_D statistics. The statistics indicate that the billfishes and tunas (each as populations in their entirety), with $r > 0.10$, can withstand > 20% exploitation rates (PGR_{MAX} rates) and can recover from depletion within 6 years, while the sharks (similarly considered), with $r < 0.07$, can withstand no more than 12% exploitation (on average), and their recovery time is 1-2 decades, or more.

The status of management unit species at the time of the adoption of the FMP (2003) is described in Appendix B. Annual SAFE documents provide regular updates on the status of stocks.

4.5 Measures Adopted by the Council to End of Overfishing and Rebuild Overfished Stocks

No MUS are currently overfished. The Council strategy to end overfishing on bigeye tuna is described below.

4.5.1 Bigeye Tuna

Both the Pacific and Western Pacific Fishery Management Councils were notified by letter from NMFS dated December 15, 2004, that the Secretary of Commerce had determined that overfishing of bigeye tuna was occurring Pacific-wide. In response, the Council has articulated a strategy to address overfishing of bigeye tuna in the EPO. Together with action taken by the WPFMC, it is intended to end overfishing of bigeye tuna Pacific-wide. The specific actions to actually end overfishing would have to be developed by multilateral cooperation through appropriate regional fishery management organizations (RFMOs), and, as necessary, domestic regulation. The elements of the Council's strategy are described below.

As part of its strategy the Council recognizes that restrictions applied to a single fishery would be insufficient to curtail fishing mortality to a level not exceeding average MSY (AMSY). Therefore, restrictions on both longline and purse-seine fisheries are necessary to end overfishing.

4.5.1.1 Management Objectives and Measures to Immediately End Overfishing

The Council will transmit recommendations for immediate specified reductions in fishing mortality to NMFS, the Department of State, and the U.S. delegations to Pacific tuna RFMOs. With regard to bigeye tuna in the EPO, the Council will work with the General Advisory Committee, established under the Tuna Conventions Act, and the U.S. Section to the Inter-American Tropical Tuna Commission (IATTC) to establish management goals to guide any necessary reductions in fishery-specific catch/effort in the EPO. To the extent practicable, these goals will be consistent with IATTC staff recommendations.

Based on stock assessments in 2005 (WCPFC 2005) and 2006 (IATTC 2006), fishing mortality on Pacific bigeye in the EPO by longline vessels must be reduced by 30 percent and purse fishing vessel mortality by 38 percent as compared to 2003-04 fishing levels. In the WCPO, fishing mortality on Pacific bigeye by longlines and purse seines must be reduced by 20 percent from 2001-03 levels for each gear type. Any

specific fishery management measure adopted by the IATTC or the WCPFC should reflect traditional participation in fisheries. In coordination with the WPFMC these measures are cumulative across the two regions (EPO and WCPO) since although Pacific bigeye tuna is thought to be a single population, it is managed in two segments, fished by different fisheries and managed by two separate RFMOs. Specific catch/effort management goals may be revised over time to be consistent with changes in stock status. The following general principals should be adhered to when proposing management measures intended to meet these goals:

1. Use science-based measures that consider historical participation, and provide for sustained participation by local communities.
2. Strive for consistent measures (e.g., between the WCPO and EPO) where possible.
3. Focus on fisheries with the greatest impacts.
4. Focus on regions of highest catches and on spawning areas.
5. Reduce surplus capacity.
6. Restrict the use of purse seines set on fish aggregating devices (FADs).
7. Consider exempting fleets that catch less than 1 percent of the total Pacific-wide catch from some or all measures.[3]
8. Improve species-specific fishery monitoring.
9. To the extent practicable, the U.S. should seek RFMO decisions that are consistent with National Standard 1 of the MSA and its guidelines as codified.

Half of the elements in this list, (2-6) are concerned with minimizing fishing mortality of bigeye, while the remainder are concerned with participation in fisheries and monitoring and management of pelagic fishing. With respect to principles and priorities for research and data collection, the Council recommends that the U.S. should also promote the following:

1. Determine consistent science-based reference points that are appropriate for management use. In the absence of international reference points, the Council will promote the establishment and application of MSY-based reference points and associated control rules with respect to preventing and ending overfishing.
2. Improve stock assessments that provide region-specific information and understanding of recruitment.
3. Promote pan-Pacific assessments that provide region-specific information.
4. Improve understanding of responses to FADs.
5. Investigate gear and fishing characteristics of vessels with above-average CPUE.
6. Collect and define vessel and gear attributes useful for effort standardization for all fleets.
7. Define total costs of management on governments and participants.

The Council may modify elements of its strategy, consistent with recommendations from IATTC staff or other scientific advisory bodies (such as the Councils' SSC), in order to further support ending overfishing on bigeye tuna in the EPO and Pacific-wide.

4.5.1.2 Rationale for Recommendations

In proposing measures to the IATTC it is essential to avoid confusion and potential conflict between that

[3] With respect to exempting fleets with comparably minimal historical catch (e.g., less than 1 percent of the total), the Council supports using a formula such as that described in IATTC Resolution C-06-02. This resolution applies to longline vessels, but in the event of the adoption of national quotas applicable to a wider range of fisheries, a similar formula to accommodate traditional participation should be considered.

organization and the WCPFC with respect to management measures regarding FMU species subject to overfishing. Moreover, the areas of competence of these two RFMOs overlap in the South Pacific, so it is essential that management measures are harmonized as far as possible. The Pacific Council will principally focus on providing advice to the IATTC to address overfishing in the EPO, but as appropriate, may provide advice to the WCPFC for stocks, such as bigeye tuna, that for assessment purposes are considered a single, Pacific-wide stock.

The general recommendations outlined above, such as focusing on the fisheries with the greatest impacts and on the regions of highest catches and on spawning areas, reducing surplus capacity, and restricting the use of purse seine FADs, support the identification of those measures that will have a measurable impact on bigeye tuna conservation. Similarly, an exemption for those fleets that catch less than 1 percent of the total Pacific-wide catch (or some other, similar formula) from some or all measures recognizes the need to avoid overly burdening those fleets and countries which are peripheral in generating fishing mortality for bigeye tuna and other FMU stocks.

Reducing fishing capacity is a recognized goal and NMFS has stated that its target is to eliminate or significantly reduce overcapacity in 25 percent of federally-managed fisheries by the end of 2009 and in a substantial majority of fisheries in the following decade (NMFS 2004). There is known to be an excess of purse seine capacity for skipjack tuna, as recognized by a 2001 resolution by the World Tuna Purse Seine Organization to achieve a 35% reduction in fishing effort by member countries. Although the purse seine vessels are targeting skipjack rather than bigeye tuna, they are a major contributor to fishing mortality through catches of bigeye and yellowfin juveniles around FADs. Consequently, reduction of purse seine fishing capacity overall would likely have a marked conservation benefit for bigeye and yellowfin tuna. In this regard, the IATTC promulgated resolutions in 2000 and 2003 to limit fishing capacity of purse seine vessels operating in the Eastern Pacific. The IATTC established a target of 158,000 m^3 (well volume) for the total purse seine fleet in the Eastern Pacific, which took into account stock status and the rights of coastal States and other States with a longstanding and significant interest in the tuna fisheries of the Eastern Pacific to develop and maintain their own tuna fishing industries.

Restricting the use of FADs by purse seine vessels in the Pacific, to aggregate skipjack tuna, will reduce the overall catch of bigeye and yellowfin tunas, and specifically the catches of juvenile bigeye and yellowfin tunas, which also aggregate beneath FADs. It is expected that this reduction in juvenile bigeye catch will likely improve recruitment of bigeye tuna to the longline fishery, where fish are caught at larger sizes and at higher value. Improvements to spawning stock biomass would also result. Similarly, any measure designed to develop time/area closures in spawning grounds or areas of high juvenile bigeye and yellowfin tuna densities would reduce fishing mortality on spawning fish and reduce the catch of juvenile fish before they had a chance to recruit to the longline fishery.

The MSA's National Standard 1 establishes a process for the use of biomass-based reference points and fishing mortality limits to determine whether fisheries are overfished or subject to overfishing. In the absence of existing reference points from the RFMOs, the Council should propose reference points for relevant FMU species for consideration by the IATTC and the WCPFC. This will be useful to the Council as, at this time, outputs from these stock assessments generate the estimates of indicators used in the Council's overfishing control rule. Moreover, the United States, as a member of RFMOs, should establish and adhere to the general principles outlined above to guide the U.S. in developing and promoting conservation and management programs and associated monitoring and compliance.

Table 4–1. Demographic and productivity comparisons of highly migratory MUS and selected prohibited species.

Species (yrs)	Age at Maturity (yr^{-1})	Fecundity (yr^{-1})	M [1/] (yrs)	Max. Age (yr^{-1})	Productivity (*r*) at B_{MSY} [2/] (yr^{-1})	PGR_{MAX} [3/] yrs)	T_D [4/]
TUNAS							
Skipjack	1	Millions (eggs)	1.50	5	0.16-0.34	0.68	2.1
Yellowfin	2.5	"	0.90	8	0.11-0.18	0.34	3.4
Bigeye	3	"	0.40	10	0.10-0.16	0.30	3.7
Albacore	4.5	"	0.30	12	0.07-0.11	0.20	5.2
Bluefin	5	"	0.25	20	0.07-0.10	0.19	5.6
BILLFISHES							
Str. Marlin	4	"	0.47	9	0.08-0.13	0.23	4.6
Swordfish	5	"	0.21	20	0.07-0.10	0.18	5.8
SHARKS							
Com.Thresh.	5	4 (pups)	0.234	19	0.04-0.07	0.12	9.2
S.F. Mako	7	6	0.160	14	0.04-0.06	0.10	10.2
Blue	6	23	0.223	20	0.04-0.06	0.10	10.4
Pel.Thresh.	9	2	0.155	29	0.02-0.04	0.07	15.0
White	9	7	0.126	36	0.02-0.04	0.07	15.8
B.E.Thresh.	13	2	0.223	20	0.02-0.03	0.05	22.7
Basking	18	3	0.136	50	0.01-0.02	0.04	27.4
OTHER							
Dorado	0.6	240K+ (eggs)	1.060	4	>0.34	0.97	1.4

Footnotes:

1. M is instantaneous natural mortality. All life history parameters are from Smith et al. (1998), Smith et al. (*In press* 2003), Au et al. (*In press*).
2. Productivity *r* is the potential per-capita rate of population growth per year, here at B_{MSY}. Estimated *for Tunas and Billfishes* assuming that at B_{MSY}, F_{MSY} =1.0M and initial fecundity increases by factor 1.00-1.25 [after Au et al. (*In press*)]; *for Sharks* assuming that at B_{MSY}, F_{MSY} = 0.5M-1.0M with fecundity not increased [after Smith et al. (*In press*)]. All figures are rounded.
3. PGR is the fractional Population Growth Rate per year. PGR_{MAX} is the maximum rate calculated as (e^{2r} - 1). Exploitation of the population (fraction of total population caught) greater than PGR_{MAX} should bring population collapse, hence PGR_{MAX} estimates maximum sustainable exploitation. The logistic model is assumed. Based on range of *r*.
4. T_D is the doubling time for populations depleted to 50% of B_{MSY} (hence the recovery time), calculated as (ln 2)/1.5*r* (the *r* is assumed to have increased linearly with the depletion, as per the logistic model). Based on range of *r*.

Table 4–2. Summary of population status of management unit species at the time of FMP adoption (see text under species descriptions for details).

Species (Stock)	F/F_{MSY}	Over-fishing? (>1.0?)	B_{MSST}/B_{MSY} (1-M)	B/B_{MSY}	Over-fished? (<1-M?)	MinBiomass Flag Ratio ($1.25(B_{MSST}/B_{MSY})$)	NeedAction? (B/B_{MSY}<FlagRatio?)
TUNAS							
Albacore (NP)	0.50	N	0.70	1.10	N	0.88	N[1/]
Bluefin (NP)	Unkn	n	0.75	Unkn	n	0.94	n [2/]
Bigeye (EPO)	1.11	y	0.60	1.11	N	0.75	N[3/]
Skipjack (EPO)	Unkn	n	0.50	2.50[4/]	N	0.63	N
Yellowfin (EPO)	~1.30[5/]	Y	0.50	~0.86[5,6/]	N	0.63	N
BILLFISHES							
Str. Marlin (EPO)	0.70	N	0.50	1.07	N	0.63	N[7/]
Swordfish (EPO)	<1.00	N	0.70	>1.00	N	0.88	N8/
SHARKS							
C.Thresher(EPO)	<1.009/	N	0.77	~1.109/	N	0.96	N10/
P.Thresher(EPO)	Unkn	?	0.85	Unkn	?	1.05	?11/
BE Thresh.(EPO)	Unkn	?	0.78	Unkn	?	0.97	?12/
Mako (EPO)	<1.00	N	0.71	>1.00	N	0.88	N13/
Blue (EPO)	<0.50	N	0.78	>1.00	N	0.97	N14/
OTHER							
Dorado (EPO)	Unkn	Unlikely	0.50	Unkn	Unlikely	0.63	N15/

Note: Overfishing, Overfished, and Need Action columns ask if previous column value meets criterion; e.g., under Overfishing, is the previous fraction >1.0? Less certain Y/N is y/n.

Footnotes:

1. Note that stock is now in high productivity period (NPALW 2000).
2. No evidence of stock ill health, but abundance indexes are inconclusive (Bayliff 2001).
3. Assuming a stock-recruitment relationship (Maunder and Harley 2002). See text for caveats.
4. Boggs et al. 2000.
5. From production model (Tomlinson 2001, IATTC 2000).
6. Assuming a stock-recruitment relationship, B/B_{MSY} for 2001 could be 1.09 (Maunder 2002).
7. EPO stock has recovered (Hinton and Bayliff 2002a).
8. Per cpue patterns in EPO (Hinton and Bayliff 2002b).
9. Work in progress, D.W. Au and C. Show, SWFSC/NMFS, La Jolla, CA
10. Stock in recovery with positive population growth since 1992-94.
11. Status unknown, but catches incidental and on edge of species' broad range.
12. Status unknown, but catches incidental and possibly on edge of species' habitat.
13. Fishery takes mostly juveniles on edge of range; adults largely unavailable.
14. See text re Kleiber et al. stock assessment.
15. Highly productive and widely distributed throughout tropical/subtropical Pacific.

Table 4–3. Stockwide and regional (CA, OR, WA) catches in thousand (K) mt for management unit species at the time of FMP adoption, with respect to MSY, sustainability, and regional harvest guidelines.

Species (Stock)	MSY (or proxy)	OY (or proxy)	Catches (K mt round wgt, 1995-99 period)			Status		
				Regional		Regional Catch		
			Stock-wide	Comm'l	Rec'l	Fract'n	Sust'l?	Harvest Guideline
1. TUNAS								
Albacore (NP)	120[1/]	(120)	67-128[2/]	10-18	<0.05-1.31	0.16	Y	
Bluefin (NP)	(20)[3/]	(15)	13-24[4/]	<1-5	<0.05	0.10	Y	
Bigeye (EPO)	79[5/]	(79)	64-94[4/]	#0.1		<0.01	Y	
Yellowfin (EPO)	270[6/]	(270)	244-306[4/]	1-6	0.12-0.84	0.01	Y	
Skipjack (EPO)	(190)[3/]	(190)	137-295[4/]	4-7	<0.1	0.03	Y	
2. BILLFISHES								
Str. Marlin (EPO)	4.5[7/]	(3.4)	2-4[7/]	<0.02	0.03	0.01	Y	
Swordfish (EPO)	(12.5)[8/]	(12.5)	8-15[4/]	1-2	<0.01	0.12	Y	
3. SHARKS								
Cm Thresher(Reg'l)	(0.45)[9/]	(0.34)	Unkn	0.27-0.33	0.01-0.06	?	Y	0.34[10/]
Pl Thresher(Reg'l)	(0.020)[11/]	(0.015)	Unkn	0.004[12/]		?	y	
BE Thresher(Reg'l)	(0.04)[13/]	(0.03)	Unkn	0.01-0.03		?	y	
Mako/Bonito(Reg'l)	(0.20)[14/]	(0.15)	Unkn	0.06-0.13	0.01-0.08	?	Y	0.15[10/]
Blue (NP)	~120[15/]	(90)	>50[16/]	0.08-0.17[17/]	<0.03	<0.01	Y	
4. OTHER								
Dorado (EPO)	(0.45)[3/]	(0.45)	0.22-0.56[18/]	<0.01-0.04	<0.01-0.08	0.04	Y	

MSY: from catch-effort relationships, unless a proxy. **Proxy MSY:** average stock-wide catches over appropriate years or (minimal) local (West Coast) MSYs (LMSY) including local average levels of catch. **OY:** equal to MSY or to 0.75MSY (bluefin tuna, str. marlin, sharks). **Stock-wide Catch:** 1995-99 catches. **Regional Commercial Catches:** 1995-99 West Coast catches from PacFIN data base (Table 2-1); also drift gillnet catches (str. marlin, blue shark) extrapolated from SWFSC Observer Records, 1995-99. Except for albacore, these catches are mainly from within the EEZ. **Regional Recreational Catch:** CPFV (Table 2-57) and RECFIN (Table 2-58) data, and assuming 12.9kg/bluefin, 7.1kg/yellowfin, 2.4kg/skipjack, 7.3kg/albacore, 6.5kg/dorado,113kg/swordfish, 16.7kg/mako, and 28.1kg/thresher; also, assuming 59kg/str. marlin, 300 sport-caught fish/yr. **Status:** Less certain Y/N is y/n re sustainability. **Harvest Guideline:** for shark species of regional/local concern; equal to the OY proxy.

Footnotes

1. Average MSY over low and high productivity periods (Bartoo and Shiohama 1985, NPALW 2000). See text.
2. NPALW 2000
3. Mean of 1995-99 stock-wide catches.
4. IATTC 2001
5. MSY between 66 and 92 K mt from production models (IATTC 2000).
6. From production model (Tomlinson 2001, IATTC 2000).
7. MSY and catches from Hinton and Bayliff (2002a).
8. Average of 1995-99 catches; an analytically derived MSY is pending.
9. LMSY proxy by Population Growth Rate (PGR) method; is a minimal estimate of MSY (see text).
10. The OY proxy = 0.75MSY.
11. LMSY proxy as average catch during strong El Niño years (here 1983, 1984, and 1997) when species presence became significant.
12. Average catch 1995-99 excluding 1997 (strong El Niño year).
13. Average catch 1982-99.
14. LMSY proxy as average 1981-1999 regional catch; is a minimal estimate of MSY (see text).
15. After Kleiber et al. (see text).
16. Estimated N. Pacific catches after Nakano and Seki (MS) (see text).

17. Catches from SWFSC DGN observer data base, plus other fisheries landings (Tables 2-1,2-40, 2-42). No data on LL bycatches.
18. FAO Area 77 catches.

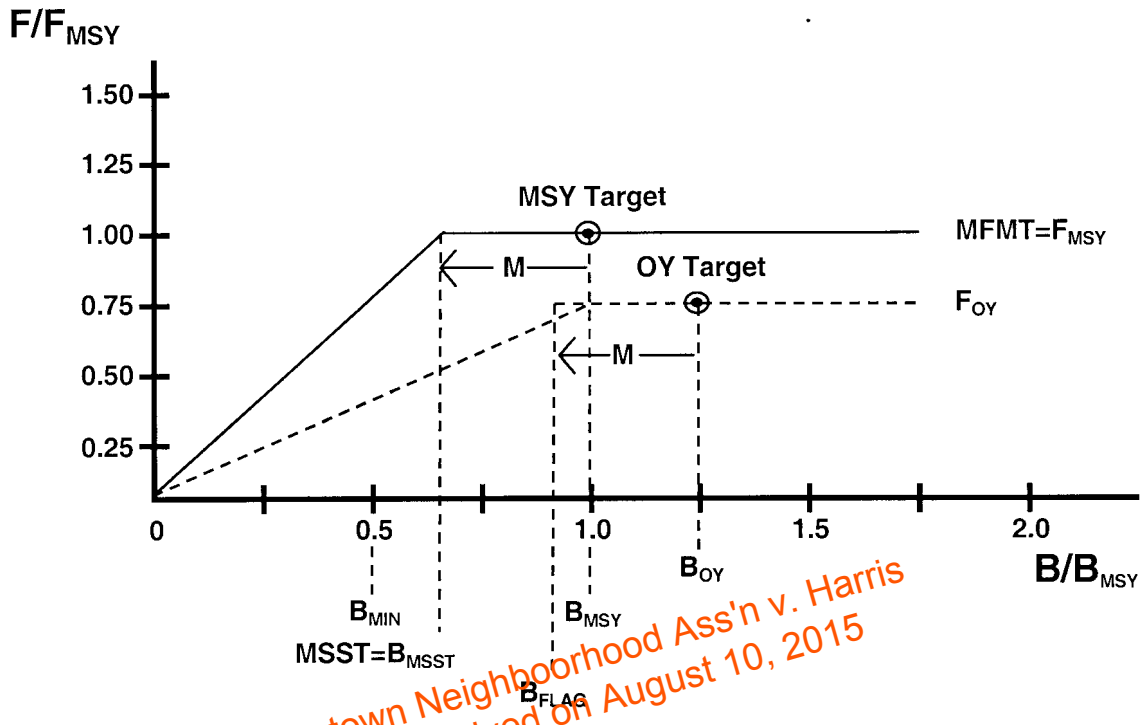


Figure 4–1. General model of maximum sustainable yield and optimum yield control rules, according to Restrepo et al. (1998).

5.0 BIENNIAL PROCESS FOR SPECIFYING MANAGEMENT REFERENCE POINTS AND MANAGEMENT MEASURES

5.1 Framework Procedures

Many fishery management plans under the Magnuson-Stevens Act use framework procedures by which flexible management, within the scope and criteria established by the FMP and implementing regulations, can be implemented without amending the FMP. Framework actions can usually be implemented more quickly than FMP amendments, allowing for more timely management response.

Such flexible management measures may be imposed, adjusted, or removed at any time during the year, or according to an established management cycle. Management measures may be imposed for resource conservation, or social or economic reasons consistent with FMP procedures, goals and objectives.

This process also may be used to identify, adopt, and review revised estimates of MSY, OY, and any related SDC based on the best scientific information. Table 4-3 shows estimates of MSY and OY at the time the FMP was originally approved. Any revised estimates, after NMFS review and approval, would be published in the next SAFE document and used for management, as appropriate.

Analyses of biological, ecological, social, and economic impacts will be considered when a particular change is proposed. As a result, the time required to take action will vary depending on the type of action, its impacts on the fisheries, resources, and environment, and the review of these impacts by interested parties. Satisfaction of legal requirements under other applicable laws (e.g., Administrative Procedure Act, National Environmental Policy Act, Regulatory Flexibility Act, Executive Order 12866, etc.) for actions taken underframework procedures generally requires analysis and public comment before the measures may be implemented by the Secretary of Commerce.

Types of Framework Actions

Under most framework procedures, management measures may be established, adjusted or removed using the following categories of actions:

- "Automatic" actions such as quota closures, which are nondiscretionary and must have already been analyzed in advance. Automatic actions may be made effective immediately in a single *Federal Register* notice, if there are adequate grounds for appropriate waivers of prior opportunity for public notice and comment, and the cooling-off period, as provided in the Administrative Procedure Act.
- "Notice" actions requiring at least one Council meeting and one *Federal Register* notice. These are management actions other than "automatic" actions that are either nondiscretionary or within the scope of a previous analysis. An example of a "notice" action might be a change in the incidental catch allowance per trip for non-HMS gears. Notice actions may be made effective immediately in a single *Federal Register* notice, if there are adequate grounds for appropriate waivers of prior opportunity for public notice and comment, and the cooling-off period, as provided in the Administrative Procedure Act.
- "Abbreviated Rulemaking" actions normally requiring at least two Council meetings and one *Federal Register* notice. Abbreviated rulemaking would be used only when time is insufficient to use the full rulemaking process. Abbreviated rulemaking actions may be made effective immediately in a single *Federal Register* notice, if there are adequate grounds for appropriate waivers of prior opportunity for public notice and comment, and the cooling-off period, as provided in the Administrative Procedure Act.

- "Full Rulemaking" (regulatory amendments or adjustments to change management rules) requiring at least two Council meetings and two *Federal Register* notices consisting of proposed and final rules. These include any proposed management measures not falling within the other categories, including measures that are highly controversial or that directly allocate a resource.

These procedures would not affect the authority of the Secretary of Commerce to take emergency regulatory action under Section 305(c) or (d) of the Magnuson-Stevens Act.

Framework Process for Rulemaking Actions

New measures or changes to measures may be implemented for one or more fisheries for HMS in the Pacific Council area through the framework procedures. The objective is efficiency in management.

Reasons for adopting these framework measures may include, but are not limited to, the following:

- to implement U.S. obligations under an international agreement;
- to achieve optimum yield and prevent overfishing;
- to respond to a determination that overfishing is occurring;
- to minimize adverse impacts of fishing on EFH;
- to minimize bycatch and bycatch mortality;
- to reduce adverse effects of fisheries on protected resources and promote the recovery of any species listed under ESA.
- to promote vessel safety;
- to reduce conflict and provide for orderly fisheries;
- to allocate among domestic HMS fisheries;
- to address social or economic issues;
- to facilitate management of the fisheries;
- to meet goals and objectives of the FMP;
- to respond to changes in management of HMS in other areas of the Pacific.

The following types of measures are authorized to be established, adjusted, or removed using this framework process, without amending the FMP:

- time/area restrictions;
- reporting requirements;
- permits or licenses (for commercial harvesters or vessels, for recreational harvesters or vessels, and for processors) and endorsements for individual fisheries;
- ABCs, ACLs, ACTs, quotas, or harvest guidelines;
- fish length limits;
- recreational daily catch (bag) limits;
- trip limits;
- gear restrictions;
- changes to definition of legal gear;
- allocations among U.S. West Coast fisheries;
- at-sea observers;

- vessel monitoring systems (VMS);
- adjustments to descriptions of EFH and designation of habitat areas of particular concern;
- measures to minimize bycatch or minimize mortality of bycatch;
- measures to minimize interactions with protected species, including, but not limited to, implementation of federal biological opinions and court rulings.

In addition, the Council may adopt changes to numerical estimates of reference points, including MSY, OY, and SDC including OFLs. Any adopted changes to estimates of MSY or OY will be forwarded to the Secretary as a recommendation, consistent with the appropriate framework action among those described above. If an organization, established pursuant to an international agreement to which the United States participates, identifies reference points for any stock managed under this FMP the Council would normally identify those reference points as appropriate for management. Any determination of the appropriateness of the use of such reference points for management would be based on the best scientific information available.

General Procedure. Following an established management cycle which includes production of an annual Stock Assessment and Fishery Evaluation (SAFE) report, the HMS Management Team, HMS Advisory Subpanel, or other Council advisory body, or a member of the public, may identify a problem and request regulatory action. If the Council agrees that regulations may be necessary, it will direct the HMS Management Team and/or staff to prepare a draft document which includes a description of the problem, proposed management actions and analysis. Any documentation must comply with the analytical requirements of NEPA, Executive Order 12866, the Regulatory Flexibility Act, the Magnuson-Stevens Act and other applicable law. Through internal scoping NMFS and the Council will determine the form and content of this analytical document.

Upon completion, the draft document will be made available to the interested public and will be addressed by the Council at a subsequent meeting. The issue will be placed on the subsequent meeting agenda, which will be distributed to the media and interested public and published in the *Federal Register*. The Council will seek to identify all interested persons and organizations and solicit their involvement in discussion and resolution of this problem through the Council process. If the action involves a fishery that extends beyond the EEZ, the Council shall invite comments from the Western Pacific and North Pacific Fishery Management Councils on the action that may affect those councils' fisheries. After receipt of comment from its advisory entities and the public, the Council will decide whether or not to adopt the draft document for public comment.

If the Council decides to proceed with the issue, it will revise the draft document as necessary and make it available for public comment. The issue will be placed on the agenda for a subsequent meeting, which will be distributed to the media and interested public and published in the *Federal Register*. At this meeting, after receipt of comment from its advisory entities and the public, the Council will adopt a measure or package of measures for submission to NMFS for approval. A final document including the Council action and rationale will be prepared and submitted to NMFS. The document will specifically indicate whether there will be any impacts on HMS fishery interests in areas of concern of other fishery management councils. If another council has commented on the proposed action, a copy of those comments will be included in the submission.

Point-of-Concern Framework Procedure. The point-of-concern procedure is an additional tool for the Council's use in exercising resource stewardship. The process is intended to foster continuous and vigilant review of Pacific HMS stocks and fisheries. Point-of-concern criteria are intended to assist the Council in determining when a focused review of a particular species is warranted and if management measures are required. The Council has the authority to act solely on a point-of-concern. The point-of-concern framework is intended to be complementary to the work by the HMS Management Team to

monitor the fisheries throughout the year. A point-of-concern must be raised to the Chair of the Council in writing, including rationale, background and supporting data.

A point-of-concern occurs when one or more of the following is found or expected:

- Catch has exceeded an ACL based on annual or muli-year average data;
- Catch is projected to exceed, within two years, the current harvest guidelines or quotas based on current exploitation rates;
- Developments in a foreign fishery or actions required under an international management framework affect the likelihood of overfishing HMS domestically;
- Estimated bycatch of a species or species group increases significantly above previous estimates, or there is information that abundance of a bycatch species has declined significantly;
- New information is discovered on the biological characteristics of one or more species, or on the characteristics of a stock, indicating that current management measures are inadequate;
- An error in data or stock assessment is detected that significantly changes the estimates of impacts of current management;
- MSY control rule parameters or approach require modification;
- Projected catches for a non-management unit HMS species increase substantially such that applying the default control rule to that species would show catches exceeding the Allowable Biological Catch. This could require moving a species into the management unit;
- Changes in ecological relationships, such as significant shifts in predator-prey interactions or declines in forage species, indicate that an HMS population may be in decline.

If a point-of-concern is raised to Chair of the Council, the Council shall decide if the HMS Management Team (HMSMT) should proceed to address the concern, and/or if any additional actions are warranted by the Council at that time. Notwithstanding, if an ACL is exceeded the Council must implement accountability measures as soon as possible to correct the operational issue that caused the ACL overage.

If so directed by the Council, the HMSMT will prepare a report including recommendations, rationale, and analysis for appropriate management measures to resolve the point-of-concern. After receiving the HMSMT report, the Council will hear public testimony and, if appropriate, recommend management measures to the NMFS Regional Administrator accompanied by supporting rationale and analysis of impacts. The Council analysis will include a description of (a) resource conservation or ecological issues consistent with FMP objectives; (b) likely impacts on other management measures, other fisheries, and bycatch; and c) socioeconomic impacts to commercial and recreational segments of the HMS fishery. The recommendation will also explain the urgency of the measure(s), if any.

The NMFS Regional Administrator will review the Council's recommendation and supporting information and will follow the appropriate implementation process. If the NMFS Regional Administrator does not concur with the Council's recommendation, the Council will be notified in writing of the reasons for the rejection.

The same framework procedures would be used during the management cycle for changing conservation and management measures, except there would be no point-of-concern criteria for raising conservation concerns to the Council.

5.2 Management Cycle

The management cycle is a pre-determined regular schedule for council management actions with respect

to HMS fisheries. Cycle differences affect the time available for fishery assessments, the timeliness of available data and of management response, and the degree to which fishers can participate in the management process.

Future developments in the fisheries do not ordinarily bring need for change in the management cycle schedule, and the management cycle is thus a fixed element of the FMP. However, should there be need to change the management schedule, e.g., because of marked changes in fishery practices, the Council can do so by vote and without a plan amendment, provided the Council gives six-month notice.

The FMP establishes a *biennial* management cycle with regulatory/statistical year *April 1 to March 31*. The schedule would be as follows:

Year 1

June	Provide update to the Council on status of the HMS fisheries and, as appropriate, proposed adjustments to the numerical estimates of MSY, OY, and SDC in a preliminary SAFE report. If necessary, Council directs HMSMT to prepare draft regulatory analysis to implement revised estimates of reference point values, ACLs or other harvest objectives and/or management measures.
September	Annual SAFE document presented to Council. If necessary, Council directs HMSMT to prepare a draft regulatory analysis to implement revised estimates of reference point values, ACLs or other harvest objectives, and/or management measures. Council adopts for public review proposed actions addressing concerns from current and previous SAFE reports.
November	Council adopts final action and submits to NMFS for approval.

Year 2

April	Measures become effective, and stay in effect for at least two years.

The SAFE document in Year 2, after NMFS review and approval, publishes any revised estimates of reference point values, including ACLs or other harvest objectives (e.g., a harvest guideline) previously adopted by the Council.

This schedule allows at least minimally sufficient time for data analysis, provides for timely response to fishery problems, and allows most fishers adequate access to the management process, as scheduled.

The cycle is repeated biennially, with new actions considered in September and becoming effective in April every other year. The Council would schedule HMS for the June, September, and November Council meetings.

Under this biennial cycle (or any cycle), the HMS management team would still conduct ongoing reviews of the fisheries and status of stocks and prepare an annual SAFE document for the Council. The Council would still have to prepare a stock rebuilding plan within two years of notification by the Secretary of Commerce that a stock not subject to management under an international agreement to which the United States is party has been declared overfished, as called for under the Magnuson-Stevens Act (Section 2.3).

5.3 Procedure for Making Recommendations to Regional Fishery Management Organizations

The Council may develop an Operating Procedure to facilitate effective coordination and communication of management advice, in concert with the WPFMC and through the appropriate U.S. delegation, between the Councils and RFMOs involved in HMS management in the Pacific Ocean. The Operating Procedure may include specific decision-making schedules and criteria in order to harmonize PFMC, WPFMC, and RFMO processes.

6.0 MANAGEMENT MEASURES

6.1 General Conservation and Management Measures

This section describes the general elements of the FMP that affect the fisheries directly. Many of these elements address fundamental requirements of the Magnuson-Stevens Act and other applicable law. They can be modified through framework procedures if the Council so chooses.

6.1.1 Legal Gear and Gear Restrictions

Background

Various state restrictions on gear exist in Washington, Oregon, and California. A listing of current state regulations in Washington, Oregon, and California at the time of plan adoption is in Appendix B to the HMS FMP FEIS (PFMC 2003).

For commercial fisheries, all three states allow the use of troll gear or hook-and-line gear.

In Washington, gillnet, harpoon, pelagic longline and purse seine gear are not listed as authorized gear. Sharks may be caught with otter trawl, beam trawl, set lines, bottomfish pots, commercial jig, and troll lines. (Note: sharks are classified by Washington as bottomfish and as such these are legal gears for sharks.) It is unlawful to use bottomfish trawl gear in state waters (0-3 miles).

In Oregon, most HMS are classified as ocean food fish. Legal gears for ocean food fish include handline, pole and line, longline, seines, spears, trawls, and pots. Drift gillnets may be used to harvest swordfish under a developmental fishery permit. It is unlawful to use gillnets to target thresher shark. Oregon has provisions for developmental longline fisheries for swordfish and blue shark outside 25 miles.

In California, legal gears are gillnets, drift gillnets, and trammel nets, purse seine and harpoon; set lines are legal in open ocean waters, but may not be used for shortfin mako, thresher, swordfish, or marlin. Pelagic longline gear is prohibited by California, but longliners may fish outside the EEZ and land in California.

HMS recreational gear is comparable coastwide, with troll and hook-and-line gears used in each state. “Mousetrap gear” is specifically prohibited in California. (Mousetrap gear means a free floating set of gear thrown from a vessel, composed of a length of line with a float on one end and one or more hooks or lures on the opposite end.)

The Federal List of Fisheries is a list of authorized fisheries under the authority of each regional fishery management council and all fishing gear used in each fishery in the EEZ. The following non-FMP fisheries (and gear) related to HMS are included in the List of Fisheries under the authority of the PFMC:

- Thresher shark and swordfish drift gillnet fishery (gillnet);
- Shark and Bonito longline and set line fishery (longline);
- Pacific albacore and other tuna hook-and-line fishery (hook and line);
- Pacific swordfish harpoon fishery (harpoon);
- Pacific yellowfin, skipjack tuna, purse seine fishery (purse seine);
- Recreational fishery (spear, trap, handline, pot, hook and line, rod and reel, hand harvest).
- Commercial fishery (trawl, gillnet, hook and line, longline, handline, rod and reel, bandit gear,

cast net, spear)

The List of Fisheries will need to be modified after implementation of this FMP to be consistent with the definition of legal HMS gear in the FMP.

This FMP authorizes commercial legal HMS gear as harpoon, surface hook and line, drift gillnet (14 inch stretched mesh or greater), purse seine, and pelagic longline. For recreational gear *the FMP* authorizes rod and reel, spear, and hook and line. The rationale for gear definitions is the FMP needs uniform definitions of gear so that management can be consistent and unambiguous, coast-wide.

Gear specifications are as follows:

Legal Gears and Definitions. The following gears would be authorized for the commercial and recreational harvest of HMS in the EEZ by all vessels, and beyond the EEZ by vessels landing in West Coast ports. Specific management measures regulating the use of legal gear types will be developed if necessary, using the framework procedures of this FMP. Gear that is not defined as legal gear is prohibited.

Commercial Gear

Harpoon: fishing gear consisting of a pointed dart or iron attached to the end of a line several hundred feet in length, the other end of which is attached to a flotation device. Harpoon gear is attached to a pole or stick that is propelled only by hand, and not by mechanical means.

Surface Hook and Line: one or more hooks attached to one or more lines (includes troll, rod and reel, handline, albacore jig, live bait, and bait boat; excludes pelagic longline and mousetrap gear [defined above]).

Drift Gillnet: a panel of netting, suspended vertically in the water by floats along the top and weights along the bottom, which is not stationary nor anchored to the bottom.

Drift gillnet mesh size: *This FMP* specifies that HMS drift gillnets must be *minimum stretched mesh size of 14 inches*. This definition minimizes potential problems from additional bycatch, protected species interactions, and competition with other fishery sectors by disallowing a relatively new fishery (small-mesh gillnet) that targets HMS; precautionary in limiting additional new fishing on HMS.

This *measure* is consistent with the historic use of drift gillnet used to target swordfish and sharks. It would mean that small mesh drift gillnet gear cannot be used to target HMS.

Purse Seine: a floated and weighted encircling net that is closed by means of a purse line threaded through rings attached to the bottom of the net (includes encircling net, purse seine, ring net, drum purse seine, lampera net).

Pelagic Longline: a main line that is suspended horizontally in the water column, which is not stationary nor anchored, and from which dropper lines with hooks (gangions) are attached.

Recreational Gear

Rod and Reel (pole and line): a hand-held (including rod holder) fishing rod with a manually or electrically operated reel attached.

Spear: a sharp, pointed, or barbed instrument on a shaft. Spears can be operated manually or shot from a

gun or sling.

Hook and Line: one or more hooks attached to one or more lines (excludes mousetrap gear).

Adjustments to Definition of Legal Gear and Gear Restrictions

The FMP authorizes the modification of the definition of legal fishing gear. New commercial or recreational gears may be authorized or existing legal gears may be prohibited using the framework adjustment procedures. Implementation or modification of commercial or recreational gear restrictions is authorized. Gear restrictions may specify the amount, dimensions, configuration or deployment of commercial and recreational fishing gear, for example minimum mesh size or the number of hooks. Any changes in gear regulations should be scheduled to minimize costs to the fisheries, insofar as this is consistent with achieving the goals of the change.

6.1.2 Incidental Catch Allowance

Incidental catch refers to harvest of HMS which are unavoidably caught while fishing for other species or fishing with gear that is not legal for the harvest of HMS. This FMP authorizes the harvest and landing of incidental catches by gears not listed as legal HMS gears in the FMP up to a maximum number or percentage of the total weight, per landing. The incidental limit may be adjusted, or separate limits may be established for different non-HMS fisheries, in accordance with framework procedures described in this chapter. The objectives of allowing incidental catches are to:

- Minimize discards in fisheries using gear that is not legal for harvesting HMS, while increasing fishing income by allowing retention and sale of limited amounts of HMS.
- Discourage targeting on HMS by non-HMS fisheries, also reduces any associated take of marine mammals, sea turtles, and seabirds.

This FMP allows incidental commercial landings of HMS, within limits, for non-HMS gear such as bottom longline, trawl, pot gear, small mesh drift gillnet, set/trammel gillnets, and others. Small mesh gillnetters and set net gillnetters would not be permitted to land swordfish (as currently required under California law), but would be permitted to land other HMS, with the restriction of 10 fish per landing of each non-swordfish highly migratory species. For the bottom longline (set line) fishery, landings would be restricted to 3 HMS sharks in total or 20% of total landings by weight of HMS sharks, whichever is greater by weight. For trawl, pot gear, and other non-HMS gear, a maximum of 1% of total weight per landing for all HMS shark species combined would be allowed (i.e., blue shark; shortfin mako shark; and bigeye, pelagic, and common thresher sharks) or two (2) HMS sharks, whichever is greater. This discourages targeting of HMS with non-HMS gears by limiting the allowed landings; reduces wastage of HMS by still allowing traditional levels of incidental catch by those gears.

These allowances are based on the frequency distribution of HMS in landings by non-HMS gears, and are intended to be practical with respect to the levels of HMS expected to be taken by non-HMS gears while not targeting HMS. A description of these rates in landings is given in the HMS FMP FEIS (PFMC 2006, section 9.2.4.2).

6.1.3 Bycatch (Including Catch-and-Release Programs)

The Magnuson-Stevens Act requires that bycatch in fisheries be assessed, and that the bycatch and bycatch mortality be reduced to the extent practicable. Specifically National Standard 9 states that an FMP shall establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority: 1) minimize bycatch; and 2) minimize the mortality of bycatch

which cannot be avoided.

Bycatch has been identified as a concern in HMS drift gillnet and longline fisheries and large-vessel purse seine fisheries (see Appendix C). Anecdotal accounts indicate bycatch in the small-vessel HMS purse seine and albacore troll fishery is relatively low, but these fisheries have not had formal observer programs. The harpoon fishery is thought to have little if any bycatch due to the selective nature of the gear.

6.1.3.1 Establishing a Standardized Bycatch Reporting Methodology

The Council examined existing bycatch reporting methodology, and found that current logbook requirements for the various fisheries (states, NMFS and IATTC), together with periodic recreational fishing surveys and port sampling, have provided an important source of information on catch and bycatch for all HMS fisheries (Appendix C, section 5). Nonetheless, certain additional measures were considered to provide improved standardization of logbook reporting and better ground-truthing of the logbook data through pilot observer programs for some of the presently unobserved fisheries. The FMP proposes to mandate observer programs initially for the longline, surface hook-and-line, small purse seine, and CPFV fisheries, with NMFS to develop and review the observer sampling plans. This action and related actions are discussed separately in Section 6.1.4, Fishery Observers. Also, in Reporting Requirements Section 6.2.6, the FMP proposes that all commercial and recreational party or charter/CPFV fishing vessels maintain and submit to NMFS logbook records of catch and effort statistics, including bycatch. These measures, together with existing reporting requirements, should provide for a comprehensive standardized bycatch reporting system.

6.1.3.2 Minimizing Bycatch and Bycatch Mortality

Additional actions that will have the effect of reducing bycatch and bycatch mortality are discussed in Appendix C and under the various fishery-specific actions in Sections 6.2.1 (drift gillnet fishery), and 6.2.2 (pelagic longline fishery).

The FMP provides for a fishery-by-fishery review of measures to reduce bycatch and bycatch mortality (see Appendix C); establishes a framework for implementing bycatch reduction; adopts measures to minimize bycatch in pelagic longline and drift gillnet fisheries (Section 6.2); and adopts a formal voluntary "catch-and-release" program for HMS recreational fisheries. This meets the goals of the Magnuson-Stevens Act and of this FMP and the requirements for estimating bycatch and for establishing measures to reduce bycatch and bycatch mortality in HMS fisheries.

The framework procedure is to allow efficient implementation of bycatch reporting and reduction measures as needed and as is practical. Potential measures/methods include but are not limited to:

- logbooks
- observers
- time/area closures
- gear restrictions or modifications, or use of alternative gear
- educational programs
- performance standards
- real-time data collection programs (e.g., VMS, electronic logbooks)

The voluntary "catch-and-release" program is to promote reduction of bycatch mortality and waste by encouraging the live release of unwanted fish. Its rationale and origination for recreational fisheries is

explained in Appendix C, section C.7. The establishment of the catch-and-release program removes live releases in the recreational fisheries from the "bycatch" category as defined in the Magnuson-Stevens Act at 16 U.S.C. 1802(2) and also promotes the handling and release of fish in a manner that minimizes the risk of incidental mortality, encourages the live release of small fish, and discourages waste.

6.1.4 Fishery Observer Authority

Observer programs are important for obtaining accurate information on total catch, catch disposition and protected species interactions, and also for detailed biological data and samples that managers cannot expect fishers to collect. Catch disposition information importantly includes data on bycatch, for which observers are indispensable in most cases (Section 6.1.3). Observers' observations can also be very useful to better understand how different gears are actually deployed and how practical and effective regulations actually are. Most FMPs provide observer placement authority for NMFS in the interest of obtaining more accurate and complete information about their fisheries. The Council and NMFS recognize, however, that observers may not be suitable for all vessels, that smaller vessels may not have accommodations for observers, and vessels that take extended trips are much more costly to observe. Therefore, it is incumbent on NMFS to develop an observer sampling plan that, in addition to the scientific objectives, also recognizes the different types of vessels and vessel capabilities in the various fisheries.

An observer program must include a sample design and cost analysis (including impacts on the vessels being sampled) for Council review and comment prior to implementing the program. The sampling design will include sampling rate, which is a function of the required sample size for determining take rates or amounts with a given precision. When a take amount is the result of infrequent events, as in certain protected species interactions, very large sampling of a fleet is needed for its precise estimation, and cost will be the determining factor for sample size.

The FMP authorizes NMFS to require that vessels carry observers when directed to do so by the NMFS Regional Administrator, and mandates observer programs initially for the longline, surface hook-and-line, small purse seine, and commercial passenger fishing vessel (CPFV) fisheries, with NMFS to complete initial observer sampling plans within six months of FMP implementation. NMFS is also to develop initial observer sampling programs for the private recreational fisheries at a later date. The FMP focuses initially on the fisheries inadequately or not monitored under federal authority (MMPA, ESA) in meeting the FMP goal of documenting and reviewing bycatch mortality and protected species interactions in the HMS fisheries.

The large- and small-mesh DGN fisheries already have MMPA-mandated observer programs, and the longline fishery has recently come under ESA mandate for observers. These programs will be reviewed by the HMS management team for adequacy in meeting the goals of this FMP (important if the sampling rates in the protected species programs are reduced).

6.1.5 Protected Species

Various federal laws provide protection for special resources, including those for protected species under ESA, MMPA, and MBTA. Interactions of HMS fishing gears with protected species are described in Appendix D. This FMP authorizes the adoption of measures to minimize interactions of HMS gears with protected species and to implement recommendations contained in Biological Opinions (ESA), Take Reduction Plans (MMPA), Seabird Management Plans, or other relevant documents pertaining to HMS fisheries. The FMP also authorizes programs to collect information on interactions in any or all HMS fisheries.

Fishery-specific measures affecting protected species are included in the initial management measures for drift gillnet and longline fisheries (Sections 6.2.1, 6.2.2). Protected species interactions with the other gear types are not major issues (Appendix D), and no alternatives were considered for those gears.

The FMP adopts a framework authorization for protected species conservation measures and implements initial conservation and management measures for drift gillnet and pelagic longline fisheries as described in section 6.2, Appendix D and the HMS FMP FEIS (PFMC 2006, sections 9.2.5.1-2). : The FMP requires general provision for its proposed protected species measures and also for future measures to reduce the takes of protected species and to minimize the risk of adverse impacts from those takes. The framework provisions of the FMP would be used to address new protected species concerns as they are identified.

Both through the SAFE Report and through special reports from interested parties (which could include the USFWS or environmental organizations), the Council will be advised of new protected species concerns; would direct the plan team or others to investigate and recommend action; will determine if action is needed and, if it is viewed as a matter of substantial concern, will direct the completion of necessary documents to analyze the issues and evaluate alternatives; and will submit recommendations for corrective action to NMFS for consideration. If such an action were recommended by the Council and approved by NMFS, the action will be implemented by NMFS.

In fisheries where protected species takes are already being addressed, as by the Pacific Offshore Cetacean Take Reduction Team (POCTRT) for the drift gillnet fishery, any recommendations and supporting analyses, as by POCTRT, will be provided by NMFS to the Council for consideration. The Council will make recommendations as it deems appropriate to NMFS, which will make final decisions on whether to proceed with rulemaking under the MMPA or Magnuson-Stevens Act, as appropriate.

6.1.6 Prohibited Species

As indicated in Section 3.4, certain species are proposed to be designated as "prohibited species" under the FMP, meaning that they cannot be retained, or can be retained only under specified conditions, by persons fishing for management unit species. Three species of shark, as well as Pacific halibut and Pacific salmon, are recommended for this designation. The designation of prohibited species could be changed using framework procedures.

This FMP prohibits retention of great white, basking and megamouth sharks (except for sale or donation of incidentally-caught specimens to recognized scientific and educational organizations). This FMP also prohibits retention of Pacific halibut and salmon (except when caught with authorized gears during authorized seasons) and adopts a framework authorization for changes in prohibited species designations. : Neither the populations of these rare or low productivity sharks nor the strict management of halibut and salmon should be compromised by HMS fisheries. The prohibited species status of halibut and salmon is also consistent with U.S. policy and other FMPs.

The great white shark's low productivity, its accessibility in certain localized areas, and its appeal to trophy hunters make it especially vulnerable to depletion. The species has been protected in the State of California since 1995; it may not be taken except for scientific and educational purposes under State permit. The sale (or donation) of incidentally-caught specimens, live or dead, to recognized scientific and educational organizations for research or display purposes would be allowed.

Megamouth sharks are extremely rare, though 4 have been taken in the drift gillnet fishery in recent years. Protection is recommended because of extreme rarity and uniqueness. Sale (donation) of incidentally caught specimens to recognized scientific and educational organizations for research or display purposes

would be allowed.

Basking sharks occur in greatest numbers in the eastern Pacific in autumn and winter months. The fins are valuable in east Asian markets. This species is recommended for protection because it is thought to be among the least productive of shark species and thus highly vulnerable to depletion. The north Pacific stock is listed as endangered by the World Conservation Union (IUCN Red List of Threatened Species). The sale (donation) of incidentally-caught specimens, live or dead, to recognized scientific and educational organizations for research or display purposes would be allowed.

Pacific halibut and Pacific salmon, while not HMS, are important as incidental catch in some HMS fisheries and so are recommended to be prohibited to ensure they are not targeted by HMS fishers, unless with authorized gear during authorized seasons. The fisheries that target halibut and salmon are already overcapitalized. Further, some runs of salmon are listed as threatened or endangered.

6.1.7 Quotas or Harvest Guidelines

Background

A *quota* is a specified numerical harvest objective for a stock, the attainment (or expected attainment) of which causes the complete closure of the fishery or fisheries for that species. A *harvest guideline* is a numerical harvest level that is a general objective and is not a quota. Attainment of a harvest guideline does not require a management response, but it does prompt review of the fishery. This will include a Management Team meeting to evaluate the status of the stock and to make recommendations.

Factors involved in choosing between a quota or harvest guideline include:

- the status of the stock and the need to prevent overfishing or rebuild overfished stocks;
- effects on bycatch;
- impacts on fisheries;
- achievement of the FMP goals and objectives
- ability to monitor catches during the season;
- U.S. obligations under an international agreement.

Harvest guidelines can help prevent overfishing or localized depletion of vulnerable species, or can be used in implementing management decisions by international HMS management bodies. Allocation of guideline amounts among fisheries may be necessary (see following section).

As explained in Chapter 4, the harvest guidelines for common thresher and shortfin mako sharks are based on a "local MSY" concept. The thresher shark harvest guideline is lower than the recommended harvest limit set in the tri-state fishery management plan for thresher shark. These two sharks are the only species with harvest guidelines thus far proposed.

This FMP establishes harvest guidelines for selected shark species and authorizes establishment or modification of quotas or harvest guidelines under the framework provisions. Initial harvest guidelines for common thresher and shortfin mako sharks, are set equal to an OY estimate specified as 0.75MSY. The MSY used is the local MSY (LMSY), as the stock-wide maximum sustainable harvests are not known.

The initial harvest guidelines are OY=0.75xLMSY, as follows:

common thresher	340 mt (round weight)
shortfin mako	150 mt (round weight).

The rationale for these harvest guidelines is that, as vulnerable species in this FMP and with total catches and extent of stocks poorly known, management of these sharks under precautionary harvest guidelines is appropriate.

These harvest guidelines pertain only to the portion of the stocks that are vulnerable to capture by West Coast vessels as they now fish. They are particularly conservative as LMSY necessarily underestimates stock-wide MSY. The guidelines are catch benchmarks that warn of possible approach to the local sustainable maximum.

The HMS Management Team, at its annual meeting in May or June, will review the catches from the previous statistical year (April 1-March 31) and compare those catches with the established harvest guidelines; evaluate the status of the stocks; and develop recommendations for management measures, as appropriate. These management measures will be presented to the Council as part of the SAFE document at its June and/or September meetings to be reviewed and approved for public review. Final action on management measures would be scheduled for the Council's November meeting.

6.1.8 Allocation

This FMP authorizes allocation of HMS quotas or harvest guidelines among U.S. West Coast-based HMS fisheries if necessary using the full rulemaking framework process. In addition to other requirements of the FMP, the Council will consider the following factors when adopting allocations of HMS among domestic fisheries:

- present participation in and dependence on the fishery, including alternative fisheries;
- historical fishing practices in, and historical dependence on, the fishery;
- economics of the fishery;
- agreements or negotiated settlements involving the affected participants;
- potential biological impacts on any species affected by the allocation;
- consistency with the Magnuson-Stevens Act National Standards;
- consistency with the goals and objectives of the FMP.

The FMP does not establish initial quota allocations to different fisheries or fishery sectors, with the exception of a ♣No Sale' of Striped Marlin Proposed Action described in section 6.2. This action allocates striped marlin for sport use only. Future allocations could be made using framework procedures. There is no pressing need to establish allocations since no quotas are presently proposed. No compelling argument was raised for repealing the long-standing (California; since 1937) no-sale status of striped marlin and for establishing it as a commercial species on the West Coast.

6.1.9 Treaty Indian Fishing

This FMP authorizes adoption of measures and procedures to accommodate treaty fishing rights in the initial implementing regulations for the FMP. Also authorize revisions to the initial regulations through regulatory amendments, without the need to amend the FMP. The initial implementing regulations would contain the measures and procedures specified below. This action is a practical procedure for accommodating treaty fishing rights, without need of plan amendments for revisions.

Initial Measures and Procedures

Under the FMP, the initial measures and procedures for accommodating treaty fishing rights are as follows:

(a) Pacific Coast treaty Indian tribes have treaty rights to harvest HMS in their usual and accustomed (u&a) fishing areas in U.S. waters.

(b) Pacific Coast treaty Indian tribes means the Hoh, Makah, and Quileute Indian Tribes and the Quinault Indian Nation.

(c) The NMFS recognizes the areas set forth below as marine u&a fishing grounds of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), affirmed 730 F.2d 1314 (9th Cir. 1984). The u&a grounds of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 64 Fed. Reg. 24087-24088 (May 5, 1999) (u&a grounds for groundfish); 50 C.F.R. 300.64(i) (u&a grounds for halibut). The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

(d) Procedures. The rights referred to in paragraph (a) will be implemented by the Secretary of Commerce, after consideration of the tribal request, the recommendation of the Council, and the comments of the public. The rights will be implemented either through an allocation of fish that will be managed by the tribes, or through regulations that will apply specifically to the tribal fisheries. An allocation or a regulation specific to the tribes shall be initiated by a written request from a Pacific Coast treaty Indian tribe to the NMFS Northwest Regional Administrator, at least 120 days prior to the time the allocation is desired to be effective, and will be subject to public review through the Council process. The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. Accordingly, the Secretary will develop tribal allocations and regulations in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

(e) Identification. A valid treaty Indian identification card issued pursuant to 25 CFR Part 249, Subpart A, is prima facie evidence that the holder is a member of the Pacific Coast treaty Indian tribe named on the card.

(f) Fishing (on a tribal allocation or under a federal regulation applicable to tribal fisheries) by a member of a Pacific Coast treaty Indian tribe within that tribe's usual and accustomed fishing area is not subject to provisions of the HMS regulations applicable to non-treaty fisheries.

(g) Any member of a Pacific Coast treaty Indian tribe must comply with any applicable federal and tribal laws and regulations, when participating in a tribal HMS fishery implemented under paragraph (d) above.

(h) Fishing by a member of a Pacific Coast treaty Indian tribe outside that tribe's usual and accustomed fishing area, or for a species of HMS not covered by a treaty allocation or applicable federal regulation, is subject to the HMS regulations applicable to non-treaty fisheries.

6.1.10 Procedures for Reviewing State Regulations

Any state may propose that the Council review a particular state regulation for the purpose of determining its consistency with the FMP and the need for complementary federal regulations. Although this procedure is directed at the review of new regulations, existing regulations affecting the harvest of highly migratory species managed by the FMP may also be reviewed under this process. The state making the proposal will include a summary of the regulation in question and concise arguments in support of consistency.

Upon receipt of a state's proposal, the Council may make an initial determination whether or not to

proceed with the review. If the Council determines that the proposal has insufficient merit or little likelihood of being found consistent, it may terminate the process immediately and inform the petitioning state in writing of the reasons for its rejection.

If the Council determines sufficient merit exists to proceed with a determination, it will review the state's documentation or prepare an analysis considering, if relevant, the following factors:

- How the proposal furthers, or is not otherwise consistent with, the objectives of the FMP, the Magnuson-Stevens Act, and other applicable law
- Likely effect on or interaction with any other regulations in force for the fisheries in the area concerned
- Expected impacts on the species or species group taken in the fishery sector being affected by the regulation
- Economic impacts of the regulation, including changes in catch, effort, revenue, fishing costs, participation, and income to different sectors being regulated as well as to sectors that might be indirectly affected.
- Any impacts in terms of achievement of harvest guidelines or harvest quotas, maintaining year-round fisheries, maintaining stability in fisheries, prices to consumers, improved product quality, discards, joint venture operations, gear conflicts, enforcement, data collection, or other factors.

The Council will inform the public of the proposal and supporting analysis and invite public comments before and at the next scheduled Council meeting. At its next scheduled meeting, the Council will consider public testimony, public comment, advisory reports, and any further state comments or reports, and determine whether or not the state regulation is consistent with the FMP and whether or not to recommend implementation of complementary federal regulations or to endorse state regulations as consistent with the FMP without additional federal regulations.

If the Council recommends the implementation of complementary federal regulations, it will forward its recommendation with the proposed rule and rationale to the NMFS Regional Administrator for review and approval. The NMFS Regional Administrator will publish the proposed regulation in the *Federal Register* for public comment, after which, if approved, he/she will publish final regulations as soon as practicable. If the Regional Administrator disapproves the proposed regulations, he/she will inform the Council in writing of the reasons for disapproval.

6.1.11 Exempted Fishing Permits

Background

Existing Federal Procedures. Exempted fishing is defined to be fishing practices that are new to a fishery and not otherwise allowed under an FMP. The NMFS Regional Administrator, using Federal EFP (Exempted Fishing Permit) procedures, may authorize the targeted or incidental harvest of HMS for experimental or exploratory fishing that would otherwise be prohibited. Applicants must submit their application package at least 60 days before the desired effective date of the EFP, provide a statement of purpose and goals of the EFP activity, the species (target and incidental) expected to be harvested, arrangements for disposition of all regulated species and any anticipated impacts on marine mammals or endangered species, and provide the times and places fishing will take place and the type, size and amount of gear to be used. There are no specific requirements. The Administrator may restrict the number of experimental permits by total catch, time, area, bycatch, incidental catch or protected species takes. The NMFS Regional Administrator may require any level of industry-funded observer coverage for these experimental permits.

Exempted fisheries are expected to be of limited size and duration and must be authorized by an EFP issued for the participating vessel in accordance with the criteria and procedures specified in 50 CFR 600.745. The duration of EFPs will ordinarily not exceed one year. Permits will not be renewed automatically. An application must be submitted to the Regional Administrator for each year. A fee sufficient to cover administrative expenses may be charged for EFPs. An applicant for an EFP need not be the owner or operator of the vessel(s) for which the EFP is requested as long as the proposed activity is compatible with limited entry and other management measures in the FMP.

The Regional Administrator or Director may attach terms and conditions to the EFP consistent with the purpose of the exempted fishing, including, but not limited to:

(a) The maximum amount of each regulated species that can be harvested and landed during the term of the EFP, including trip limitations, where appropriate.

(b) The number, size(s), name(s), and identification number(s) of the vessel(s) authorized to conduct fishing activities under the EFP.

(c) The time(s) and place(s) where exempted fishing may be conducted.

(d) The type, size, and amount of gear that may be used by each vessel operated under the EFP.

(e) The condition that observers, a vessel monitoring system, or other electronic equipment be carried on board vessels operated under an EFP, and any necessary conditions, such as pre-deployment notification requirements.

(f) Reasonable data reporting requirements.

(g) Other conditions as may be necessary to assure compliance with the purposes of the EFP, consistent with the objectives of the FMP and other applicable law.

(h) Provisions for public release of data obtained under the EFP that are consistent with NOAA confidentiality of statistics procedures at set out in subpart E. An applicant may be required to waive the right to confidentiality of information gathered while conducting exempted fishing as a condition of an EFP.

Additional FMP Requirements for an Exempted Fishing Permit. This FMP places additional requirements for authorizing an EFP for targeting HMS species. An EFP proposal will be required to follow a specific Council protocol and be reviewed by the Council prior to application to NMFS. The intent of the protocol is to ensure the Council has adequate information on all aspects of the proposed fishery and has adequate time to consider, review and formulate recommendations. This protocol will be available from the Council. It will require additional detailed information and analysis beyond those specifically required for an NMFS EFP. The protocol will specify timing for submissions and timing for Council review.

This FMP authorizes mandatory data reporting and mandatory on-board observers for vessels with exempted fishing permits (PFMC 2003, see section 9.2.4.6). Installation of vessel monitoring units (VMS) aboard vessels with exempted fishing permits may be also required.

The FMP requires that applicants submit for Council review and approval an initial EFP plan prior to formal application to NMFS, following a specific Council supplied EFP protocol, which is to be developed by the HMS Management Team. The specific protocol will be available from the Council as a Council Operating Procedure. The protocol will include, but not be limited to, the following elements:

- schedule and procedure for submitting EFP applications;

- format for applications;
- qualification criteria for applicants;
- Council internal review procedures;
- relevant laws and regulations that must be followed.

To serve its constituents, the Council needs a formal process through which it can review and make recommendations on the EFP applications to NMFS.

The Council will review, comment, and make recommendations on the plan and may require changes or request additional information. The final EFP plan and Council recommendations will then be provided by the applicant to NMFS for action. An example of a fishery-specific proposal is shown in the HMS FMP FEIS (PFMC 2003, section 9.2.5.2.1, Example of Exempted Longline Fishery Permit with Experimental Design). NMFS review and any subsequent issuance of an EFP will then proceed according to regulations specified in Code of Federal Regulations (50 CFR •600.745) pursuant to the procedures and criteria in that section.

6.1.12 Temporary Adjustments due to Weather

The Council will consider and may provide, after consultation with the U.S. Coast Guard and persons utilizing the fishery, temporary adjustments for access to the fishery by vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels, except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery. No adjustments due to weather are proposed at this time as the Council has no information from fishery participants or others to indicate that particular accommodations are needed to provide reasonable opportunity to harvest HMS. There are no quotas or allocations that could not be harvested due to poor weather.

6.1.13 Safety of Life at Sea

National Standard 10 (NS-10) requires that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. The substantive requirements of NS-10 are fulfilled by Council, NMFS, USCG, and fishing industry consultation on the nature and extent of any adverse effects that proposed management measures may have on safety of human life at sea. The purpose of consultation is to identify and mitigate, to the extent practicable, any adverse effects. 50 CFR 600.355, which implements NS-10, provides lists of safety considerations and mitigation measures that could be considered. To fulfill NS-10, the Council will utilize existing Council and Council subgroup meeting procedures, and the framework provisions of the FMP. Except for automatic actions such as quota closures, the framework provisions require public comment and Council action before management actions are implemented. Safety and weather issues can be considered during the Council process. The USCG has a Council representative who regularly comments on proposed management measures. In addition, the USCG participates on the Council's Enforcement Consultants Committee, which is another forum for considering safety and weather issues. The HMS Management Team and Advisory Subpanel also hold public meetings where safety and weather concerns can be raised and addressed. Mitigation measures may be incorporated into pre-season and in-season actions under the framework procedures.

A NMFS regulation at 50 CFR 600.745 applies to any fishing vessel required to carry an observer as part of a mandatory observer program or carrying an observer as part of a voluntary observer program under the Magnuson-Stevens Act, MMPA (16 U.S.C. 1361 et seq.), the South Pacific Tuna Act of 1988 (16 U.S.C. 973 et seq.), or any other U.S. law. Observers may not depart on a fishing trip aboard a vessel that does not comply with United States Coast Guard safety requirements or that does not display a current commercial fishing vessel safety examination decal. All vessels required to carry an observer must meet

Coast Guard safety requirements and display a current safety decal (issued within the previous two years). Vessels not meeting these requirements are deemed unsafe for purposes of carrying an observer and must correct deficiencies before departing port. The vessel owner or operator must also allow an observer to visually inspect any safety or accommodation requirement if requested. Observers are required to complete a pre-trip safety check of the emergency equipment and are encouraged to review emergency instructions with the operator before the vessel departs port.

6.2 Specific Conservation and Management Measures

This section describes the initial specific management measureswhen the plan was adopted. The adopted measures may be modified in the future, or new regulations may be implemented, using framework adjustment procedures in the FMP. These measures would stay in effect until revised or removed by specific action.

The proposed measures are described below specifically for the drift gillnet, longline, and purse seine fisheries only, because of the measures that would affect how those particular fisheries are conducted. On the other hand, the measures proposed for hook-and-line, harpoon, and recreational fisheries are largely administrative in nature, having to do with permits and logbooks that do not directly affect fishing operations. Management of recreational fishing, moreover, is essentially deferred to the states in this FMP, reflecting the mainly localized nature of sportfishing issues and values that are best addressed at that level. Although this FMP does have a proposed catch-and-release measure for the recreational fishery that could affect fishing practices, that program would be voluntary.

6.2.1 Drift Gillnet Fishery Management Measures

Background

The drift gillnet fishery for swordfish and shark (14" minimum mesh size) is managed under numerous complex and detailed federal and state regulations to protect the populations fished as well as the protected species incidentally taken. These regulations are described in Appendixes B and C to the original FMP FEIS (PFMC 2003), the latter being the California code for fishing swordfish and shark with minimum stretched mesh of 14 inches required. Briefly, the regulations (for ∃14" stretched mesh only) drift gillnets are as follows:

Federal Regulations

Take Reduction Team (POCTRT) measures to protect marine mammals:

- Acoustic deterrent devices (pingers) are required on drift gillnets to deter entanglement of marine mammals.
- All drift gillnets must be fished at minimum depth below the surface of 6 fm (10.9 m).
- Skipper workshops may be required.
- Vessels must provide accommodations for observers when assigned.
- Federal Turtle Conservation Closed Areas:
- Drift gillnet fishing may not be conducted:.
  - In the portion of the EEZ bounded by the coordinates 36° 18.5' N latitude (Point Sur), to 34°27' N latitude, 123° 35' W longitude (off CA); then to 129° W longitude; then north to 45° N latitude (off OR); then east to the point where 45° N latitude meets land (OR), through year 2003 from August 15 to November 15;

- In the portion of the EEZ south of Point Conception, California (34°27' N latitude) and west to 120° W longitude from August 15 to August 31 and again from January 1 through January 31 during a forecasted or occurring El Niño, as announced by NMFS[4].

State Restrictions (applicable to vessels operating from the state's ports)

Participation restrictions:

- The California and Oregon limited entry programs for the swordfish/shark drift gillnet fisheries.

Gear restrictions (California):

- The maximum cumulative length of a shark or swordfish gill net(s) on the net reel of a vessel, on the dock of the vessel, and/or in the water at any time shall not exceed 6,000 ft in float line length, except that up to 250 fm of spare net (in separate panels not to exceed 100 fm) may be on board the vessel stowed in lockers, wells, or other storage.
- The use of quick disconnect devices to attach net panels is prohibited.
- Drift gillnets must be at least 14 inch stretch mesh.
- The unattached portion of a net must be marked by a pole with a radar reflector.

Mainland area restrictions/closures:

- Drift gillnets cannot be used:

- In the EEZ off California from February 1 to April 30.

- In the portion of the EEZ off California within 75 nm of the coastline from May 1 to August 14.

- In the portion of the EEZ off California within 25 nm of the coastline from Dec. 15 through Jan. 31.

- In the portion of the EEZ bounded by a direct line connecting Dana Point; Church Rock on Catalina Island; and Point La Jolla, San Diego County; and the inner boundary of the EEZ from August 15 through September 30 each year.

- In the portion of the EEZ within 12 nm from the nearest point on the mainland shore north to the Oregon border from a line extending due west from Point Arguello.

- East of a line running from Point Reyes to Noonday Rock to the westernmost point of southeast Farallon Island to Pillar Point.

- In the portion of the EEZ within 75 nm of the Oregon shoreline from May 1 through August 14, and within 1000 fm the remainder of the year.

- Off Washington (Washington does not authorize this HMS gear).

Channel Islands (California) closures:

---

[4] A final rule was published December 16, 2003, at 68 FR 69967, changing 50 CFR § 223.206(d).to prohibit fishing during the months of June, July, and August, which NMFS has concluded offers more protection for loggerheads while having less impact on the fishery than a closure in January and August.

- Drift gillnets cannot be used:

- In the portion of the EEZ within six nm westerly, northerly, and easterly of the shoreline of San Miguel Island between a line extending six nm west magnetically from Point Bennett and a line extending six nm east magnetically from Cardwell Point and within six nm westerly, northerly, and easterly of the shoreline of Santa Rosa Island between a line extending six nm west magnetically from Sandy Point and a line extending six nm east magnetically from Skunk Point, from May 1 through July 31 each year.

- In the portion of the EEZ within 10 nm westerly, southerly, and easterly of the shoreline of San Miguel Island between a line extending 10 nm west magnetically from Point Bennett and a line extending 10 nm east magnetically from Cardwell Point and within 10 nm westerly, southerly, and easterly of the shoreline of Santa Rosa Island between a line extending 10 nm west magnetically from Sandy Point and a line extending 10 nm east magnetically from Skunk Point from May 1 through July 31 each year.

- In the portion of the EEZ within a radius of 10 nm of the west end of San Nicolas Island from May 1 through July 31 each year.

- In the portion of the EEZ within six of the coastline on the northerly and easterly side of San Clemente Island, lying between a line extending six nm west magnetically from the extreme northerly end of San Clemente Island to a line extending six nm east magnetically from Pyramid Head from August 15 through September 30 each year.

The federal Turtle Conservation Closed Areas are based on recommendation from the Pacific Offshore Cetacean Take Reduction Team (POCTRT or TRT), which was modified by NMFS after considering fishery observer data and recent satellite telemetry tracking data obtained from two leatherback sea turtles that were tagged in Monterey Bay in September 2000; and on existing state restrictions that regulate drift gillnet gear and regulate drift gillnet use in certain times or places. In an effort to minimize the economic impact of the time and area closures, the above "modified" TRT recommendation was developed to provide access to the productive fishing grounds north of Point Conception, which is consistent with the intent of the TRT proposal, while still providing at least an equal, if not greater, level of protection for leatherback and loggerhead sea turtles. In addition, the modified TRT recommendation does not include the lowering of the net to at least 60 feet as recommended by the TRT because observer data (1990-2000) do not suggest that the lengthening of extenders to 60 ft would result in a definite decrease in leatherback interactions. The original *trigger* language identified by the TRT to extend the area closure in a southerly direction to Point Conception if a leatherback was observed was also removed because NMFS did not consider this extra precaution to be necessary based on the distribution of the turtles. Although the TRT recommended 36°15' N latitude as the southern boundary of the closed area, Point Sur was set as the southern boundary because it is a more recognizable landmark and only three miles north of 36° 15' N latitude. The diagonal line from Point Sur to 34° 27' N latitude, 123° 35' W longitude was developed by plotting the satellite tracking data of two leatherback turtles, keeping the southernmost turtle trajectory north of the diagonal line. The reason for this precaution is to protect a potential migratory corridor of leatherbacks departing Monterey Bay for western Pacific nesting beaches. NMFS hopes to learn more about this migratory corridor through additional satellite tag attachments on turtles leaving Monterey Bay, in order to minimize the impact of commercial fisheries on leatherbacks.

This FMP endorses or adopts in the FMP all federal conservation and management measures in place under the MMPA and ESA; adopts all state regulations for swordfish/shark drift gillnet fishing under Magnuson-Stevens authority except limited entry programs (which will remain under states' authority); modifies an OR closure inside 1000 fm (or way point equivalent) to be in effect year round; closes EEZ waters off WA to all drift gillnet fishers; and continues the current turtle protection closure north of Point Sur, CA to 45° N latitude (August 15 to November 15). During a forecasted or occurring El Niño event (August and January) a specified area south of Pt. Conception to 120° W longitude is closed during June,

July and August. The reason for this closure is existing federal and state regulations, including current states' drift gillnet time-area closures and gear restrictions (except for an Oregon spring-summer closure) were deemed appropriate for adopting intact. However, the Council concluded it was premature to federalize the states' limited entry programs, with its increase in federal costs and administrative burdens. Closures off Washington and Oregon are intended to protect the common thresher shark, sea turtles and marine mammals.

The FMP modifies the current state regulations to prohibit, year round, drift gillnet fishing for swordfish and sharks in EEZ waters off OR east of a line approximating the 1,000 fm curve (deleting the May-August prohibition within 75 nm) and prohibits HMS DGN fishing in all EEZ waters off WA. The state of Washington currently does not allow the use of drift gillnet gear and Oregon does not allow drift gillnets to target thresher shark, although DGN vessels have fished off both states and landed their catch in California.

6.2.2 Pelagic Longline Fishery Management Measures

The pelagic longline *measures* differ according to their application inside or outside the EEZ.

Inside the EEZ:

This FMP establishes a general prohibition on the use of pelagic longline gear in the EEZ (see also Legal Gear Restrictions Section 6.1.1 , with reference to prohibition of longline gear inside the EEZ). This avoids/prevents potential bycatch, protected species, and fishery competition problems by continuing the de facto longline prohibition throughout the EEZ.

Proposals for research or exempted fishing permit (EFP) use of longline gear under this prohibition will be evaluated when the proposals are submitted, the latter according to EFP guidelines developed by the HMS management team (see Section 6.1.11, Exempted Fishing).

Outside the EEZ:

N.B.: *The Council's preferred alternative (Alternative 2) for these measures was disapproved by NMFS. The following measures are pursuant to a December 2003 supplement to the August 2003 FMP FEIS.*

Measures proposed by the Council for longline fishing in waters west of 150° W longitude are supplemented by NMFS rules under the ESA to impose the same restrictions on longline vessels fishing outside the EEZ but *east* of 150° W longitude. (**N.B.**: *The text of the December 2003 supplement appears to be in error and is shown corrected*). This will result in implementation of all the elements listed below for all fishing on the high seas by West Coast longline fishing vessels.

Longline vessels operating on the high seas outside the EEZ would be subject to the same controls that applied to Hawaii-based longline fishing vessels holding longline permits in 2003. These are as follows:

1. Line clippers, dip nets, and bolt cutters meeting NMFS' specifications must be carried aboard each vessel for releasing turtles (specifications vary by vessel size);
2. A vessel may not use longline gear to fish for or target swordfish (*Xiphias gladius)* north of the equator (0° latitude); landing or possession of more than 10 swordfish per trip is prohibited.
3. The length of each float line possessed and used to suspend the main longline beneath a float must be longer than 20 m (65.6 ft or 10.9 fm).
4. From April 1 through May 31, a vessel may not use longline gear in waters bounded by 0° latitude and 15° N latitude, and 145° W longitude and 180° W longitude;

5. No light stick (any light emitting device for attaching underwater to the longline gear) may be possessed on board a vessel;
6. When a longline is deployed, no fewer than 15 branch lines may be set between any two floats (10 branch lines if using basket gear);
7. Longline gear must be deployed such that the deepest point of the main longline between any two floats, i.e., the deepest point in each sag of the main line, is at a depth greater than 100 m (328.1 ft or 54.6 fm) below the sea surface;
8. While fishing for management unit species north of 23° N latitude, a vessel must:
    - Maintain a minimum of two cans (each sold as 0.45 kg or 1 lb size) containing blue dye on board the vessel during a fishing trip;
    - Use completely thawed bait to fish for Pacific pelagic management unit species;
    - Use only bait that is dyed blue of an intensity level specified by a color quality control card issued by NMFS;
    - Retain sufficient quantities of offal for the purpose of discharging the offal strategically in an appropriate manner;
    - Remove all hooks from offal prior to discharging the offal;
    - Discharge fish, fish parts (i.e., offal), or spent bait while setting or hauling longline gear on the opposite side of the vessel from where the longline is being set or hauled;
    - Use a line-setting machine or line-shooter to set the main longline (unless using basket gear);
    - Attach a weight of at least 45 g to each branch line within 1 m of the hook; and
    - Remove the bill and liver of any swordfish that is incidentally caught, sever its head from the trunk and cut it in half vertically, and periodically discharge the butchered heads and livers overboard on the opposite side of the vessel from which the longline is being set or hauled.
9. Other measures[5] for the proper release and handling of turtles and seabirds, the requirement for vessel operators to attend a protected species workshop each year, and the requirement for Vessel Monitoring Systems (VMS). VMS is required because the proposed action involves area-specific regulations.

6.2.3 Purse Seine Fishery Management Measures

These measures pertain to the small purse seine vessels (< 364 mt carrying capacity) fishing HMS.

This FMP opens the entire EEZ to purse seine fishing. With few data to suggest any potential harmful bycatch or gear conflicts, this action provides additional opportunity for purse seiners to fish for bluefin tuna in those years when they travel in fishable schools off Oregon and Washington, and could raise a potential for purse seining for albacore in the northwest portion of the EEZ.

Purse seine fishers targeting HMS from any state can fish anywhere in the EEZ, although there has been little interest in such fishing off Oregon and Washington.

6.2.4 Prohibit Sale of Certain Species (No-sale Marlin Provision)

This FMP prohibits the sale of striped marlin by vessels under PFMC jurisdiction.

---

[5] Full description of all applicable measures are in 50 CFR Part 660, see 66 FR 63630 (turtles) and 67 FR 34408 (seabirds).

Rationale: Greater regional and national net benefits are obtained from continuing coast-wide under federal authority the long standing, traditional policy (California) of reserving this species for sport use only.

Striped marlin is considered to have far greater value as a recreational rather than commercial target species, and is only available seasonally. Prohibiting its sale removes the incentive for its taking by commercial fishers.

6.2.5 Permits

Permits are a standard tool used in virtually all fishery management plans to support management by:

- enhancing or facilitating collection of biological, economic or social data.
- facilitating enforcement of laws and regulations.
- identifying those who would be affected by actions to prevent or reduce excess capacity in the fishery.
- providing information to meet international obligations.

A special kind of permit is for limited entry into a fishery. However, no limited entry systems are proposed at this time. Implementation of a limited entry program would require a plan amendment. The Council adopted a control date of March 9, 2000 for commercial and charter fisheries for HMS, in anticipation that a limited access program may be needed in the future.

Commercial Permits

This FMP requires a federal permit for HMS vessels with a specific endorsement for each gear type (harpoon, drift gillnet, surface hook and line, purse seine, and pelagic longline). The permit is to be issued to a vessel owner for each specific fishing vessel used in commercial HMS fishing. This action is a practical procedure for tracking and controlling, by permits, commercial HMS fishing activities and the effects of regulations on those activities.

Regulations implementing the FMP establish the permitting system and set the terms and conditions for issuing a permit. Initially, there will be no qualification criteria, such as minimum amount of landings, to obtain specific gear endorsements. Any commercial fisher may obtain the required gear endorsements. The permits and endorsements are subject to sanctions, including revocation, as provided by Section 308 (g) of the Magnuson-Stevens Act. Permit requirements could be changed in the future under the framework procedures (Section 5.1). This permit program would not eliminate existing state permit or licensing requirements, or federal permits under the High Seas Fishing Compliance Act.

Recreational Permits

This FMP requires a federal permit for all commercial passenger recreational fishing vessels (CPFV) that fish for HMS, but an existing state permit or license for recreational vessels could meet this requirement. The Council will , however, request states to incorporate in their existing CPFV permit systems an allowance for an HMS species endorsement on the permits so that statistics could be gathered on that segment of the HMS fishery. This action is a practical procedure for tracking and controlling, by permits, recreational HMS fishing activities and the effects of regulations on those activities.

6.2.6 Reporting Requirements

The Magnuson-Stevens Act requires that FMPs specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not

limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors (Sec. 303(a)(5)).

Catch, effort, and catch disposition data are critical for monitoring the fisheries, assessing the status of the stocks and fisheries, and evaluating the effectiveness of management. Data necessary for management of HMS have not been regularly or fully collected by state, federal and international agencies under existing provisions. HMS reporting requirements for basic catch-effort and bycatch are inconsistent among the states and the federal government and do not cover all HMS fisheries operations or do not collect all data needed for stock and fishery monitoring. The NMFS requires logbooks under the High Seas Fishing Compliance Act for all vessels fishing outside the U.S. EEZ (purse seine, surface hook-and-line, longline) and the formats of the logs are tailored to the fishery-specific needs. But the logbook requirements do not extend to fisheries in the EEZ. Logbooks are required for specific fisheries by non-federal authorities: the IATTC (purse seine, baitboat), California (drift gillnet, harpoon, charter/party), Oregon (developmental gillnet, developmental longline). No other HMS reporting requirements exist in Washington or Oregon (although voluntary logbooks for various HMS fisheries are accepted).

Current estimates indicate catch, effort and bycatch data are not captured for approximately 72% of the surface hook-and-line vessels fishing in the U.S. EEZ and an unknown percentage of the charter/party vessels operating from Oregon and Washington ports. In 2000, 28% of the estimated 710 surface hook-and-line vessels fishing in the EEZ submitted logbooks. Currently 77% of the charter/party vessels coast-wide submit logbooks. The remainder of the HMS fisheries report catch and effort and bycatch data in one format or another to some collecting authority with approximately 100% reporting rate. Not all currently collected data are available to PFMC on a timely basis or in a detailed format making contemporary monitoring of some HMS stocks and fisheries difficult or problematic. Bycatch/incidental catch reporting is not consistent among fisheries and will need revision upon adoption of this FMP. PacFIN does not capture catch and effort data (allowing CPUE to be estimated), which is fundamental for stock assessment and monitoring and needed for preparation of SAFE documents.

All three states have far offshore fishery regulations that require fishers to declare when they plan to fish on the high seas. These fishers are then allowed to fish outside the EEZ, but cannot fish inside the EEZ during the same trip. All three states have exceptions for albacore troll vessels. The FMP does not propose federal regulations addressing declarations, because the state requirements are adequate.

This FMP requires all commercial and recreational party or charter/CPFV fishing vessels to maintain and submit logbooks to NMFS. State or existing federal logbooks could meet this requirement as long as essential data elements are present, and data are available to NMFS subject to a data exchange agreement. Authorizes adjustment of reporting requirements under a framework process. This action is a practical procedure for obtaining commercial (including CPFV) catch and effort data for a standardized NMFS data base on West Coast fisheries.

The operator of any commercial fishing vessel and any charter vessel fishing for HMS is required to maintain on board an accurate and complete record of catch, effort and other data on logbook forms provided by NMFS or a state agency. The original logbook form for each day of the fishing trip must be submitted to either the Southwest Regional Administrator of NMFS or the appropriate state management agency. Existing state or federal logbook forms may be used. These include logbooks required by: 1) the Tuna Conventions Act, the FMP for Pelagic Fisheries of the Western Pacific Region, the High Seas Fishing Compliance Act, and any logbook required by California, Oregon or Washington. These logbook forms can be found in the HMS FMP FEIS (PFMC 2003), Appendix D. Information required to be

submitted on logbooks may be revised in the future. Existing state reporting requirements, including those for landing receipts, would remain in effect.

6.3 Domestic Annual Harvest (DAH), Total Allowable Level of Foreign Fishing (TALFF), and Domestic Annual Processing (DAP)

The Magnuson-Stevens Act at 16 U.S.C. §1853(a)(4) requires that each fishery management plan assess and specify 1) the capacity and extent to which U.S. fishing vessels, on an annual basis, will harvest the OY from the fishery (DAH); 2) the portion of the OY which, on an annual basis, will not be harvested by U.S. fishing vessels and can be made available for foreign fishing (TALFF); and 3) the capacity and extent to which U.S. fish processors, on an annual basis, will process that portion of the OY that will be harvested by U.S. fishing vessels (DAP). Regulations implementing the Magnuson-Stevens Act at 50 C.F.R. § 600.516 further define the total allowable level of foreign fishing, as—with respect to any fishery subject to exclusive U.S. fishery management authority (i.e., the portion of the fishery that occurs within the U.S. EEZ)—that portion of the OY of such fishery that will not be caught by U.S. vessels.

All species in the management unit of this FMP are highly migratory and range far beyond the EEZ. As presently defined, the OY for each species is based on MSY for the entire stock, both within and beyond the U.S. EEZ. However, the U.S. domestic fleet harvests only a small portion of the OY, and only a small portion of the U.S. harvest is taken in the EEZ. The rest of the U.S. harvest is taken beyond the EEZ.

Presently, no highly migratory species in excess of U.S. harvest capacity are available for foreign fishing (TALFF) in the EEZ. The DAH of HMS from 1995 through 1999 has averaged 24,349 mt (Chapter 2, Table 2-1). During this period, an average of 1,074 vessels landed HMS on the West Coast (Chapter 2, Table 2-64). The amount of fishing gear actually deployed on an annual basis to take management unit species depends on availability of the resource. In all instances, the harvesting capacity of the U.S. fleet along the West Coast exceeds the amount of the resource available in the EEZ.

Similarly, no HMS are available for foreign processing. In Appendix A, the FMP documents the characteristics of 20 HMS communities, including the number of processors/buyers in each area. U.S. processors process fish caught within and outside the EEZ by U.S. vessels, and import additional HMS to meet market demand. Therefore, the capacity and extent of domestic annual processing (DAP) exceeds the amount of HMS harvested by U.S. vessels in the EEZ.

A review of the capacity and extent of domestic annual harvest and processing will be included in the annual SAFE document.

7.0 ESSENTIAL FISH HABITAT (EFH)

7.1 Background

Section 303(a)(7) of the Magnuson-Stevens Act, 16 U.S.C. 1801 et seq., as amended by the Sustainable Fisheries Act in 1996, requires that fishery management plans (FMPs):

Describe and identify essential fish habitat, minimize to the extent practicable adverse effects on such habitat caused by fishing and identify other actions to encourage the conservation and enhancement of such habitat.

The Magnuson-Stevens Act provides the following definition:

The term 'essential fish habitat' means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. (16 U.S.C. 1802 (10)).

The essential fish habitat (EFH) regulations (at 50 C.F.R. 600 Subpart J) provide additional interpretation of the definition of essential fish habitat:

'Waters' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle.

The NMFS guidelines intended to assist councils in implementing the EFH provision of the Magnuson-Stevens Act set forth the following four broad tasks:

- Identify and describe EFH for all species managed under an FMP;
- Describe adverse impacts to EFH from fishing activities;
- Describe adverse impacts to EFH from non-fishing activities; and
- Recommend conservation and enhancement measures to minimize and mitigate the adverse impacts to EFH resulting from fishing and non-fishing related activities

The EFH regulations require that EFH be described and identified within the U.S. Exclusive Economic Zone (EEZ) for all life stages of each species in a fishery management unit if they occur within that zone. FMPs must describe EFH in text and/or tables and figures which provide information on the biological requirements for each life history stage of the species. According to the EFH regulations, an initial inventory of available environmental and fisheries data sources should be taken to compile information necessary to describe and identify EFH and to identify major species-specific habitat data gaps. The EFH regulations also suggest that where possible, FMPs should identify Habitat Areas of Particular Concern (HAPCs) within EFH for habitats which satisfy the criteria of being 1) sensitive or vulnerable to environmental stress, 2) are rare, or are 3) particularly important ecologically.

Conservation and enhancement measures may be recommended by the National Marine Fisheries Service (NMFS) during consultation with federal agencies, as required by section 305(b) of the Magnuson-Stevens Act, on projects which may potentially impact HMS EFH. Specific conservation measures, however, will be developed on a case-by-case basis. NMFS' authority includes the direct management of activities associated with fishing for marine, estuarine, and anadromous resources; NMFS' role in federal

interagency consultations with regard to non-fishing threats is, more often than not, advisory. This document does not assume any new authority or regulatory role for NMFS in the control of non-fishing activities beyond the statutory requirements to recommend measures to conserve living marine resources, including their habitats.

This chapter identifies and describes EFH for management unit species. Improved descriptions of EFH may be possible with more basic research on life history, habitat use, behavior and distribution of life stages. Research also is needed to identify Habitat Areas of Particular Concern (HAPC). This FMP authorizes changes to the identification and description of EFH, and of HAPCs, as new information is collected.

The FMP also authorizes the adoption of management measures to minimize adverse effects on EFH from fishing when there is evidence for such effects. Presently, however, there is no clear evidence of adverse impacts from any fisheries' practices or gear on HMS EFH. Management measures to prevent, mitigate, or minimize adverse effects from fishing activities include, but are not limited to:

Fishing gear restrictions: Seasonal and areal restrictions on the use of specified gear; gear modifications to allow escapement of particular species or particular life stages (e.g., juveniles); prohibitions on the use of explosives and chemicals; prohibitions on anchoring or setting gear in sensitive localities; and prohibitions on fishing activities that cause significant physical damage in EFH.

Time/area closures: Closing areas to all fishing or specific gear types during spawning, migration, foraging, and nursery activities; and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life history stages.

Harvest limits: Limits on the take of species that provide structural habitat for other species assemblages or communities, and limits on the take of prey species.

This FMP adopts species and stage-specific Essential Fish Habitat designations for individual Management Unit Species as described in Section 7.2 and Appendix F. Designating EFH according to the best understanding of species' requirements enables informed assessments of the impacts of habitat alterations or disturbances.

7.2 Description of Designated EFH by Species

In general, the management unit species are found in temperate waters within the Pacific Council's region. Variations in the distribution and abundance of the management unit species are affected by ever-changing oceanic environmental conditions including water temperature, current patterns and the availability of food. Sea surface temperatures and habitat boundaries vary seasonally and from year to year, with some HMS much more abundant from northern California to Washington waters during the summer and warm waters years than during winter and cold water years, due to increased habitat availability within the EEZ. There are large gaps in the scientific knowledge about basic life histories and habitat requirements of a few management unit species. The migration patterns of the stocks in the Pacific Ocean are poorly understood and difficult to categorize despite extensive tagging studies for many species. Little is known about the distribution and habitat requirements of the juvenile life stages of tuna and billfish after they leave the plankton until they recruit to fisheries. Very little is known about the habitat of different life stages of most highly migratory species which are not targeted by fisheries (e.g., certain species of sharks). For these reasons, the Council recommends a precautionary approach in designating EFH for the management unit species

7.2.1 Common Thresher Shark

Based on California drift gill net logbook (1981-1991); drift net observer data (1990-1999); Oregon driftnet logbook data 1991-2001. Food habit information from Stick and Hreha (1989), Bedford (Bedford and Haugen 1992) /d) Preti et al. (2001).

- Neonate/early juveniles (< 102 cm FL): Epipelagic, neritic and oceanic waters off beaches, in shallow bays, in near surface waters from the U.S.-Mexico EEZ border north to off Santa Cruz (37° N latitude) over bottom depths of 6 to 400 fm, particularly in water less than 100 fm deep and to a lesser extent further offshore between 200-300 fm. Little known of the food of early juveniles; presumably feeds on small northern anchovy and other small, schooling fishes and invertebrates.
- Late juveniles/subadults (> 101 cm FL and < 167 cm FL): Epipelagic, neritic and oceanic waters off beaches and open coast bays and offshore, in near-surface waters from the U.S.-Mexico EEZ border north to off Pigeon Point, California (37° 10' N latitude) from the 6 fm to 1400 fm isobaths. Known to feed primarily on northern anchovy, Pacific hake, Pacific mackerel and sardine; secondarily on a variety of other fishes, squid and pelagic red crab (warm water years). Northern anchovy especially important for juvenile fish < 160 cm FL.
- Adults (> 166 cm FL): Epipelagic, neritic and oceanic waters off beaches and open coast bays, in near surface waters from the U.S.-Mexico EEZ border north seasonally to Cape Flattery, WA from the 40 fm isobath westward to about 127° 30' W longitude. north of the Mendocino Escarpment and from the 40 to 1900 fm isobath south of the Mendocino Escarpment. Known to feed primarily on northern anchovy, Pacific hake, Pacific mackerel and sardine; secondarily on a variety of other fishes, squid and pelagic red crab (warm water years).

7.2.2 Shortfin Mako Shark

Based on California drift gill net logbook (1981-1991); drift net observer data (1990-1999); Oregon driftnet logbook data 1991-2001; longline and gillnet catch data from Nakano (1994); California Department of Fish and Game tagging data; Holts and Bedford (1993); and Casey and Kohler (1992). Food habits information from Hanan et al. (1993); Eschmeyer et al. (1983); D. Holts (NMFS, SWFSC La Jolla, pers. comm. 10/16/2000).

- Neonate/early juveniles (< 101 cm FL): Oceanic and epipelagic waters of the U.S. West Coast from the 100 fm isobath out to the 2000 fm isobath (and possibly beyond) from the Mexico border to Point Pinos, CA, especially the Southern Calif. Bight, from the 1000 fm isobath out to 2000 fm isobath from Monterey Bay north to Cape Mendocino; and from the 1000 fm isobath out to the EEZ boundary north of Cape Mendocino to latitude 46° 30' N latitude. Occupies northerly habitat during warm water years. Nothing documented on food of neonates; presumably feeds on small pelagic fishes.
- Late juveniles/subadults (> 100 cm FL and < 180 cm FL males and < 249 cm FL females): Oceanic and epipelagic waters from the U.S.-Mexico EEZ border north to 46° 30' N latitude from the 100 fm isobath out to the EEZ boundary north to San Francisco (38° N latitude), and from 1000 fm out to the EEZ boundary north to San Francisco (38° N latitude) and from 1000 fm out to the EEZ boundary north of San Francisco. Shortfin mako off the West Coast reportedly feed on mackerel, sardine, bonito, anchovy, tuna, other sharks, swordfish and squid. Since the large majority of makos within the EEZ are juveniles, presumably this diet refers to primarily to juveniles and subadults.

Adults (> 179 cm FL males and > 248 cm FL females--Most adults within the U.S. West Coast EEZ are males.): Epipelagic oceanic waters from the U.S.-Mexico EEZ border north to 46° 30' N latitude

extending from the 400 fm isobath out to the EEZ boundary south of Point Conception, from 1000 fm isobath out to the EEZ boundary and beyond north of Point Conception, and from the 1000 fm isobath out to the EEZ boundary and beyond, North of Point Conception, CA. Little is known of diet of large adults. Two adult shortfin mako over 250 cm TL were found to contain remains of a harbor seal, common dolphin, small sharks, and marlin (D. Holts, NMFS, SWFSC La Jolla, pers. comm. 10/16/2000). As with juveniles, presumably mackerel, sardine, bonito, anchovy, tunas, squid and swordfish may also be taken by adults, but existing published information on diet in our region is not broken down by mako size.

7.2.3 Blue Shark

Based on California drift gill net logbook (1981-1991); drift net observer data (1990-1999); Nakano and Nagasawa (1996); and Nakano (1994). Diet information based on Tricas (1979); Harvey (1989); and Brodeur et al. (1987).

- Neonate/early juveniles (< 83 cm FL): Epipelagic, oceanic waters from the U.S.-Mexico border north to the U.S.-Canada border from the 1000 fm isobath seaward to the outer boundary of the EEZ and beyond; extending inshore to the 100 fm isobath south of 34° N latitude. Size-specific information on diet of neonates is not available for our region.
- Late juveniles/subadults (> 82 cm FL and < 167 cm FL males and < 153 cm FL females): Epipelagic, oceanic waters from the U.S.-Mexico border north to 37° N latitude (off Santa Cruz, CA) from the 100 fm isobath seaward to the outer boundary of the EEZ and beyond; and north to the U.S.-Canada border from the 1000 fm isobath seaward to the EEZ outer boundary. Within the U.S. West Coast EEZ known to feed on northern anchovy, Pacific hake, squid, spiny dogfish, Pacific herring, flatfishes, and opportunistically on surface-swarms of the euphausiid, *Thysanoessa spinifera*, and inshore spawning aggregations of market squid, *Loligo opalescens*.

Adults (> 166 cm FL males and > 152 cm FL females): Epipelagic, oceanic waters from the U.S.-Mexico border north to the U.S.-Canada border from the 1000 fm isobath seaward to the outer boundary of the EEZ and beyond; extending inshore to the 200 fm isobath south of 37° N latitude off Santa Cruz, CA. Although diet information is lacking for fish of this specific size group, blue sharks in coastal waters off the U.S. West Coast reportedly feed on northern anchovy, Pacific hake, squid, spiny dogfish, herring, flatfishes, and opportunistically on surface-swarms of the euphausiid, *Thysanoessa spinifera*, and inshore spawning aggregations of market squid, *Loligo opalescens.*

7.2.4 Albacore Tuna

Based on drift net observer data (1990-1999); California Commercial Passenger Fishing Vessel data; and Saito (1973); Laurs et al. (1974); Laurs and Lynn (1991); Bartoo and Forman (1994); and Hanan et al. (1993). Diet information from Iverson (1962) and Pinkas et al. (1971).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile < 85 cm FL. Oceanic, epipelagic waters generally beyond the 100 fm isobath from the U.S.-Mexico EEZ border north to U.S.-Canada border, and westward to the outer edge of the EEZ boundary. Habitat concentrations off southern and central California and the area of the Columbia River Plume area. Reported to feed opportunistically, predominantly on fishes (e.g., Pacific saury) and squids. Associated with SSTs between 10°C and 20°C in waters of the North Pacific Transition Zone in dissolved oxygen saturation levels greater than 60%. Smaller (younger) fish are known to have a higher proportion of squid in their diet. In our region, may aggregate in the vicinity of upwelling fronts to feed on small fishes (northern anchovy, saury, rockfish spp., Myctophids, barracudina), squids (e.g., *Loligo, Gonatus* and *Onychoteuthis* sp.) and crustaceans (Sergestid shrimp, pelagic red crab, *Phronima* amphipods, euphausiids).

Adult > 84 cm FL. Oceanic, epipelagic waters generally beyond the 100 fm isobath from the U.S.-Mexico EEZ border north to U.S.-Canada border, and westward to the outer edge of the EEZ boundary. Associated with SSTs between 14°C and 25°C in waters of the North Pacific Transition Zone in dissolved oxygen saturation levels greater than 60%. Reported to feed opportunistically, predominantly on fish (e.g., Pacific saury) and squid. Large fish tend to prey increasing more on fish and less on squid.

7.2.5 Bigeye Tuna

Based on California drift gill net observer data (1990-1999); California Commercial Passenger Fishing Vessel data; Kikawa (1961; 1957); and Alverson and Peterson (1963).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile - < 100 cm FL. Oceanic, epipelagic and mesopelagic waters beyond the 200 fm isobath out to the EEZ boundary from the U.S.-Mexico EEZ border north to Point Conception, CA, some years extending northward to Monterey Bay (37° N latitude). Associated with SSTs between 13°C and 29°C with optimum between 17°C and 22°C. Habitat concentrated in the Southern California Bight primarily south of 34° N latitude from the 100 fm isobath out to the 1000 fm isobath. Nothing is known of the diet of juvenile bigeye in the U.S. West Coast EEZ.

Adult - > 100 cm FL. Oceanic, epipelagic and mesopelagic waters beyond the 200 fm isobath out to the EEZ boundary from the U.S.-Mexico EEZ border north to Point Conception, CA, some years extending northward to Monterey Bay (37° N latitude). Associated with SSTs between 13°C and 29°C with optimum between 17°C and 22°C. Habitat concentrated in the Southern California Bight primarily south of 34° N latitude from the 100 fm isobath out to the 1000 fm isobath. Nothing is known of diet of adult bigeye in the U.S. West Coast EEZ.

7.2.6 Northern Bluefin Tuna

Based on California drift gill net observer data (1990-1999); Oregon driftnet logbook data, 1992-2001; Uosaki and Bayliff (1999); Bayliff (1994); Harada (1980). Food habits based on Pinkas et al. (1971) and Bayliff (1994).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile - < 150 cm FL and 60 kg, Bayliff (1994); Harada (1980). Oceanic, epipelagic waters beyond the 100 fm isobath from the U.S.-Mexico EEZ border north to U.S.-Canada border, and westward to the outer edge of the EEZ boundary. Associated with SST between 14°C and 23°C. Northerly migratory extension appears dependent on position of the North Pacific Subarctic Boundary. A major prey item of juvenile bluefin in our region is the northern anchovy; other food items reported from off southern California include saury, market squid, (up to 80% of stomach contents by volume), saury, squid, and hake. May feed on pelagic red crab when this species occurs in the EEZ, since it is a significant component of the diet off Mexico.

Adult - (∃ 150 cm FL and 60 kg, Bayliff (1994); Harada (1980). No regular habitat within the U.S. West Coast EEZ, although large fish are occasionally caught in the vicinity of the Channel Islands off Southern California and rarely off the central California coast. Adult prey items are squids and a variety of fishes including anchovies, herring, pompanos, mackerel, and other tunas.

7.2.7 Skipjack Tuna

Based on California drift gill drift net observer data (1990-1999); California Commercial Passenger Fishing Vessel data; Matsumoto et al. (1984) and IATTC (2001). Diet information based largely on Alverson (1963).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile - No habitat within the U.S. West Coast EEZ.

Adult - Oceanic, epipelagic waters beyond the 400 fm isobath out to the EEZ boundary from the U.S.-Mexico EEZ border northward to Point Conception, CA, and northward beyond the 1000 fm isobath north to about 40° N latitude. Associated with SSTs between 18°C and 20°C and dissolved oxygen level ∃ 3.5 ppm. Habitat concentrated, esp. in warm years, in the Southern California Bight primarily south of 33° N latitude. Off Baja California, Mexico and southern California, pelagic red crab and northern anchovy are important constituents of the diet. Euphausiids, Pacific saury and squid are also taken.

7.2.8 Yellowfin Tuna

Based on California Commercial Passenger Fishing Vessel data; drift gill net observer data (1990-1999); Uosaki and Bayliff (1999); Block et al. (1997); IATTC (1990; 2000); Schaefer (1998); N. Bartoo (SWFSC, NMFS, La Jolla, CA pers. comm.). Diet information based largely on Alverson (1963).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile - females: < 92 cm FL; males: < 69 cm FL. Oceanic, epipelagic waters from the U.S.-Mexico EEZ border north to Point Conception, CA, some years extending northward to Monterey Bay (37° N latitude). South of Pt Conception from the 100 fm isobath out to the EEZ boundary; north of Point Conception from 300 fm isobath out to the EEZ boundary. Associated with SSTs between 18° to 31°C. Pelagic red crab is an important constituent of the diet off the west coast of Baja California, Mexico, and southern California (warm water years), and, secondarily, northern anchovy. Cephalopods also occur in the diet less frequently.

Adult - females: ∃ 92cm FL; males: ∃ 69 cm FL. Adult yellowfin tuna do not regularly occupy habitat within the U.S. West Coast EEZ.

7.2.9 Striped Marlin

Based on Uosaki and Bayliff (1999); California drift net observer data (1990-1999 and angler tag-release data (D. Holts and D. Prescott, pers. comm. NMFS, SWFSC, La Jolla, CA), and diet information from Hubbs and Wisner (1953), Nakamura (1985), Ueyanagi and Wares (1975), and Holts (2001).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.
- Juvenile - No regular habitat within the U.S. West Coast EEZ.

Adult - > 150 cm EFL or 171 JFL. Oceanic, epipelagic waters of the Southern California Bight, above the thermocline, from the 200 fm isobath from the U.S.-Mexico EEZ border to about 34° 09' N latitude (Pt. Hueneme, CA), east of the Santa Rosa-Cortes Ridge (a line from South Point, Santa Rosa Island, southeast to the EEZ boundary at approx. 31° 36' N latitude and 118° 45' W longitude). Preferred water temperature bounded by 68° to 78°F (20-25°C). Food species off California include Pacific saury, northern anchovy, Pacific sardine, jack mackerel, squid and pelagic red crab.

7.2.10 Swordfish

Based on California drift gill net observer data (1990-1999); Oregon driftnet logbook data , 1991-2001; and DeMartini et al. (2000); diet information from Fitch and Lavenberg (Fitch and Lavenberg 1971) Mearns et al. (Mearns, *et al.* 1981) and Markaida and Sosa-Nishizaki (Markaida and Sosa-Nishizaki 1998).

- Eggs and Larvae - No habitat within the U.S. West Coast EEZ.

- Juvenile - (Males < 102 EFL or 118 cm JFL; females < 144 cm EFL or < 163 JFL). Oceanic, epipelagic and mesopelagic waters from the U.S.-Mexico EEZ border north to 41° N latitude. In the Southern California Bight primarily south of the Santa Barbara Channel Islands from the 400 fm isobath out to the EEZ boundary. North of Point Conception from the 1000 fathom isobath westward to the EEZ outer boundary and northward to 41° N latitude. Food species within the U.S. West Coast EEZ have not been documented for this size category. Diet is thought to be largely opportunistic on suitable-sized prey. Off southern California, swordfish of unspecified size are reported to feed on Pacific hake, northern anchovy, squid, Pacific hake, jack mackerel, and shortbelly rockfish; squids are also important prey off western Baja California, Mexico

(Males > 102 cm EFL or 117 JFL; females > 144 cm EFL or 162 JFL): Oceanic, epipelagic and mesopelagic waters out to the EEZ boundary inshore to the 400 fm isobath in southern and central California from the U.S.-Mexico EEZ border north to 37° N latitude; beyond the 1000 fm isobath northward to 46° 40' N latitude. Food species within the U.S. West Coast EEZ have not been documented for this size category. Off southern California, swordfish of unspecified size are reported to feed on Pacific hake, northern anchovy, squid, Pacific hake, jack mackerel, and shortbelly rockfish; squids are also important prey off western Baja California, Mexico. Large swordfish are capable of foraging in deep water and may also feed on mesopelagic fishes.

7.2.11 Dorado or Dolphinfish

Based on California Commercial Passenger Fishing Vessel catches; Norton (1999); and Ambrose (1996). Diet information based on Eschmeyer et al. (1983) and Palko at al. (1982).

- Spawning, eggs and larvae - (< 13.7 cm FL): Primarily outside of the U.S. West Coast EEZ. Spawning restricted to water ∃ 24°C; off southern Baja California, Mexico, with peak larval production in August and September (Ambrose 1996).
- Juveniles and subadults - (> 13.6 cm FL and < 35 cm FL): Epipelagic (# 30 m deep) and predominantly oceanic waters offshore the 6 fm isobath along coastal California from the U.S.-Mexico border generally as far north as Point Conception, CA (34° 34' N latitude) and within the U.S. West Coast EEZ primarily east of the Santa Rosa-Cortes Ridge. (Line extends from Point Conception south-southeast to a point on the EEZ boundary at 31° 36' N latitude and 118° 45' W longitude). Prefers sea surface temperatures 20°C and higher during warm water incursions. Nothing documented on the diet of juvenile dolphin within the EEZ; presumably feeds on other epipelagic fishes (e.g, small flying fish), crustaceans and squids.

Adults - (> 34 cm FL): Epipelagic (# 30 m deep) and predominantly oceanic waters offshore the 6 fm isobath along coastal California from the U.S.-Mexico border generally as far north as Point Conception, CA (34° 34' N latitude) and within the U.S. West Coast EEZ primarily east of the Santa Rosa-Cortes Ridge. (Line extends from Point Conception south-southeast to a point on the EEZ boundary at 31° 36' N latitude and 118° 45' W longitude). Prefers sea surface temperatures 20°C and higher during warm water incursions. Nothing is known of the diet of adult dolphin within the U.S. EEZ, but in the Pacific, adult common dolphin are reportedly mainly piscivorous, with flying fish being the most important in volume and occurrence.

7.3 Habitat Areas of Particular Concern (HAPCs)

There are no HAPCs designated at this time, but through this FMP, a framework is authorized to ensure review and updating of EFH based on new scientific evidence or other information as well as incorporation of new information on HMS HAPCs as it becomes available in the future.

Reviewing and identifying HAPCs would entail additional management costs and an increase in data

needs to survey and determine HAPC (such as shark pupping grounds), and for periodically reviewing and updating EFH designations. But incorporating a framework should save costs in the long run by avoiding the necessity of having to go through the amendment process every time new data necessitated revision. There may be some inconsistency with the Western Pacific FMP, which has a different type of framework relating to EFH, but the WPFMC management area also has regional differences in habitat utilization and a different plan development design and history.

Research is needed to identify HAPCs, such as shark pupping grounds, key migratory routes, feeding areas, and areas of concentration of large adult females. The Council recommends adoption of EFH designations as presented without identification of HAPCs at this time, because of lack of information on specific habitat dependencies for species that may occupy critical habitat in the EEZ, such as the more coastal-occupying sharks. Some of the more transitory MUS that invade the region only at the far fringes of their distributions (e.g., the tropical tunas and dorado), probably do not occupy habitat within the EEZ essential to the health and survival of their populations. If HAPCs of these species, and those of others that have more regional distributions, become identified in the future (such as pupping areas of thresher and mako sharks), it is recommended that the Council make every effort to protect them, especially if found to be concentrated in localized definable areas.

7.4 Effects of Fishing Activities on Fish Habitat

Section 600.815(a)(2) of the final rule lists the mandatory contents of FMPs regarding fishing activities that may adversely affect EFH. The adverse effects from fishing activities may include physical, chemical, or biological alterations of the substrate, and loss of, or injury to, benthic organisms, prey species and their habitat, and other components of the ecosystem. FMPs must include management measures which minimize adverse effects on EFH from fishing, to the extent practicable, and identify conservation and enhancement measures. FMPs must also contain an assessment of the potential adverse effects of all fishing activities in waters described as EFH. In completing this assessment, councils should use the best scientific information available, as well as other appropriate information sources, as available. This assessment should consider the relative impacts of all fishing gears and practices used in EFH on different types of habitat found within EFH. The assessment should also consider the establishment of research closure areas and other measures to evaluate the impact of any fishing activity that alters EFH.

Councils must act to minimize, prevent, or mitigate any adverse effects from fishing activities, to the extent practicable, if there is evidence that a fishing activity is having an identifiable adverse effect on EFH. In determining whether it is practicable to minimize an adverse effect from fishing, councils should consider whether, and to what extent, the fishing activity is adversely impacting EFH, including the fishery; the nature and extent of the adverse effect on EFH; and whether the management measures are practicable, taking into consideration the long- and short-term costs and benefits to the fishery and EFH, along with other appropriate factors, consistent with national standard 7 (conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication).

In general, fishing gear is not known to directly alter HMS water column habitat, but habitat can be affected by inadvertent loss of gear that is left to “ghost fish,” or to create marine debris that can cause harm to other species in the pelagic environment (e.g., light sticks from swordfish longlining are known to be mistaken for food by abatrosses). Also, fishing activities also affect the water column through discharge of offal from fish processed at sea. These discards may redistribute prey food or attract bycatch and protected species, which then become susceptible to capture or entanglement by the gear.

Fishing activity can also cause harm when it takes place in areas where HMS congregate and are thus highly susceptible to capture during a critical life history period, e.g., when they form spawning/pupping

aggregations, when adults are concentrated inshore during seasonal migration, or when young are concentrated in core nursery areas.

7.4.1 Physical Impacts of Fishing Gears on HMS EFH

HMS fisheries are associated with hydrographic structures of the water column (e.g., the marine pelagic and mesopelagic zone and convergence boundary areas between currents and major features such as the thermocline). Thus the approved gears that are used in the HMS fisheries do not contact the bottom substrate; therefore, the only opportunity for damage to benthos or EFH for any species in fishing for HMS is from lost gear. If gear is lost, diligent efforts should be made to recover the lost gear to avoid further disturbance of the underwater habitat through "ghost fishing." Under federal law, it is illegal for any vessel to discharge plastics or garbage containing plastics into any waters, but plastic buoys, light sticks, monofilament line and netting, and other plastic items have been known to enter the system from fishing operations, mostly as a result of damage to gear. The full extent of this problem in our HMS fisheries is not known, but is not thought to have a significant impact on HMS EFH because of the agility of these large pelagic species in avoiding debris in the open ocean, and the tendency of at least some of this material to sink to the bottom, and the relatively inert nature of plastic. These materials may have a far greater impact on benthic and intertidal environments, or on seabirds and turtles which may ingest floating plastics mistaking them for food. Intact sections of gillnets have the potential to continue fishing in the pelagic environment for some time. When high seas squid nets were operating in the Pacific, NMFS estimated in 1991 that 0.06% of driftnets were lost each time they were set (Davis 1991). It has been reported that lost and discarded sections of driftnet ball up fairly quickly and cease to ghostfish in a short period of time (Mio, *et al.* 1990), but these loose balls may trail streaming sections of net that may continue to fish for extended periods (Ignell, *et al.* 1986; Von Brandt 1984). It is most likely, however, that HMS, particularly tunas and billfish are less vulnerable to the ghost fishing effects of streaming sections of netting than are less mobile or scavenging species which may blunder into the net (e.g. *Mola mola*) or become entangled in attempts to feed on remains of the catch (e.g. seabirds and pinnipeds). Nonetheless, sharks may be more vulnerable, and blue shark and pelagic hammerhead shark have been reported as caught in four sections of derelict squid driftnet retrieved by U.S. observers in 1985 (Ignell, *et al.* 1986).

There are other fishery operations off the Pacific coast which may alter species complexity in the water column. There is a large mid-water trawl fishery for Pacific whiting, primarily occurring north of 39° N latitude. Discharge of offal and processing slurry may affect EFH for HMS. Prolonged offal discards from some large-scale fisheries have redistributed prey food away from mid-water and bottom-feeding organisms to surface-feeding organisms, such as tuna, usually resulting in scavenger and seabird population increases. Offal discards in low-current environments can collect and decompose on the ocean floor, creating anoxic bottom conditions which may affect HMS. Pacific coast marine habitat is generally characterized by strong current and tide conditions, but there may be either undersea canyons affected by at-sea discard, or bays and estuaries affected by discard from shoreside processing plants. As with bottom trawling off the Pacific coast, little is known about the environmental effects of mid-water trawling and processing discards on habitat conditions.

7.4.2 Mitigation Considerations for Fishing Effects

Fishery management options to prevent, mitigate, or minimize adverse effects from fishing activities may include, but are not limited to:

Fishing gear restrictions: Seasonal and areal restrictions on the use of specified gear; gear modifications to allow escapement of particular species or particular life stages (e.g., juveniles); prohibitions on the use of explosives and chemicals; prohibitions on anchoring or setting gear in sensitive areas; and prohibitions

on fishing activities that cause significant physical damage in EFH.

Time/area closures: Closing areas to all fishing or specific gear types during spawning, migration, foraging, and nursery activities; and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life history stages.

Harvest limits: Limits on the take of species that provide structural habitat for other species assemblages or communities, and limits on the take of prey species.

Compliance and Enforcement of Marine Pollution Laws: Fishers are required to save light sticks for disposal on land as required by the International Convention of the Prevention of Pollution from Ships, or MARPOL established in 1973. Annex V of the Protocol deals with plastics and garbage disposal from ships and prohibits dumping of all ship-generated plastics. The Coast Guard is in charge of enforcing MARPOL Annex V within the U.S. EEZ. All vessels, regardless of nationality, are bound by these MARPOL restrictions within the territorial waters of the treaty nations.

Compliance and Enforcement of Seabird Mitigation Measures Related to Strategic Offal Discards. This includes, but is not limited to, strategic release of offal from vessels to distract seabirds and other protected species away from longline hooks during setting and retrieval.

There is an increasing amount of research to measure the effects of fishing activities on marine habitat, and some general conclusions about the effects of some gear types on marine habitat may be drawn from this research. However, as noted above, there has been little research on Pacific coast fisheries EFH and into the fishing effects on such habitat, especially HMS EFH, which is generally less associated with the sea bottom topography and inshore waters, as the habitats of most other species managed by the Council. Implementing measures to mitigate gear impacts on habitat may require research that specifically describes the effects of the fishing gear used in Pacific coast fisheries on marine habitat utilized by HMS. The Council may weigh the magnitude of this potential impact and develop appropriate recommendations for addressing them.

In addition to suggesting measures to restrict fishing gears and/or methods, NMFS' regulatory guidance on EFH also suggests time/area closures as possible habitat protection measures. These measures might include, but would not be limited to: closing areas to all fishing or specific gear types during spawning, migration, foraging, and nursery activities; and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life history stages (e.g., to protect early life stages of sharks). Some of these closures may already exist, such as the exclusion of trawling within three miles of the California coastline and areas closed to commercial fishing (e.g., Santa Monica Bay). The Council may examine whether such opportunities exist for HMS and make appropriate recommendations for addressing them. The proposed action to require West Coast -based high seas longliners to abide by the same regulations restricting the targeting of swordfish north of the equator west of 150° W longitude will undoubtedly reduce significantly the number of lightsticks that may be inadvertently lost during fishing operations, since this gear is primarily used in swordfish longlining.

Beyond protecting natural reserves and areal closures for particular species, the Council may consider creating marine reserves closed to all fishing, should certain critical habitat areas be identified in the future, although it is recognized that most HMS move widely throughout and beyond the EEZ and reserves tend to be more practical for more sedentary species. Several no-fishing zones have been created in the North Pacific Fishery Management Council for the waters off Alaska, generally for the purposes of protecting either crab or marine mammal rookeries.

Additional research is recommended to identify adverse impacts and to quantify impacts currently occurring. Any inshore areas that are closed to fishing in order to conserve pupping and juvenile habitats would be ideal locations to study the effects of fishing gear impacts on EFH. Research in these areas is strongly advocated, and further evaluations of fishing impacts on HMS habitat will be undertaken as more research is conducted and information becomes available. Information will be reviewed annually to assess the state of knowledge in this field; the annual Stock Assessment and Fishery Evaluation (SAFE) report (see section 3.4) will include any new information on the impacts of fishing activities on HMS EFH.

7.4.3 Findings

As of this writing (January 16, 2003), there is no evidence that HMS fishing practices or gear are causing identifiable adverse impacts on HMS EFH, or that other FMP fishing practices are causing identifiable adverse effects on HMS EFH. Therefore, the West Coast HMS FMP meets the Magnuson-Stevens Act requirement to minimize to the extent practicable, the adverse effects of fishing on EFH, and no further action is recommended at this time.

7.5 Effects of Non-fishing Activities on Fish Habitat

Section 600.815(a)(4) of the EFH regulations pertains to identifying non-fishing related activities that may adversely affect EFH. The section states that FMPs must identify activities that have the potential to adversely affect, directly or cumulatively, EFH quantity or quality, or both. Broad categories of activities which can adversely affect EFH include, but are not limited to: dredging, filling, excavation, mining, impoundment, discharge, water diversions, thermal additions, actions that contribute to non-point source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of EFH. For example, Sheehan and Tasto (2001) provide a good summary of various sources of impairment of water quality and habitats in California waters. FMPs should describe known and potential adverse impacts to EFH. These descriptions should explain the mechanisms or processes that may cause adverse effects and how these may affect habitat function. A GIS or mapping system should be used to support analyses of data and to present these data in an FMP in order to geographically depict impacts identified in this paragraph.

The Magnuson-Stevens Act requires federal agencies undertaking, permitting, or funding activities that may adversely affect EFH to consult with NMFS. Under section 305(b)(4) of the Magnuson-Stevens Act, NMFS is required to provide EFH conservation and enhancement recommendations to federal and state agencies for actions that adversely affect EFH; however, state agencies and private parties are not required to consult with NMFS. EFH consultations will be combined with existing interagency consultations and environmental review procedures that may be required under other statutes, such as the Endangered Species Act, Clean Water Act, the National Environmental Policy Act, the Fish and Wildlife Coordination Act, the Federal Power Act, or the Rivers and Harbors Act.

EFH consultation may be at either a broad programmatic level or project-specific level. Programmatic is defined as “broad” in terms of process, geography, or policy (e.g., “national level” policy, a “batch” of similar activities at a “landscape level”, etc.). Where appropriate, NMFS will use a programmatic approach designed to reduce redundant paperwork and to focus on the appropriate level of analysis whenever possible. The approach would permit project activities to proceed at broad levels of resolution so long as they conform to the programmatic consultation. The wide variety of development activities over the extensive range of EFH, and the Magnuson-Stevens Act requirement for a cumulative effects analysis warrants this programmatic approach.

The following are general descriptions of non-fishing activities which may directly or cumulatively, temporarily or permanently, threaten the physical, chemical, and biological properties of the habitat utilized by HMS and/or their prey. The direct result of these threats is that EFH may be eliminated, diminished, or disrupted. The list includes common activities with known or potential impacts to EFH; it is not prioritized nor is it to be considered all-inclusive. The potential adverse effects described below, however, do not necessarily apply to the described activities in all cases, as the specific circumstances of the proposed activity or project must be carefully considered on a case-by-case basis. Furthermore, some of the activities described below may also have beneficial effects on habitat, which need to be considered in any analysis.

Non-fishing related effects on EFH for HMS may not be as adverse relative to other EFH types, because adults and juveniles are highly mobile, and all life stages are pelagic (in the water column near the surface and not associated with substrate) and dispersed in a wide band along the West Coast. Table 4-1 summarizes the potential adverse impacts of these non-fishing activities and conservation/enhancement measures to minimize those effects.

7.5.1 Description of Non-fishing Activities

Dredging

Dredging navigable waters has a periodic impact on benthic and adjacent habitats during construction and operation of marinas, harbors and ports. Periodic or constant dredging is required to maintain or create ship (e.g., ports) and boat (e.g., marinas) access to docking facilities. Dredging is also used to create navigable channels or to maintain existing channels which periodically fill with sediments from rivers, or transported by wind, wave, and tidal processes. In the process of dredging, large quantities of the seafloor are removed, disturbed, and resuspended and the biological characteristics of the seafloor are changed, and turbidity plumes may arise.

Dredging events using certain types of dredging equipment can result in increased levels of fine-grained mineral particles, usually smaller than silt, and organic particles in the water column habitat utilized by HMS. These turbidity plumes of suspended particles may reduce light penetration and decrease the rate of photosynthesis, and lower the primary productivity of an aquatic area if suspended for variable periods of time. HMS may suffer reduced feeding ability if suspended particles persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particles in the material may become biologically available to organisms either in the water column or through food chain processes.

Dredging, as well as the equipment used in the process (e.g., pipelines), may damage or destroy spawning, nursery habitat and other sensitive areas important to HMS, particularly sharks, or the habitat of coastal pelagic forage fish and invertebrates that are important prey of HMS. Within bays and harbors, dredging may also modify current patterns and water circulation of the habitat by changing the direction or velocity of water flow, or otherwise changing the dimensions of the water body potentially utilized by HMS.

Dredged Material Disposal/Fills

The disposal of dredged materials resulting from dredging operations or the use of fill material in the development of harbors results in sediments (e.g., dirt, sand, mud) covering or smothering existing substrates. Usually these covered sediments are of a soft-bottom nature as opposed to rock or hard-bottom substrates.

The disposal of dredged or fill material can result in varying degrees of change in the physical, chemical, and biological characteristics of the substrate. Subsequent erosion or lateral displacement of such deposits can also adversely affect the substrate outside the perimeter of the disposal site by changing or destroying benthic habitat. The amount and composition of the discharged material and the location, method, and timing of discharges may all influence the degree of impact on potential HMS EFH or that of HMS prey species. The discharged material can also alter the chemistry of the receiving water at the disposal site by introducing chemical constituents in suspended or dissolved form.

The discharge of dredged or fill material can result in greatly elevated levels of fine-grained mineral particles, usually smaller than silt, and organic particles in the water column thereby affecting HMS. These suspended particles may reduce light penetration and decrease the rate of photosynthesis and lower the primary productivity of an aquatic area if suspended for lengthy intervals. HMS or their prey may suffer reduced feeding ability leading to limited growth and reduced resistance to disease if high levels of suspended particles persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particles in the material may become biologically available to organisms either in the water column or through food chain processes.

Fossil Fuel Production and Exploration

Oil exploration/production occurs at a wide range of water depths and usually over soft-bottom substrates, although hard-bottom habitats may also be present in the general area. Oil exploration/production areas are vulnerable to an assortment of physical, chemical, and biological disturbances as oil and gas deposits are located using high energy seismic surveys. EFH may be disrupted by the use and/or installation of anchors,

chains, drilling templates, dredging, pipes, and platform legs. During actual operations, chemical contaminants may also be released into the aquatic environment.

The impacts of oil exploration-related seismic energy release may interrupt and cause HMS to disperse which may disrupt feeding. Exploratory activities may also result in resuspension of fine-grained mineral particles, usually smaller than silt, in the water column. These suspended particles may reduce light penetration and decrease the rate of photosynthesis and lower the primary productivity of the aquatic area especially if suspended for lengthy intervals. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion.

The discharge of oil drilling muds can change the chemistry and physical characteristics of the receiving water at the disposal site by introducing toxic chemical constituents thereby potentially affecting HMS EFH. Changes in the clarity and the addition of contaminants can reduce or eliminate the suitability of water bodies for habituation by fish species and their prey.

Water Intake Structures

Withdrawing ocean water through the use of offshore water intake structures is a common occurrence coastwide. Water may be withdrawn to provide cooling water for coastal power generating stations or as a source of potential drinking water as in the case of desalinization plants. If not properly designed, these structures may create unnatural and vulnerable conditions to various fish life stages and their prey. Various life stages of HMS can be affected by water intake operations by entrapment through water withdrawal, impingement on intake screens, and entrainment through the heat-exchange systems or discharge plumes of both heated and cooled effluent.

Aquaculture

The culture of marine and freshwater species in coastal areas can reduce or degrade the habitats used by native stocks. The location and operation of these facilities will determine the level of impact on the marine environment.

A major concern of aquaculture operations is the discharge of organic waste from the farms. Wastes are composed primarily of feces and excess feed, and the buildup of waste products into the receiving waters depends on water depths and circulation patterns. The release of these waters may introduce nutrients or organic materials into the surrounding water body and lead to a high biochemical oxygen demand which may reduce dissolved oxygen, thereby potentially affecting the survival of many aquatic organisms in the area. Net effects to HMS may be either positive or negative.

Aquaculture operations also have the potential to release high levels of antibiotics and disease, as well as allowing cultured organisms to escape into the environment. These events have unknown but potential adverse impacts on fish habitat.

Wastewater Discharge

The discharge of point and non-point source wastewater from activities including municipal wastewater treatment plants, power generating stations, industrial plants (e.g., pulp mills, desalination plants) and storm drains into open ocean waters, bays or estuaries can introduce pollutants detrimental to estuarine and marine habitats. These pollutants include pathogens, nutrients, sediments, heavy metals, oxygen-demanding substances, hydrocarbons and other toxins. Historically, wastewater discharges have been one of the largest sources of contaminants into coastal waters. However, wastewater discharges have been regulated under increasingly more stringent requirements over the last 25 years, while non-point source/stormwater runoff has not, and continues to be a significant remaining source of pollution to the coastal areas and ocean. Outfall-related changes in community structure and function, health and abundance may result, many of these changes can be long-lasting.

Wastewater effluent and non-point source/stormwater discharges may affect the growth and condition of fish associated with wastewater outfalls when high contaminant levels (e.g., chlorinated hydrocarbons; pesticides; herbicides) are discharged. In addition, the high nutrient levels downcurrent of these outfalls may also be a concern. If contaminants are present, they may be absorbed across the gills or accumulate as a result of consuming contaminated prey. This is especially true for benthic-feeding fish frequenting wastewater discharge outfalls. Due to turbation, diffusion, and other upward transport mechanisms, buried contaminants may migrate to surface layers and become available.

Localized sources of pollution which may affect HMS in bays and harbors along the coast may not affect HMS stocks as a whole because HMS are distributed over large areas of the open coast and respond quickly to adverse changes in their environment by moving away.

The use of biocides (e.g., chlorine; heat treatments) or the discharge of brine as a byproduct of desalinization may reduce the suitability of water bodies for populations of fish species and their prey within the general vicinity of the discharge pipe. The impacts of chlorination and heat treatments, if any, are minimized as a result of their intermittent use and regulation pursuant to state and/or federal national pollutant discharge elimination system (NPDES) permit requirements. These compounds may change the chemistry and the physical characteristics of the receiving water at the disposal site by introducing chemical constituents in suspended or dissolved form. In addition to chemical and thermal effects, discharge sites may adversely impact sensitive areas such as emergent marshes, seagrasses, and kelp beds if located improperly.

High discharge velocities may cause scouring at the discharge point as well as entrainment of particles with resulting turbidity plumes. Turbidity plumes may reduce light penetration and decrease the rate of photosynthesis and lower the primary production in an area if suspension persists. Fish may suffer reduced feeding ability, especially if suspended particles persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion.

A significant portion of impacts to coastal waters may also be caused by non-point source pollution from agriculture and urban runoff. Other significant sources include faulty septic systems, forestry, marinas and recreational boating, physical changes to stream channels, and habitat degradation, especially the destruction of wetlands and vegetated areas near streams. Runoff can include heavy metals, pesticides, fertilizers, synthetic and petroleum hydrocarbons, and pet droppings. Unless proper management measures are incorporated, these contaminants can find their way into the food web through benthic infaunal communities and subsequently accumulate in numerous fish species.

Discharge of Oil or Release of Other Hazardous Substances

The discharge of oil or release of hazardous substances into estuarine and marine habitats, or exposure to a product of reactions resulting from such discharge can have both acute and chronic effects on fish resources and their prey.

Exposure to petroleum products and hazardous substances from spills or other unauthorized releases can also potentially reduce the marketability of target species. Direct contact with discharged oil or released hazardous substances (e.g., toxins; oil dispersants; mercury) or indirect exposure through from food chain processes can produce a number of biological responses in fish resources and their prey; these responses can occur in a variety of habitats including the water column, seafloor, bays, and estuaries. Chronic and large oil spills have a significant impact on fishery populations.

Mercury contamination of EFH is a potential concern because higher level predators such as HMS contaminated with this neurotoxin tend to accumulate mercury in their tissues either directly or through the food chain. Mercury is a natural occurring element, but an estimated two-thirds of environmental mercury is the result of human activities. It is a by-product of gold and zinc mining and the fossil fuel, solid waste management, and smelting industries. Other sources include cement plants and gasoline combustion. Primary sources of mercury in the U.S. are the combustion of fossil fuels (notably coal) and municipal waste incinerators. Like water, mercury can evaporate and become airborne, and because it is an element, does not break down into other substances. Once mercury escapes from the environment, it circulates in and out of the atmosphere into lakes and oceans. Harbor dredging can mix mercury contaminated sediments into the water column. Bacteria and chemical reactions in wetlands change mercury into a much more toxic form known as methylmercury. In this form it undergoes biomagnification toward the upper ends of the aquatic food chain, with HMS species such as swordfish and tunas at times known to exceed the 1 ppm action level of acceptability state and federal agencies now regulate industrial discharges of mercury, and mercury use in agriculture, to provide an increased margin of safety (R.J. Price. 1995. Mercury in Seafood. California Sea Grant College Program U.C.). Preventative measures include compliance with emission-related legislation to lower or eliminate incineration of mercury-bearing materials and industrial processes that promote removal of mercury from the waste stream. Little work has been done on the direct effect of mercury contamination on HMS except there is recent evidence that this toxin can effect the nervous system of fish by circumventing the blood-brain barrier that usually prevents toxins from entering the brain. Fish depend on their nervous systems to find food, communicate, migrate, orient themselves and to recognize predators. In addition to uptake through the food chain, dissolved mercury is taken in by fish through their gills and dispersed by blood as it circulates through the body. (Environmental News Service 9/8/99 citing C. Rouleau, Environment Canada).

Other related issues include efforts to cleanup spills or releases that in themselves can create serious harm to the habitat. For example, the use of potentially toxic dispersants to break up an oil spill may adversely affect various life stages of HMS.

Coastal Development Impacts

Coastal development involves changes in land use by the construction of urban, suburban, commercial, and industrial centers and the corresponding infrastructure. Vegetated and open forested areas are removed to enhance the development potential of the land. Portions of the natural landscape are converted to impervious surfaces resulting in increased runoff volumes. Runoff from these developments include heavy metals, sediments, nutrients and organics, including synthetic and petroleum hydrocarbons, yard trimmings, litter, debris, and pet droppings. As residential, commercial, and industrial growth continues, the demand for water escalates. As ground water resources become depleted or contaminated, greater demands are placed on surface water through dam and reservoir construction or other methods of freshwater diversion. The consumptive use of redistribution of significant volumes of surface freshwater causes reduced river flows that can affect salinity regimes as saline waters intrude further upstream.

Development activities within watersheds and in coastal marine areas may impact fish habitat on both long-term and short-term scales. Runoff of toxins reduces the quality and quantity of water column and benthic EFH for HMS by the introduction of pesticides, fertilizers, petrochemicals, and construction chemicals (e.g., concrete byproducts, seals, and paints).

7.5.2 Mitigation Considerations for Non-Fishing Effects

Section 600.815(a)(6) of the EFH regulations states that FMPs must describe options to avoid, minimize, or compensate for the adverse effects and promote the conservation and enhancement of EFH. Generally, non-water-dependent actions should not be located in EFH if such actions may have adverse impacts on EFH. Activities which may result in significant adverse effects on EFH should be avoided where less environmentally harmful alternatives are available. If there are no alternatives, the impacts of these actions should be minimized. Environmentally sound engineering and management practices should be employed for all actions which may adversely affect EFH. Disposal or spillage of any material (dredge material, sludge, industrial waste, or other potentially harmful materials) which may destroy or degrade EFH should be avoided. If avoidance or minimization is not possible, or will not adequately protect EFH, compensatory mitigation to conserve and enhance EFH should be recommended. FMPs may recommend proactive measures to conserve or enhance EFH. When developing proactive measures, the Council may develop a priority ranking of the recommendations to assist federal and state agencies undertaking such measures.

Established policies and procedures of the Council and NMFS provide the framework for conserving and enhancing essential fish habitat. This framework includes components to avoid and minimize adverse impacts; provide compensatory mitigation whenever the impact is significant and unavoidable; and incorporate enhancement. New and expanded responsibilities contained in the Magnuson-Stevens Act will be met through appropriate application of these policies and principles. In assessing the potential impacts of proposed projects, the Council and NMFS are guided by the following general considerations:

- The extent to which the activity would directly and indirectly affect the occurrence, abundance, health, and continued existence of fishery resources.
- The extent to which the potential for cumulative impacts exists.
- The extent to which adverse impacts can be avoided through project modification, alternative site selection or other safeguards.

- The extent to which the activity is water dependent if loss or degradation of EFH is involved.

The extent to which mitigation may be used to offset unavoidable loss of habitat functions and values.

The following activities have been identified as potentially, directly or indirectly, affecting the habitat utilized by all or some HMS: dredging, fills/dredge material disposal, oil/gas exploration/production, water intake structures, aquaculture, wastewater discharge, discharge of oil or release of hazardous substances, and coastal development. While we recognize that HMS, because of their more pelagic, oceanic and migratory habits, may be less vulnerable to coastal development and degradation than more coastal and benthic fishes, they are not immune. They may be indirectly affected by the disruption or tainting of key organisms within the food web upon which they depend; and being upper level predators, are also especially efficient at accumulating various toxins within their tissues. The following measures are suggested in an advisory, not mandatory, capacity as proactive conservation measures which would aid in minimization or avoidance of the adverse effects of these non-fishing activities on essential fish habitat.

Dredging

1. To the maximum extent practicable, new, as opposed to maintenance dredging, should be avoided. Activities which require dredging (such as placement of piers, docks, marinas, etc.) should be sited in deep water areas or designed in such a way as to alleviate the need for maintenance dredging. Projects should be permitted only for water dependent purposes, when no feasible alternatives are available. Open coast dredging and beach replenishment should be conducted in a manner that minimizes disruption of existing surf grass beds, which provide habitat for certain HMS prey species.

2. Where the dredge equipment employed could cause significant long-term impacts due to entrainment of prey species, dredging in estuarine waters shallower than 20 feet in depth should be performed during the time frame when prey species are least likely to be entrained.

3. All dredging permits should reference latitude-longitude coordinates of the site so information can be incorporated into GIS for tracking cumulative impacts. Inclusion of aerial photos may also be required to help geo-reference the site and evaluate impacts over time.

4. Sediments should be tested for contaminants as per the Environmental Protection Agency and U.S. Army Corps of Engineers requirements to determine proper removal and disposal procedures.

5. The cumulative impacts of past and current dredging operations on EFH should be considered and described by federal, state, and local resource management and permitting agencies and considered in the permitting process.

6. Where a dredging equipment type is used that is expected to create significant turbidity (e.g., clamshell), dredging should be conducted using adequate control measures to minimize turbidity.

Fills/Dredge Material Disposal

1. Upland dredge disposal sites should be considered as an alternative to offshore disposal sites. Fills should not be allowed in areas with subaquatic vegetation or other areas of high productivity. Surveys should be undertaken to identify least productive areas prior to disposal. Use of clean dredge material meeting Army Corps of Engineers and state water quality requirements for beach replenishment and other beneficial uses (e.g., creation of eelgrass beds/surf grass beds) is encouraged, but dredging itself must be carried out along the coast so as to have minimum impact on open coast surf grass beds, which provide habitat for certain prey species.

2. The cumulative impacts of past and current fill operations on EFH should be addressed by federal, state, and local resource management and permitting agencies and considered in the permitting process.

3. Any disposal of dredge material in EFH should meet applicable state and/or federal quality standards for such disposal.

4. When reviewing open water disposal permits for dredged material, state and federal agencies should identify the direct and indirect impacts such projects may have on EFH. Benthic productivity should be determined by sampling prior to any discharge of fill material. Sampling design should be developed with input from state and federal resource agencies.

5. The areal extent of the disposal site should be minimized. However, in some cases, thin layer disposal may be less deleterious. All non-avoidable, adverse impacts (other an insignificant impacts) should be fully mitigated.

6. All spoil disposal permits should reference latitude-longitude coordinates of the site so information can be incorporated into GIS systems. Inclusion of aerial photos may also be required to help geo-reference the site and evaluate impacts over time.

Oil/Gas Exploration/Production

1. Benthic productivity should be determined by sampling prior to any exploratory operations. Areas of high productivity should be avoided to the maximum extent possible. Sampling design should be developed with input from state and federal resource agencies.

2. Mitigation should be fully addressed for impacts.

3. Containment equipment and sufficient supplies to combat spills should be on site at all facilities that handle oil or hazardous substances.

4. Each facility should have a "Spill Contingency Plan" and all employees should be trained in how to respond to a spill.

5. To the maximum extent practicable, storage of oil and hazardous substances should be located in an area that would prevent spills from reaching the aquatic environment.

Water Intake Structures

1. New facilities which rely on surface waters for cooling should be located in areas of low productivity or areas not prone to congregating HMS and their prey. New discharge points should be located in areas which have low concentrations of living marine resources, or they should incorporate cooling towers that employ sufficient safeguards to ensure against release of blow-down pollutants into the aquatic environment in concentrations that exceed state and/or federal limits established pursuant to state and/or federal NPDES regulations.

2. All intake structures should be designed to minimize entrainment or impingement of prey species. Power plant intake structures should be designed to meet the "best technology available" requirements as developed pursuant to section 316b of the Clean Water Act.

3. Discharge temperatures (both heated and cooled effluent) should comply with applicable

temperature limits established pursuant to state and/or federal NPDES regulations.

Aquaculture Facilities

1. Facilities should be located in upland areas as often as possible. Tidally influenced wetlands should not be enclosed or impounded for mariculture purposes. This includes hatchery and grow-out operations. Siting of facilities should also take into account the size of the facility, the presence or absence or submerged aquatic vegetation, proximity of wild fish stocks, migratory patterns, and competing uses. Areas of high productivity should be avoided to the maximum extent possible.

2. Water intakes should be designed to avoid entrainment and impingement of fish species.

3. Water discharge should be treated to avoid contamination of the receiving water, and should be located only in areas having good mixing characteristics.

4. Where cage mariculture operations are undertaken, water depths and circulation patterns should be investigated and should be adequate to preclude the buildup of waste products, excess feed, and chemical agents.

5. Any net pen structure should have small enough webbing to prevent entanglement by prey species.

6. Measures should be taken to avoid escapement of farmed animals.

7. Mitigation should fully address all impacts.

Wastewater Discharge

1. New outfall structures should be placed offshore sufficiently far enough to prevent discharge water from impacting productive areas. Discharges should be managed to comply with applicable state and/or federal NPDES permit requirements, including compliance with applicable technology-based and water quality-based effluent limits.

2. The establishment of management programs to address non-point source/stormwater pollution water quality issues on a watershed basis is supported and encouraged.

Discharge of Oil or Release of Hazardous Substances

1. Containment equipment and sufficient supplies to combat spills should be on-site at all facilities that handle oil or hazardous substances.

2. Facilities should have a “Spill Contingency Plan” where required by applicable local, state, federal requirements, and employees identified in the plan as having responsibility for responding to a spill should receive appropriate training.

3. To the maximum extent practicable, storage of oil and hazardous substances should be located in an area which would prevent spills from reaching the aquatic environment.

Coastal Development Impacts

1. Prior to installation of any piers or docks, benthic productivity should be determined and areas with high productivity avoided. Sampling design should be developed with input from state and federal

resource agencies.

2. Fueling facilities should be equipped with all necessary safeguards to prevent spills. A spill response plan should be developed and gear necessary for combating spills should be located on site.

3. Filling of any aquatic areas should be curtailed as much as reasonably possible.

Table 7–1. Adverse non-fishing activities, impacts and conservation/enhancement measures for HMS EFH.

ACTIVITY	IMPACTS (Potential)	CONSERVATION MEASURES (Advisory)
1. Dredging	▪ Bottom-dwelling organisms ▪ Turbidity plumes ▪ Toxins becoming biologically available ▪ Damage to sensitive habitats	▪ Curtail/minimize new dredging activities as practicable ▪ Take actions to prevent impacts to flora/fauna ▪ Geo-reference all dredge sites ▪ Containment assays ▪ Address cumulative impacts ▪ Minimize turbidity
2. Dredge Material Disposal/Fills	▪ Bottom-dwelling organisms ▪ Turbidity plumes ▪ Toxins becoming biologically available ▪ Damage to sensitive habitats ▪ Loss of habitat function	▪ Place dredge spoils upland if possible; avoid fills in productive areas ▪ Address cumulative impacts ▪ Meet applicable quality requirements for disposal of dredge material in EFH ▪ Identify direct and indirect impacts on EFH ▪ Minimize areal extent of the disposal site ▪ Geo-reference the site
3. Oil/Gas Exploration Production	▪ Seismic energy release ▪ Discharge of exploratory drill muds and cuttings ▪ Resuspension of fine-grained mineral particles ▪ Composition of the substrate altered	▪ Avoid areas of high productivity ▪ Provide mitigation ▪ On-site containment equipment ▪ Maintain "spill contingency plan" ▪ Keep oil and hazardous substances from reaching the aquatic environment
4. Water Intake Structures	▪ Entrapment, impingement, and entrainment ▪ Loss of prey species	▪ Locate new facilities away from productive areas ▪ Minimize entrainment or impingement of prey species per CWA 316(b) ▪ Discharge temperature to meet applicable discharge limits
5. Aquaculture	▪ Discharge of pollutants from the facility ▪ Escapement	▪ Minimize water/habitat quality impacts ▪ Avoid entrainment and impingement losses ▪ Treat and mix water discharges ▪ Preclude waste product buildup ▪ Prevent entanglement of prey species ▪ Prevent escapement ▪ Mitigate impacts
6. Wastewater Discharge	▪ Wastewater effluent with high contaminant values ▪ High nutrient levels downcurrent of outfall ▪ Biocides to prevent biofouling ▪ Thermal effects ▪ Turbidity plumes ▪ Stormwater runoff	▪ Avoid areas of high productivity with new discharge points ▪ Watershed management programs

ACTIVITY	IMPACTS (Potential)	CONSERVATION MEASURES (Advisory)
7. Oil Discharge/ Hazardous Substances Release	▪ Direct physical contact ▪ Indirect exposure resulting ▪ Cleanup ▪ Mercury Contamination	▪ Maintain on-site containment equipment and supplies ▪ On-site "spill contingency plan" ▪ Prevent spills from reaching the aquatic environment ▪ Compliance with industrial mercury discharge standards
8. Coastal Development Impacts	▪ Contaminant runoff ▪ Sediment runoff ▪ Filling of aquatic areas	▪ Shoreline construction should avoid productive areas ▪ Prevent fuel spillage ▪ Curtail fills in estuaries, wetlands, and bays

7.5.3 Findings

Federal action agencies must consult with NOAA Fisheries regarding any of their actions authorized, funded or undertaken, or proposed to be authorized, funded or undertaken, that may adversely affect EFH. For actions that were completed prior to the approval of these EFH designations for HMS, consultation is not required.

7.6 Summary

- The proposed action is to adopt species- and stage-specific EFH designations for the thirteen individual management unit species as described in above and Appendix F. This FMP identifies and describes EFH for all MUS managed under this FMP based on available Level 1 and Level 2 data from the fisheries and from the literature on distribution and habitat preference. Some of these important habitat areas are already protected to some extent by regulatory season and area closures now in effect.
- No specific EFH problem areas were identified at this time that could be addressed by management actions to protect and enhance EFH. After conducting a review and analysis of new and existing data on MUS' habitat and possible sources of disturbance in these habitats, the Council found no clear evidence of significant adverse impacts on HMS EFH. Thus no new EFH management measures, and therefore no regulations, are proposed.
- At this time, there is no evidence that HMS fishing practices or non-fishing activities are causing adverse impacts on HMS EFH, although EFH Conservation Recommendations are included to mitigate the possible effects of these practices.
- Current management measures to protect fishery habitat appear to be adequate, but should future research demonstrate a need, the Council will act accordingly to protect habitat necessary to maintain a sustainable and productive fishery in the eastern Pacific region.
- No HAPCs have been designated at this time, but the FMP provides a framework which will ensure review and updating of EFH based on new scientific evidence or other information as well as incorporation of new information on HMS HAPCs as it becomes available in the future. The Council is authorized to proceed with establishing such a framework procedure for reviewing EFH and identifying HAPCs, particularly critical areas such as shark pupping and core nursery areas.

7.7 Recommendations for EFH Research

Very little specific information is known about the migratory corridors and habitat dependency of these large mobile fishes, how they are distributed by season and age throughout the Pacific and within the

West Coast EEZ, and how oceanographic changes in habitat affect production, recruitment and migration. More research is needed in these areas to better define EFH and HAPCs. Also, research is needed to identify specific shark habitat areas of particular concern, such as pupping grounds, key migratory routes, feeding areas, and areas of concentration of large adult female sharks. Pupping grounds and core nursery areas have not yet been identified and need further study. These areas may not only concentrate pups, but also the highly valuable pregnant females at certain times of the year. Reproductive female sharks, having run and survived the gauntlet of many years of natural and fishing mortality, are extremely valuable to the continued growth of their populations, and if concentrated in certain areas at pupping times, would be highly vulnerable to habitat perturbations. Of special relevance are thresher and mako shark pupping areas, the locations of which are currently unknown but must occur somewhere within the southern portion of the U.S. West Coast EEZ, judging from the presence of post-partum pups in the area (NMFS Driftnet Observer data;Bedford and Haugen 1992).

8.0 RESEARCH AND DATA NEEDED FOR MANAGEMENT

There is substantial uncertainty on the status of stocks and estimates of MSY for many HMS species. Basic biological and life history data are unknown for some species, and understanding of distribution, abundance, and reproductive behaviors of most is poor. There is insufficient understanding of stock structures relative to the extent of fisheries, on the interchange between stocks, and on survival and fecundity schedules for investigating exploitation effects and species' resiliency to exploitation. Total catch data may be inaccurate for some species, because of unreported catch by international fisheries, or unreported bycatch. There is lack of fishery independent indexes of abundance.

More complete catch information and data on interactions with protected and prohibited species are needed for most fisheries. Data collection and reporting requirements are inconsistent between state and federal regulations. There is inadequate understanding of the fisheries on some HMS stocks that are shared with Mexico (e.g., species composition of shark catches in Mexican fisheries), and inadequate data exchange with Mexico.

Little is known of the long-term survivorship of hooked fishes after release, to assess the effectiveness of recreational tag-and-release methods on big game fishes (pelagic sharks, tunas and billfishes) and of methods to reduce bycatch mortality in longline fishing. Controlled studies of the survivability of hooked and released pelagic sharks and billfishes are needed to determine the physiological responses to different fishing gears, and the effects of time on the line, handling, methods of release, and other factors. More work is also needed to investigate the hooking survivorship of protected species such as turtles and seabirds, that are caught incidentally in HMS fisheries.

There is very little specific information on the migratory corridors and habitat dependencies of these large mobile fishes, how they are distributed by season and age throughout the Pacific and within the West Coast EEZ, and how oceanographic changes in habitat affect production, recruitment and migration. Research is needed to better define EFHs and to identify specific habitat areas of particular concern (HAPC), such as pupping grounds, key migratory routes, feeding areas, and where adults aggregate for reproduction. A special need is to determine the pupping areas of thresher and mako sharks, which are presumed to be within the southern portion of the U.S. West Coast EEZ, judging from the occurrence of post-partum and young pups in the area (e.g., NMFS Driftnet Observer data).

For sharks, the size/age groups contributing most to population growth and maintenance need to be determined by demographic studies to better determine how best to apply management measures, such as season and area closures, and 'slot' size limits. Additionally, the U.S. Congress identified the following data needs for sharks in the Shark Finning Prohibition Act (PL 106-557) (see also the U.S. National Plan of Action for Sharks):

- The collection of data to support stock assessment of shark populations subject to incidental or directed harvesting by commercial vessels, giving priority to species according to vulnerability of the species to fishing gear and fishing mortality, and its population status.
- Research to identify fishing gear and practices that prevent or minimize incidental catch of sharks in commercial and recreational fishing.
- Research on fishing methods that will ensure maximum likelihood of survival of captured sharks after release.
- Research on methods for releasing sharks from fishing gear that minimize risk of injury to fishing vessel operators and crews.
- Research on methods to maximize the utilization of, and funding to develop the market for, sharks not taken in violation of a fishing management plan approved under the Magnuson-

Stevens Act.

- Research on the nature and extent of the harvest of sharks and shark fins by foreign fleets and the international trade in shark fins and other shark products.

8.1 Information Needs by Species

The following information needs have been identified. They are to obtain better fundamental information, like on reproductive and feeding habits, and distribution and abundance. There is a need to determine:

Albacore Tuna

- Whether there are multiple sub-stocks with differently-migrating juveniles or juveniles from different spawning localities with different migration routes and timetables.
- How deep-dwelling adults migrate and are distributed in the north Pacific by season and age, including in the West Coast EEZ.
- How ENSO and decadal oceanographic changes affect stock production and the east-west migrations of juveniles.
- Whether certain prey species are key for survival and reproductive success.

Bigeye Tuna

- How deep-dwelling adults migrate and are distributed by season and age in the Pacific.
- Significance of floating object and other-species associations in bigeye life history.
- How ENSO/decadal oceanographic changes affect stock production and recruitment success.
- Whether certain prey species are key for survival and reproductive success.

Skipjack Tuna

- The significance of floating object and other-species associations in skipjack life history.
- How ENSO/decadal oceanographic changes affect production and recruitment.
- How the very large skipjack catch in the western Pacific is affecting the pelagic community.
- Whether certain prey species are key for survival and reproductive success.

Bluefin Tuna

- How adult bluefin migrate and are distributed by season and age in the North Pacific, including in the West Coast EEZ.
- How stock abundance can most reliably be measured.
- How ENSO/decadal oceanographic changes affect production, recruitment, and east-west migrations.
- Whether certain prey species are key for survival and reproductive success.

Yellowfin Tuna

- How yellowfin migrate and are distributed by season and age in the Pacific.
- How ENSO/decadal oceanographic changes affect yellowfin production and recruitment.

- The significance of floating object and other-species associations in yellowfin life history.
- Whether certain prey species are key for survival and reproductive success.

Common Thresher Shark

- The stock structure and boundaries of this species; the relationship to populations to the south and west.
- The extent of pupping and nursery grounds off northern Mexico, and their relationship to those of southern California.
- The pattern of seasonal migrations for feeding and reproduction, and where and when life stages may be vulnerable.
- Aging and growth rate, including validation.

Shortfin Mako Shark

- Distribution, abundance, size, and catch distribution of shortfin mako to the south and west of the U.S. EEZ; relative importance of the nursery areas off southern California.
- Pupping areas off southern California and northern Mexico, and whether any are critical for stock health.
- Importance of the high-seas habitat and the dispersal and migratory patterns of adults.
- Age and growth of this species (current growth estimates differ widely).

Blue Shark

- Survival rate of discarded longline-caught blue sharks.
- Total regional catches by sex and size (unknown because of high discard rate).
- Movements of maturing fish from the EEZ to the high seas, comparing size composition of catches inside the EEZ and beyond.

Swordfish

- How swordfish can be caught with greatly reduced take of protected species.
- How swordfish are distributed by season and age in the outer EEZ and beyond, and whether there could be better fishing strategies.
- Age and growth of west-coast-caught swordfish.

Striped Marlin

- Nature and degree of exchange or isolation of the U.S./Mexico population with populations to the south and west (stock structure).
- How the seasonal migration into southern California waters differs by size, age, and sex (archival tagging).
- Age and growth of fish sampled from the eastern Pacific.

Dorado

- Stock structure of eastern Pacific population.

- The catches in the eastern Pacific, including from artisanal fisheries.
- The importance of floating objects to this species according to age, sex, and reproductive state, comparing associated and non-associated fish (archival tagging).

8.2 Information Needs by Fishery

There is a need to determine, in priority order of need (not of fisheries):

Drift Gillnet

- Size composition of bycatch species.
- Adequacy of catch sampling by observers—are enough samples being collected given variability?
- Dressed weights of individually landed fish (weight of entire catch is presently entered on fish tickets)

Surface Hook and Line (troll)

- Total catch information (including incidental and bycatch) by vessel.
- The extent of protected species interactions in this fishery (thought to be low).
- Mortality of fish released in this fishery.

Pelagic Longline

- The size and species composition of the primary catch.
- Extent and composition of bycatch and of protected species interactions and resulting impacts on populations; distribution, abundance, and movements of protected species.
- How protected species takes can be reduced and survivability increased with new techniques and gear modifications. Effectiveness of the conservation measures adopted from the Hawaii-based longline fishery in the area fished by the West Coast longline fleet.
- Economic factors (for RIR and RFA analysis).

Harpoon

- Accurate catch composition taken exclusively by harpoon (California landings data, drift gillnet catches, are sometimes mixed with the Harpoon/Spear category when fishers hold multiple gear permits).
- Length and weight data for individual swordfish (including estimates for fish struck but escaped).
- Economic factors (for RIR and RFA analysis).

Coastal Purse Seine

- Extent and composition of bycatch and protected species interactions, and the mortality rates.
- Size, sex, and maturity composition of bluefin in catch.
- Economic factors (for RIR and RFA analysis).

Recreational - Party/Charter Vessels

- Complete catch composition and logbook information on a coast-wide basis (CA/OR/WA).
- Protected species interactions, including depredation by sea lions and survival of hooked birds, and evaluation of the adequacy/accuracy of logbook entries.
- Bycatch on a coast-wide basis and evaluation of adequacy/accuracy of information from logbooks and the MRFSS.
- Economic factors (for RIR and RFA analysis).

Recreational - Shore and Private Vessels

- Ways to adequately sample private vessels utilizing marinas.
- Ways to determine the bycatch and protected species interactions by such private vessels.
- Ways to sample the recreational catch for length and weight of fish caught to be able to convert catches reported in numbers to catches by weight.
- Economic factors (for RIR and RFA analysis).

8.3 General Information Needs

EFH

- Very little is known about the habitat of different life stages of most highly migratory species that are not targeted.
- Little is known about the environmental effects of mid-water trawling and of the processing of discards.
- Need to identify pupping grounds of common thresher sharks and shortfin mako sharks. Areas where pregnant females congregate may be sensitive to perturbation, and the aggregated females and pups there may be vulnerable to fishing.

PacFIN Data Issues

There are significant errors in gear codes of existing PacFIN data, and there is a need for finer resolution of California, Oregon, and Washington gear codes associated with HMS landings. Specific recommendations are:

Problem: Landings reported under incorrect gear codes.

Solution: Minimize inaccurate reporting on HMS fish tickets by eliminating defunct gear codes and by discouraging the use of dealers' knowledge of vessels to designate gear type. These concerns should be addressed through the states' fish ticket systems, and may require newly designed, or redesigned, fish tickets that more precisely identify HMS gears. California tickets to which this might apply include: (1) northern, central and southern hook and line; (2) central and southern gillnet and harpoon; and, (3) pelagic species.

Problem: Drift gillnet landings reported under both specific and lumped gear categories.

Solution: Recommend CDFG provide "corrected" drift gillnet fishery landings (using a filtering process) to PacFIN that include drift gillnet catches previously lumped under the general "entangling net" (60) and "other gear" (0) categories. Currently, PacFIN data for the drift gillnet fishery reflect only those landings

that were assigned to gear code 65 (drift gillnet), and do not consider drift gillnet landings that were assigned to gear code 0 (unknown gear) or, more importantly, to gear code 60 (the general gillnet category, "entangling net").

Problem: Historical drift gillnet landings data contain errors stemming from inconsistent reporting of data processing practices.

Solution: To the extent possible, generate a "correct" record of historical drift gillnet landings.

Problem: Longline landings are lumped so impossible to separate out pelagic longline data.

Solution: Request that California delineate a drift/pelagic longline gear on HMS fish tickets, using a PacFIN gear code (GRID) created for drift/pelagic longline gear. Lately there has been increased interest in West Coast HMS species by pelagic longline vessels. A distinct pelagic longline gear code would accommodate landings by these vessels.

To the extent possible, generate a "correct" record of historical, pelagic longline landings.

Problem: Inability to differentiate CA coastal purse seine landings from distant water purse seine landings.

Solution: Request that the states and PacFIN distinguish between HMS purse seine landings by distant water tuna vessels (U.S. tropical tuna purse seine fleet) and HMS purse seine landings by California coastal vessels. The distinction is important for socioeconomic impact analyses, Regulatory Flexibility Analysis and potential quota allocations between fleets. To the extent possible, generate a "correct" record of historical purse seine landings of tropical tunas, bluefin and albacore, by purse seine gear type.

Problem: Inability to separate salmon from albacore effort/landings for OR and WA.

Solution: Develop distinct salmon and albacore troll gear codes for Oregon and Washington fish tickets.

To the extent possible, generate a "correct" record of historical albacore and salmon landings, by species troll type.

LITERATURE CITED

Alverson, F. G. 1963. The food of yellowfin and skipjack tunas in the eastern tropical Pacific Ocean. *Inter-Amer. Trop. Tuna Comm. Bull.* 7:293-396.

Alverson, F. G. and C. L. Peterson. 1963. Synopsis of the biological data on bigeye tuna Parathunnus sibi (Temminck and Schlegel) 1844. *FAO Fish. Rep.* 6(2):482-514.

Ambrose, D. A. Coryphaenidae: Dorados. 1996.

Bartoo, N. W. and T. J. Foreman. 1994. A review of the biology and fisheries for North Pacific albacore (*Thunnus alalunga*). *FAO Fish. Tech. Pap.* 336(2):179-187.

Bayliff, W. H. 1994. A review of the biology and fisheries for northern bluefin tuna (*Thunnus thynnus*) in the Pacific Ocean. *FAO Fish. Tech. Pap.* 336(2):244-295.

Bedford, D. and C. W. Haugen. 1992. Thresher shark. In *California's Living Marine Resources: A Status Report*, edited by Leet, W. S., R. C.M.Dewees, Klingbeil, and E.J.Larson. California Sea Grant.

Block, B. A., J. E. Keen, B. Castillo, H. Dewar, E. V. Freund, D. J. Marcinek, R. W. Brill, and C. Farwell. 1997. Environmental preferences of yellowfin tuna (*Thunnus albacares*) at the northern extent of its range. *Mar. Biol.* 130:119-132.

Brodeur, R.D., Lorz, H. V., and Pearcy, W. G. 1987. Food habits and dietary variability of pelagic nekton of Oregon and Washington, 1979-1984.: NMFS. NOAA Tech. Rep.

Casey, J. G. and N. E. Kohler. 1992. Tagging studies on the shortfin mako shark (Isurus oxyrinchus) in the western North Atlantic. *Aust. J. Mar. Freshwater Res.* 43:45-60.

Davis, L. A. 1991. Note, North Pacific pelagic driftnetting; untangling the high seas controversy. *S. Cal. Law Rev.* 64:1057.

DeMartini, E. E., J. H. Uchiyama, and H. A. Williams. 2000. Sexual maturity, sex ratio, and size composition of swordfish, *Xiphias gladius*, caught by the Hawaii-based pelagic longline fishery. *Fish. Bull. , U. S.* 98:489-506.

Eschmeyer, W. N., E. S. Herald, and H. Hammann. 1983. *A Field Guide to Pacific Coast Fishes of North America From the Gulf of Alaska to Baja California*. Boston: Houghton Mifflin.

Fitch, J. E. and W. L. Craig. 1964. First records for the bigeye thresher (*Alopias superciliosus*) and slender tuna (*Allothunnus fallai*) from California, with notes on eastern Pacific scombrid otoliths. *Calif. Fish. Game* 50:195-206.

Fitch, J. E. and R. J. Lavenberg. 1971. California marine food and game fishes. *Calif. Nat. Hist. Guide* 28:-179.

Hanan, D. A., D. B. Holts, and A. L. Coan Jr. 1993. The California drift gill net fishery for sharks and swordfish 1981-82 through 1990-91. *California Dept. Fish and Game Fish Bull.* 175:-95.

Harada, T. 1980. Maguro-rui yosei kenkyu no shinten to tenbo (Progress and future prospects in tuna culturing studies). Pages 50-58 in Japan Tuna Res. Conf. Proc., Far Seas Fish. Res. Lab.

Harvey, J. T. 1989. Food habits, seasonal abundance, size and sex of the blue shark, Prionace glauca in Monterey Bay, California. Calif. *Fish Game* 75(1):33-44.

Holts, D. B. 2001. Striped Marlin. In *California Living Marine Resources and Their Utilization*, edited by W.S.Leet and R.Klingbiel. California Department of Fish and Game.

Holts, D. B. and D. W. Bedford. 1993. Horizontal and vertical movements of the shortfin mako shark, Isurus oxyrinchus, in the Southern California Bight. *Aust. J. Mar. Freshwater Res.* 44:901-909.

Hubbs, C. L. and R. L. Wisner. 1953. Food of marlin in 1951 off San Diego, California. *Calif. Fish Game* 39(1):127-131.

IATTC (Inter-American Tropical Tuna Commission). 1990. Quarterly report of the Inter-American Tropical Tuna Commission. La Jolla, CA: IATTC.

IATTC (Inter-American Tropical Tuna Commission). 2000. Annual Report 1998.

IATTC (Inter-American Tropical Tuna Commission). 2001. Annual Report 1999.

IATTC. 2006. Staff Recommendations on Conservation. IATTC 74th Meeting, Busan, Korea. La Jolla: Inter-American Tropical Tuna Commission. Document IAYYC-74-05.

Ignell, S., Bailey, J., and Joyce, J. 1986. Observations on high-seas squid gill-net fisheries, North Pacific ocean, 1985. U.S. Dept. of Commerce, NOAA, Tech. Memo. NMFS-F/NWC105.

Iverson, R. T. B. 1962. Food of the albacore, Thunnus germo (Lacepede), in the central and northeastern Pacific. *Fish. Bull. , U. S.* 62(214):459-481.

Kikawa, S. 1961. The group maturity of bigeye tuna Parathunnus mebachi in the spawning area of Pacific. *Rep. Nankai Reg. Fish. Res. Lab.* 13:35-46.

Kikawa, S. 1957. The concentrated spawning areas of bigeye tuna in the western Pacific. *Rep. Nankai Reg. Fish. Res. Lab.* 5:145-157.

Laurs, M. R. and R. J. Lynn. 1991. North Pacific albacore ecology and oceanography. In *Biology, Oceanography and Fisheries of the North Pacific Transition Zone and Subarctic Frontal Zone*, edited by Wetherall, J. A. Pages 69-87. Washington, D.C.: NMFS.

Laurs, R. M., C. Hooker, L. Hreha, and R. Lincoln. 1974. A uniform U.S. west coats logbook for albacore, *Thunnus alalunga* (Bonnaterre), and a coastwide albacore fishery data system. *Mar. Fish. Rev.* 37(11):14-21.

Markaida, U. and Sosa-Nishizaki, O. 1998.

Matsumoto, W. M., Skillman, R. A., and Dizon, A. E. 1984. Synopsis of biological data on skipjack tuna, *Katsuwonus pelamis*. NOAA Tech. Rep. Circular 451.

Mearns, A. J., D. R. Young, R. J. Olson, and H. A. Schafer. 1981. Trophic structure and cesium-potassium ratio in pelagic ecosystems. *Calif. Coop. Oceanic Fish. Invest. (CalCOFI) Rep.* 22:99-110.

Mio, S., T. Domon, K. Yoshida, and S. Matsumura. 1990. Preliminary study on change in shape of drifting nets experimentally placed in the sea. In *Proceedings of the Second International Conference on*

Marine Debris, 27 April 1989, edited by R.S.Shomura and M.L.Godfrey. Pages 615-619. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS, NOAA-TM-NMFS-SWFSC154.

Nakamura, I. 1985. Billfishes of the world, an annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. Rome: Food and Agriculture Organization.

Nakano, H. 1994. Age, reproduction and migration of the blue shark in the North Pacific Ocean. *Bull. Nat. Res. Inst. Far Seas Fisheries* 31:141-256.

Nakano, H. and H. Matsunaga. 1997. Acoustic tracking of bigeye thresher shark, Alopias superciliosus, in the eastern Pacific Ocean. *Indo-Pacific Fish Conference, Noumea, New Caledonia*, Shimizu, Japan: National Research Institute of Far Seas Fisheries.

Nakano, H. and K. Nagasawa. 1996. Distribution of pelagic elasmobranchs caught by salmon research gillnets in the North Pacific. *Fish. Sci* 62(6):860-865.

NMFS. 2004. United States National Plan of Action for the Management of Fishing Capacity. Silver Spring MD: National Marine Fisheries Service. Aug. 2004.

Norton, J. G. 1999. Apparent habitat extensions of dorado (*Coryphaena hippurus*) in response to climate transients in the California Current. *Scientia Marina* 63(3-4):239-260.

Palko, B. J., Beardsley, G. L., and Richards, W. J. 1982. Synopsis of the biological data on dolphin-fishes, *Coryphaena hippurus* Linnaeus and *Coryphaena equiselis* Linnaeus. FAO Fisheries Synopsis No. 130, NOAA Tech. Rep. NMFS Circular 443.

PFMC (Pacific Fishery Management Council). 1981. Draft fishery management plan for billfish and oceanic sharks. Portland, OR: Pacific Fishery Management Council.

PFMC (Pacific Fishery Management Council). 2003. Final management plan and environmental impact statement for U.S. west coast fisheries for highly migratory species. Portland, OR: PFMC. Aug. 2003.

Pinkas, L. M. S. and I. L. K. Iverson. 1971. Food habits of albacore, bluefin tuna and bonito in California waters. *Calif. Dep. Fish Game, Fish Bull.*(152):1-105.

Preti, A., S. E. Smith, and D. A. Ramon. 2001. Feeding habits of the common thresher shark (Alopias vulpinus) sampled from the California-based drift gill net fishery, 1998-99. *CalCOFI Reports* 42:145-152.

PSMFC. 1990. *Interjurisdictional Fishery Management Plan for Thresher Shark Off the Coasts of California, Oregon, and Washington*. Portland, OR: Pacific States Marine Fisheries Commission.

Restrepo, V. R., Thompson, G. G., and Mace, P. M. 1998. Technical Guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. Washington, D.C.: U.S. Dept. Commerce, NOAA, NMFS. NOAA Tech. Mem. NMFS-F/SPO-31.

Saito, S. 1973. Studies on fishing of albacore (Thunnus alalunga Bonnaterre) by experimental deep-sea tuna longline. *Hokkaido Univ. Mem. Fac. Fish.* 21(2):107-184.

Schaefer, K. M. 1998. Reproductive biology of yellowfin tuna (Thunnus albacares) in the eastern Pacific

Ocean. *Inter-American Tropical Tuna Commission Bull.* 21(5):205-268.

Sheehan, L. and R. Tasto. 2001. The Status of Habitats and Water Quality in California(s Coastal and Marine Environment. In *California's Living Marine Resources: A Status Report.*, edited by Leet, W. S., C.M.Dewees, R.Klingbeil, and E.J.Larson. Pages 29-45. Univ. California.

Stick, K. C. and Hreha, L. 1989. Summary of the 1988 Washington/Oregon experimental thresher shark gill net fishery.: State of Washington Dept. Fisheries. Progress Rep. 275.

Tricas, T. C. 1979. Relationships of the blue shark, Prionace glauca, and its prey species near Santa Catalina Island, California. *Fish. Bull. , U. S.*

Ueyanagi, S. and Wares, P. G. 1975. Synopsis of biological data on striped marlin, *Tetrapturus audax* (Philippi), 1887. NOAA Technical Report NMFS SSRF-675.

Uosaki, K. and W. H. Bayliff. 1999. A review of the Japanese longline fishery for tunas and billfishes in the eastern Pacific Ocean, 1988-1992. *Inter-American Tropical Tuna Commission Bull.* 21(6):273-488.

Von Brandt, A. 1984. *Fish Catching Methods of the World Fish*: News Books.

WCPFC. 2005. Report of the first regular session of the Scientific Committee, Noumea, New Caledonia, 8-19 August, 2005. Pohnpei, FSM: Western and Central Pacific Fishery Commission.

WPRFMC (Western Pacific Region Fishery Management Council). 1994. Management of U.S. Pacific pelagic fisheries: Single council designation.