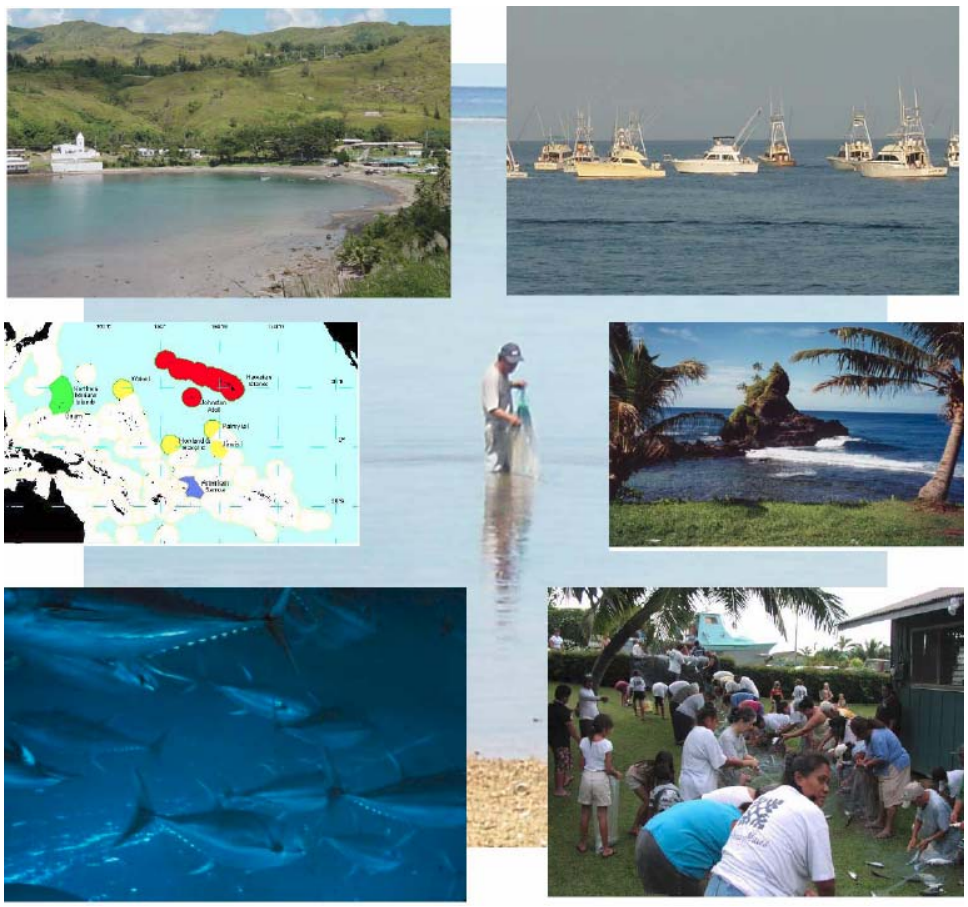
Draft Programmatic Environmental Impact Statement

Toward an Ecosystem Approach for the Western Pacific Region: From Species-Based Fishery Management Plans to Place-Based Fishery Ecosystem Plans



Prepared by:

National Oceanic and
Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Region

WESTERN
PACIFIC
REGIONAL
FISHERY
MANAGEMENT
COUNCIL

March 30, 2007

Cover:

Center: Guam Net Fishermen (photo: WPFMC)
Top Left: Umatic Bay, Guam (photo: WPFMC)
Top Right: Start of the 2003 Hawaii International Billfish Tournament (photo: WPFMC)
Center Right: American Samoa (photo: WPFMC)
Bottom Right: Hana Community Fish Sharing (photo: WPFMC)
Bottom Left: School of yellowfin tuna (photo credit: OAR/National Undersea Research Program, National Oceanic and Atmospheric Administration, Department of Commerce)
Center Left: Map of Western Pacific Region (highlighted: WPFMC)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

MAR 30 2007

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act (NEPA), we enclose for your review the Draft Programmatic Environmental Impact Statement – Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystems Plans (DEIS).

This DEIS is prepared pursuant to NEPA to assess the environmental impacts associated with the establishment of an institutional framework that would facilitate a shift to an ecosystem approach to fisheries management in the Western Pacific Region.

Additional copies of the DEIS may be obtained from the Responsible Program Official identified below. The document is also accessible electronically through the Pacific Islands Regional Office and Western Pacific Fishery Management Council websites at www.fpir.noaa.gov/ and www.wpcouncil.org, respectively.

Written comments should be submitted through mail, facsimile (fax), or email to the Responsible Program Official identified below. Written comments submitted during the agency's 45-day public comment period must be received by May 29, 2007. When submitting fax or email comments, include the following document identifier in the comment subject line: Revised Draft Programmatic EIS.

Responsible Program Official:

William Robinson
Regional Administrator
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Sincerely,

for

Rodney F. Weiher, Ph.D.
NOAA NEPA Coordinator

Enclosure

Draft Programmatic Environmental Impact Statement
Toward an Ecosystem Approach for the Western Pacific Region: From Species-Based Fishery Management Plans to Place-Based Fishery Ecosystem Plans

March 30, 2007

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Fishery Management Plans: Bottomfish and Seamount Groundfish, Coral Reef Ecosystems, Crustaceans, Precious Corals, Pelagics. The replacement Fishery Ecosystem Plans are separate documents, preliminary drafts are available from the same contacts listed above.

Abstract: The impacts on the human environment associated with replacing the existing Fishery Management Plans (FMPs) with Fishery Ecosystem Plans (FEPs) for the Western Pacific Region (American Samoa, the Commonwealth of the Northern Mariana Islands, Hawaii, the U.S. Pacific Remote Island Areas, and the pelagic zone fisheries) are disclosed in this analysis. Components of the proposed action include place-based fishery ecosystem plans replacing species-based fishery ecosystem plans and designation of management unit species to be managed under each fishery ecosystem plan. Important issues evaluated include biolgocial impacts on bottomfish, precious corals, coral reef ecosystems, crusteaceans, essential fish habitat, protected species, fishery participants and commjuniteis, and administration and enforcement. None of the action considered will result in irreversible or irretrievable commitments. The establishment of Regional Ecosystem Committees (part of the preferred alternative) would enhance the Council's ability to coordinate with member managmement agencies to address non-fishing-related issues that could impact the physical environment.

Date public comments are due: May 29, 2007
e-mail comment portal: WesternPacificRDPEIS@noaa.gov

EXECUTIVE SUMMARY

On December 20, 2005, at its 130th meeting, the Western Pacific Fishery Management Council (Council) recommended the final action of a shift in fishery management for the Western Pacific Region from a species-based approach to an ecosystem-focused approach. This recommendation stemmed from an increasing awareness that fisheries should be managed within a place-based structure rather than one that regulates fisheries by species. However, ecosystem approaches to fisheries management are in their developmental stages and the proposed shift in management structure would accordingly be an incremental first step towards the long-term goal of place-based marine ecosystem conservation and management. It is anticipated that future management actions would utilize and build on information acquired as a result of shifting to a place-based approach. The proposed action in this Programmatic Environmental Impact Statement (EIS) is the approval and implementation of Fishery Ecosystem Plans (FEPs) by the Secretary for federally managed fisheries that operate in the Western Pacific Region. These FEPs would replace the existing Fishery Management Plans (FMPs), and the action considered here simply establishes the institutional framework for future fishery ecosystem management actions.

This EIS analyzes the impacts on the human environment of replacing the existing FMPs with FEPs for the Western Pacific Region (American Samoa, the Commonwealth of the Northern Mariana Islands, Hawaii, the U.S. Pacific Remote Island Areas or PRIA[1], and Pelagic). A previous Draft Programmatic EIS (dated October 27, 2005) was circulated for public review from November 10, 2005 to December 26, 2005 (70 FR 68443). In response to public comment during the circulation of the 2005 Draft Programmatic EIS for review, it was decided to expand the Draft Programmatic EIS to contain analyses of impacts related specifically to the approval and implementation of fishery ecosystems plans in the Western Pacific Region. As a result, the National Marine Fisheries Service's (NMFS), Pacific Islands Regional Office (PIRO), and Council staff revised the Draft Programmatic EIS that was released in October 2005.

Purpose and Need

The purpose of the proposed action is to establish an institutional framework that facilitates a shift to an ecosystem approach to fisheries management in the Western Pacific Region. This would be accomplished through the approval and implementation of place-based FEPs, without any substantive changes to current fishing regulations. This shift would enable increased understanding and protection of ecosystem structures and functions and is needed to provide the management framework that would simplify the development and implementation of future conservation and management measures for marine ecosystems and their fishery resources. Because there are currently a number of fisheries operating under the existing species-based fishery management plans, this shift should be done in a manner that is understandable to fishery

[1] The PRIA consist of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Wake Island, Palmyra Atoll, and Midway Island. Because Midway is located in the Hawaiian Archipelago it is not considered as part of the PRIA in this document.

participants and with minimal regulatory burden. The proposed Federal action consists of the following components:

Component 1: The implementation of one or more place-based fishery ecosystem plans that delineate specific boundaries and support a shift to an ecosystem approach to fisheries in the Western Pacific Region. The new fishery ecosystem plan or plans would replace existing species-based fishery management plans. Included in Component 1 is the associated reorganization of existing species-based FMP regulations into place-based FEP regulations.

Component 2: The designation of appropriate management unit species to be managed under each FEP.

Also considered in this document are three additional components. These components are the Council's advisory structure, and its role in regional coordination and international management and research. The analysis of these components is included to assist the Council in determining its optimal organizational structure and procedures commensurate with a shift to ecosystem management. These components are not considered Federal actions.

Alternatives

Components 1 and 2 are regulatory in nature and are considered the Federal action in this document. Components 3, 4, and 5 are nonregulatory (i.e., they have no regulatory effect), and their consideration is included to assist the Council in identifying an appropriate advisory structure and coordination activities under an ecosystem-based fishery management structure. Component 2 is contingent upon selecting one of the action alternatives under Component 1. The following table provides a brief description of the alternatives considered in detail for each component.

Table ES-1: Alternatives considered in detail.

Components of the Federal Action and the Alternatives	Description
Component 1:	***Replace FMPs with FEPs***. Included in Component 1 for Alternatives 1B through 1E is the associated reorganization of existing species-based FMP regulations into place-based FEP regulations.
Alternative 1A - No Action	Do not approve or implement FEPs; Do not replace FMPs with FEPs
Alternative 1B	For one area only, approve and implement an FEP, which will replace existing FMPs
Alternative 1C	Approve and implement FEPs that include EEZ waters around each archipelagic area (American Samoa, Hawaiian, Marianas, PRIA), these FEPs will replace existing FMPs; Retain the Pelagic FMP for the domestic pelagic fisheries operating on the surrounding high seas
Alternative 1D - Preferred	Approve and implement four demersal FEPs and one pelagic FEP, which will replace existing FMPs
Alternative 1E	Approve and implement FEPs for each biogeographic and pelagic zones, which will replace existing FMPs
Component 2:	***List of MUS***
Alternative 2A - No Action	Do not change the current MUS lists
Alternative 2B - Preferred	Define FEP MUS as those current MUS that are *known*[1] to be present within each FEP boundary
Alternative 2C	Define FEP MUS as those current MUS *known* to occur within the boundaries of the FEP, *plus* incidentally caught and associated species that are known to occur within each FEP boundary
Alternative 2D	Define FEP MUS as those current MUS *believed*[2] to potentially occur, *plus* incidentally caught and associated species believed to potentially occur within each FEP boundary
Component 3:	***Council Advisory Structure***
Alternative 3A - No Action	Do not change the current advisory structure

[1] For the purpose of this EIS, *Known* is used as a species generally recognized as being established within a particular ecosystem.
[2] For the purpose of this EIS, *Believe* is used as an opinion that a species exists within a particular ecosystem or a similar ecosystem of the Western Pacific Region, especially when there is no absolute proof of its existence or reality.

Alternative 3B	Add a single FEP Plan Team to the current advisory structure
Alternative 3C	Replace the current FMP advisory panels, plan teams, and five standing committees with FEP advisory panels, FEP plan teams, and FEP standing committees
Alternative 3D - Preferred	Replace the current FMP advisory panels, plan teams, and five standing committees with FEP advisory panels, FEP standing committees, and two FEP plan teams
Component 4:	***Regional Coordination***
Alternative 4A - No Action	Do not establish Ocean Council type groups
Alternative 4B - Preferred	Establish Regional Ecosystem Council Committees
Alternative 4C	Participate in and support existing Ocean Council type groups
Alternative 4D	Establish independent Regional Ecosystem Councils
Component 5:	***International Coordination***
Alternative 5A - No Action	Continue to participate in international fisheries management fora and international workshops
Alternative 5B - Preferred	Increase participation in international fisheries management fora and establish meetings/workshops with neighboring nations of island areas of the Western Pacific Region
Alternative 5C	Do not participate in international management fora

In general, each component's alternatives range from no action or *status quo* to the implementation of a detailed and specific approach to the component at hand. Alternatives selected as "preferred" by the Council are identified for each component. Several alternatives were also considered but regarded as unreasonable and were therefore eliminated from detailed study.

Reasons for Choosing the Preferred Alternatives

The U.S. Pacific island-based pelagic fisheries and the four demersal fisheries (bottomfish, crustaceans, precious corals and coral reef resources) are currently managed under FMPs. Whereas the 1996 Sustainable Fishery Act amendments to Magnuson-Stevens Fishery Conservation and Management Act (MSA) require considerations of fishery impacts on other species not managed under FMPs (e.g., bycatch reduction), there are several limitations of the current management framework (i.e., species-based FMPs) that appear to constrain the Council in recommending conservation for a wider range of marine resources as well as protecting marine ecosystems.

Current stock assessments generally do not explicitly recognize the significant natural variability in marine resources and habitats, although some models do incorporate spatial and temporal environmental effects. Under place-based FEPs, stock assessments will increasingly and explicitly separate environmentally-driven resource variability (e.g., inter-annual, decadal, long-term ocean regime shifts) from fishery-driven and habitat-driven effects on target stocks and other components of ecosystems, thus improving fishery science and management.

In addition, the majority of current monitoring under FMPs accounts for major resource removals by fishing, but not by other sources such as coastal development, which has destroyed or severely degraded inshore fish habitat and associated stocks around the more heavily populated islands of the U.S. Pacific. Through regional coordination efforts under place-based FEPs, all sources of resource removal would be considered, including those related to shoreline modification, waste discharge, watershed erosion, storm runoff, and other terrestrial activities. FEP-based monitoring will ultimately include ecosystem indicators and models that take into account non-fishing uses, their impacts on resources, and tradeoffs among different user groups who depend on the same resource.

As discussed in Chapter 1, the purpose of the proposed Federal Action in this EIS is to establish an institutional framework that will allow a shift to an ecosystem approach for fisheries management in the Western Pacific Region. This will be accomplished, in part, through the approval and implementation of place-based FEPs, Component 1 of the proposed Federal Action. Component 1 also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations.

For Component 1, among the action Alternatives (Alternatives 1B, 1C, 1D and 1E), Alternatives 1C and 1D are most similar in their impacts. Both of these alternatives would facilitate a practical ecosystem approach to fisheries management in the Western Pacific Region so that the full range of fisheries' impacts and other activities on marine ecosystems would be addressed in a manner that coherently considers each archipelago's biological resources, physical conditions, socioeconomic needs, and cultural traditions. However, Alternative 1D recognizes the highly mobile and often migratory nature of pelagic stocks and fisheries, whereas Alternative 1C does not. Alternative 1D would establish a single Pelagics FEP that would span the entire region managed. Alternatives 1B and 1E were not selected as the Preferred Alternative because of their negative impacts on management, administration, and enforcement and impacts on fishery participants and communities.

Component 2 is also regulatory in nature and considered part of the Federal action in this document. Component 2 is contingent upon selecting one of the action alternatives under Component 1. All alternatives under Component 2 (Alternatives 2A, 2B, 2C, and 2D), consider changes to the MUS list. Alternative 2A was not selected as the Preferred Alternative because of its negative impacts on management, administration, and enforcement and impacts on fishery participants and communities. In particular, under Alternative 2A, there would be some demersal species identified as MUS in an FEP for which they were not actually present. Under Alternative 2B, the Preferred Alternative, the MUS list for each archipelagic FEP would consist of any MUS currently on any of the four existing demersal FMP MUS lists that are known to occur within the range of that particular FEP. The MUS list for the pelagic FEP will be identical to the pelagic FMP MUS list. Alternative 2B is similar to Alternative 2A but would eliminate the confusion that could result from the inclusion on the MUS list of species not physically present in a given

FEP area. Alternatives 2C and 2D were rejected primarily because of their impacts on management, administration, and enforcement and because they would add species to the MUS lists that would require monitoring and annual evaluation.

The Preferred Alternatives would promote a holistic view of marine resources through increased examination of meta-population resource dynamics and linkages between upland watershed activities, coastal habitats, and nearshore waters. This in turn will lead to enhanced understanding and improved management of the relationships between different fish stocks and users of those stocks. In general, species-based FMPs focus on individual stocks of fish or related species and the people who harvest them. However, fish and fishermen do not act in isolation, and fishermen may be active in several fisheries targeting different resources over years or even seasonally.

Furthermore, the harvests of one species often influence the dynamics of fish markets (and subsequent fishing effort) for others. Place-based FEPs will provide fishery managers with comprehensive information on all fishery impacts within a given area and allow improved decision making with less unintended consequences due to poorly understood connections. By operating within an ecosystem context, fishery managers will also be better positioned to anticipate likely physical and biological responses to changing environmental conditions and to determine appropriate management actions to forestall adverse impacts on marine ecosystems, rather than reacting to changes after they occur. In addition, greater stability and predictability is more likely when resources are considered in aggregate rather than as independent units.

The ecosystem approach under the Preferred Alternative may improve the management of coastal resources at both Federal and local levels through changes in the structure of resource management plans and the process by which these plans are developed and implemented. There is potential for jurisdictional disputes. However, it is the Council's role to provide guidance and clarification on mandated responsibilities and management authorities to preclude governance issues from occurring. Because the organizational structure for developing and implementing a FEP is broader than for an FMP, and will incorporate more local community input, it is more likely to make better use of local knowledge and experience in management strategies and tactics. This will strengthen cooperation and voluntary compliance with management measures which is especially important in the Western Pacific Region where enforcement capabilities can sometimes be limiting.

The southern and western Pacific Ocean is dotted with thousands of islands governed by several nations. American Samoa, for example, is surrounded by the EEZs of five independent nations and the PRIA (Wake, Howland/Baker, Jarvis, and Palmyra) are part of larger archipelagic island chains. Several targeted pelagic species are considered highly migratory and management of these resources is increasingly becoming an international issue. As marine ecosystems are generally considered "open" systems and large scale changes can be observed within smaller units, international coordination as well as cooperation among the Council, RFMOs, US Department of State, NMFS, and neighboring nations of island areas in the Western Pacific Region will be a necessary component of the successful implementation of an ecosystem approach to fisheries management.

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Appendices

Acronyms and Abbreviations

ACHPPM	Army Center for Health Promotion and Preventive Medicine
APA	Administrative Procedures Act
BMUS	Bottomfish Management Unit Species
CCL	Curved Carapace Length
CMUS	Crustaceans Management Unit Species
CNMI	Commonwealth of the Northern Mariana Islands
CRE	Coral Reef Ecosystem
CRM	Coastal Resources Management (Division for CNMI)
CWA	Clean Water Act
CWB	Continental Water Boundary
CZCS	Coastal Zone Color Scanner
CZMA	Coastal Zone Management Act
DFW	Division of Fish and Wildlife
DMWR	Department of Marine and Wildlife (Government of American Samoa)
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENSO	El Niño Southern Oscillation
EPA	Environmental Protection Agency
EPAP	Ecosystem Principles Advisory Panel
ESA	Endangered Species Act
FAD	Fish Aggregation Device
FAO	Food and Agriculture Organization
FBNMS	Fagatele Bay National Marine Sanctuary
FEP	Fishery Ecosystem Plan
FMP	Fishery Management Plan
FSM	Federated States of Micronesia
HAPC	Habitat Areas of Particular Concern
HE	Halmahera Eddy
HMRFS	Hawaii Marine Recreational Fisheries Survey
IATTC	Inter-American Tropical Tuna Commission
ICES	International Council for the Exploration of the Sea
IQA	Information Quality Act
ITCZ	Intertropical Convergence Zone
Lbs	Pounds
LME	Large Marine Ecosystem
ME	Mindanao Eddy
MHI	Main Hawaiian Islands

MMPA	Marine Mammal Protection Act
MPA	Marine Protected Areas
MRFSS	Marine Recreation Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
MUS	Management Unit Species
NEPA	National Environmental Policy Act
NGCC	New Guinea Coastal Current
NHRC	North Hawaiian Ridge Current
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPC	North Pacific Current
NPTZ	North Pacific Transition Zone
NWHI	Northwestern Hawaiian Islands
NWR	National Wildlife Refuge
OI	Optimal Interpolation
OLE PID	Office of Law Enforcement Pacific Islands Division
PBEC	Pacific Basin Environmental Consultants
PF	Polar Front
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
PMP	Preliminary Management Plan
PMUS	Pelagic Management Unit Species
PRA	Paperwork Reduction Act
PRIA	U.S. Pacific Remote Island Areas
RAIOMA	Resouce Assessment Investigation of the Mariana Archipelago
RFA	Regulatory Flexibility Act
RFMC	Regional Fishery Management Council
SAF	Subantarctic Front
SAFZ	Subartic Frontal Zone
SCL	Straight Carapace Length
SECN	South Equatorial Current (southern branch)
SECS	South Equatorial Current (northern branch)
SFA	Sustainable Fisheries Act
SPCZ	South Pacific Convergence Zone
SSC	Scientific and Statistical Committee
STCC	South Tropical Countercurrent
STF	Subtropical Front
STFZ	Subtropical Frontal Zone
UH SOEST	Univ. of Hawaii School of Ocean and Earth Science and Technology

USCG	United States Coast Guard
USFWS	U.S. Fish and Wildlife Service
VMS	Vessel Monitoring Systems
WCPFC	Western and Central Pacific Fisheries Commission
WGB	Weddell Gyre Boundary
WPRFMC	Western Pacific Regional Fishery Management Council
XBT	Expendable Bathythermograph

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CHAPTER 1: INTRODUCTION, PURPOSE AND NEED, BACKGROUND INFORMATION

This Programmatic Environmental Impact Statement (EIS) provides decision-makers and the public with an evaluation of the environmental, social, and economic effects of replacing the five existing Western Pacific Fishery Management Plans (FMPs; Bottomfish and Seamount Groundfish, Coral Reef Ecosystems, Crustaceans, Precious Corals, and Pelagics) with place-based fishery ecosystem plans (FEPs). This EIS will also provide the Secretary of Commerce (Secretary) with analytical information relevant for his review and potential approval of the FEPs under with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

Introduction

On December 20, 2005 at its 130th meeting, the Western Pacific Fishery Management Council (Council) took final action to recommend a shift in fishery management for the Western Pacific Region from a species-based approach to an ecosystem-focused approach. This change stems from an increasing awareness that fisheries should be managed within a place-based structure rather than one that regulates fisheries by species. As discussed here, ecosystem approaches to fisheries management are in their developmental stages and the proposed shift in management structure would accordingly be an incremental first step towards this long-term goal of place-based marine ecosystem conservation and management. It is anticipated that future management actions would utilize and build on information acquired as a result of shifting to a place-based approach. The proposed action is the approval and implementation of place-based fishery management plans (fishery ecosystem plans)[3] by the Secretary for federally managed fisheries that operate in the Western Pacific Region. These FEPs would replace the existing FMPs, and the action considered here simply establishes the institutional framework for future fishery ecosystem management actions.

The analysis presented here is based on the terms established by the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.), its corresponding regulations (40 CFR §§1500–1508), and National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6 (Environmental Review Procedures for Implementing the National Environmental Policy Act). Chapter 1 contains the purpose and need for managing fisheries within a place -based context. Chapter 1 also contains background information on fishery management in the Western Pacific Region and an overview of important topics related to managing fisheries under an ecosystem approach.

This EIS examines alternative approaches to fishery ecosystem plans. These alternatives are described in detail in Chapter 2. The environmental consequences of these alternatives are described in Chapter 4.

[3] Fishery ecosystem plans are ecosystem-based fishery management plans that would be subject to Secretarial review and approval pursuant to Section 304 of the MSA.

Chapter 3 contains description of the affected environment that is intended to help the reader understand the environmental consequences evaluation presented in Chapter 4. Chapter 5 summarizes the analysis on the environmental management issues. Chapter 6 documents the preparers of the EIS and public review components of this NEPA process. Chapter 7 contains the references cited in this analysis. Chapter 8 contains a glossary of terms pertinent to fisheries management in the Western Pacific Region. Chapter 9 contains the index of this analysis. The appendices includes the list of the current management unit species (MUS) and for the Preffered Alternative under Component 2 (introduced in Section 1-1) as well as summaries of workshops the Council convened to explore ecosystem science and management.

The Western Pacific Region place-based FEPs proposed would replace the existing FMPs (see Figure 1-1). Preliminary draft FEPs representing the preferred alternatives discussed here are available from the Council's website at www.wpcouncil.org or by mail[4] from the Council. Additionally, an electronic copy of the preliminary draft FEPs will be attached to the EIS at the time the document is distributed to the public for comment.

1.1 Purpose and Need

The purpose of the proposed action is to establish an institutional framework that facilitates a shift to an ecosystem approach to fisheries management in the Western Pacific Region. This would be accomplished through the approval and implementation of place-based FEPs, without any substantive changes to current fishing regulations. This shift would enable increased understanding and protection of ecosystem structures and functions and is needed to provide the management framework that would simplify the development and implementation of future conservation and management measures for marine ecosystems and their fishery resources. Because there are currently a number of fisheries operating under the existing species-based fishery management plans, this shift should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. The proposed Federal action consists of the following components:

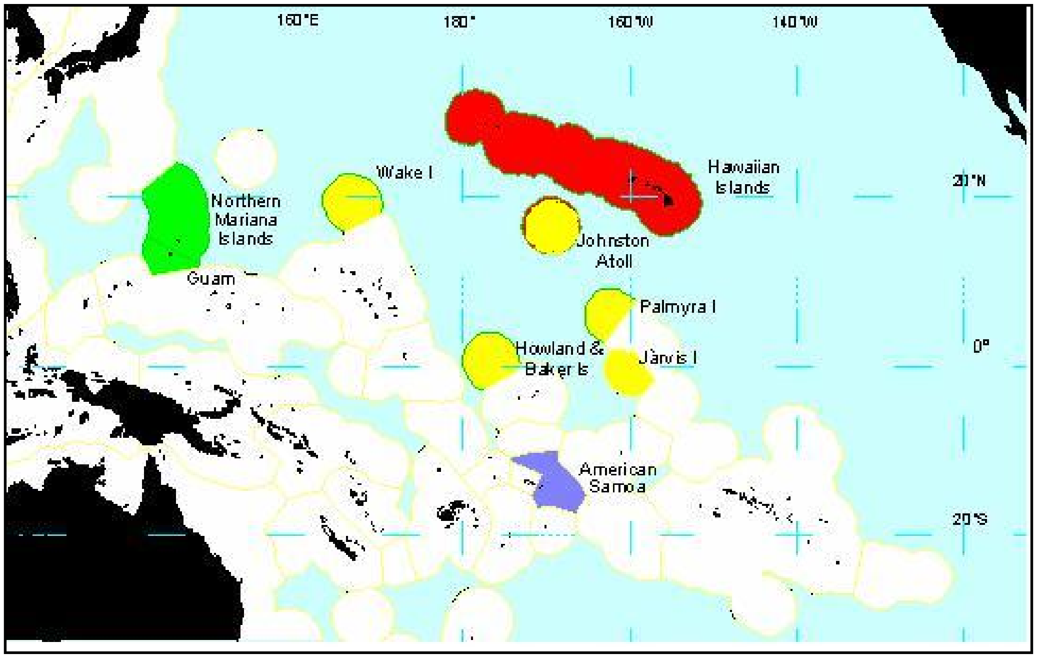
Component 1: The implementation of one or more place-based fishery ecosystem plans that delineate specific boundaries and support a shift to an ecosystem approach to fisheries in the Western Pacific Region. The new fishery ecosystem plan or plans would replace existing species-based fishery management plans. Included in Component 1 is the associated reorganization of existing species-based FMP regulations into place-based FEP regulations.

Component 2: The designation of appropriate management unit species to be managed under each FEP.

Also considered in this document are three additional components. These components are the Council's advisory structure, and its role in regional coordination and international management and research. The analysis of these components is included to assist the Council in determining its optimal organizational structure and procedures commensurate with a shift to ecosystem management. These components are not considered Federal actions.

[4] WPFMC, 1164 Bishop Street, Suite 1400 Honolulu, Hawaii 96813

Figure 1-1: Western Pacific Region and Proposed FEP Areas.



Proposed Mariana Archipelago FEP

Proposed Hawaii Archipelago FEP

Proposed Pacific Remote Island Areas FEP

Proposed American Samoa Archipelago FEP

Proposed Pacific Pelagic FEP (applies within all EEZ waters and high seas)

1.2 Background Information

This EIS analyzes the impacts on the human environment of replacing the existing FMPs with FEPs for the Western Pacific Region (American Samoa, the Commonwealth of the Northern Mariana Islands [CNMI], Hawaii, the U.S. Pacific Remote Island Areas [PRIA[1]], and Pelagic). A previous Draft Programmatic EIS (dated October 27, 2005) was circulated for public review from November 10, 2005 to December 26, 2005 (70 FR 68443).

Subsequent to the circulation of the 2005 Draft Programmatic EIS for pubic review, it was decided to expand the Draft Programmatic EIS to contain analyses of impacts related specifically to the approval and implementation of fishery ecosystems plans in the Western Pacific Region.

[1] The PRIA consist of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Wake Island, Palmyra Atoll, and Midway Island. Because Midway is located in the Hawaiian Archipelago it is not considered as part of the PRIA in this document.

As a result, the National Marine Fisheries Service's (NMFS), Pacific Islands Regional Office (PIRO), and Council staff revised the Draft Programmatic EIS that was released in October 2005. To assist the public during the review of this revised Draft Programmatic EIS, preliminary draft FEPs representing the preferred alternatives described here are available for reference at the Council's website at www.wpcouncil.org or by mail[5] from the Council. Additionally, an electronic copy of the preliminary draft FEPs will be attached to the EIS at the time the document is distributed to the public for comment.

The Western Pacific Region includes several archipelagos (e.g., Hawaii, Mariana) with distinct cultures, communities, and marine resources. For thousands of years, the indigenous people of these Pacific islands relied on healthy marine ecosystems to sustain themselves and their island communities. This remains true today as Pacific island communities continue to depend on the ecological, economic, and social benefits of healthy marine ecosystems.

On international, national, and local levels, institutions and agencies that manage marine resources are moving toward an ecosystem approach to fisheries management. One reason is a growing awareness that many of Earth's marine resources respond to stress and that the ecosystems that support them are being degraded. As stated in Pikitch et al. (2004), increased concern regarding the potential impacts of fishing and nonfishing activities on the marine environment, and a greater understanding of the relationships between ecosystem changes and population dynamics, have fostered support for a holistic approach to fisheries management that is science-based and forward thinking.

NOAA defines an ecosystem approach as "management that is adaptive, specified geographically, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives" (NOAA 2004). The Food and Agriculture Organization of the United Nations states that the purpose of an ecosystem approach to fisheries management is "to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from a full range of goods and services provided by marine ecosystems" (Garcia et al. 2003).

In 1998, the U.S. Congress charged NMFS with establishing the Ecosystem Principles Advisory Panel (Panel; EPAP), which was responsible for assessing the extent to which ecosystem principles were being used in fisheries management and recommending how to further ecosystem principle use to improve the status and management of marine resources. The Panel was composed of members of academia, fishery and conservation organizations, and fishery management agencies.

[5] WPFMC, 1164 Bishop Street, Suite 1400 Honolulu, Hawaii 96813

The EPAP outlined the following principles as important when considering and identifying marine ecosystems and adopting an ecosystem approach to management:

- The ability to predict ecosystem behavior is limited.
- An ecosystem has real thresholds and limits that, when exceeded, can affect major system restructuring.
- Once thresholds and limits have been exceeded, changes can be irreversible.
- Diversity is important to ecosystem functioning.
- Multiple scales interact within and among ecosystems.
- Components of ecosystems are linked.
- Ecosystem boundaries are open.
- Ecosystems change with time.

The EPAP reached consensus that FEPs should be developed and implemented to manage U.S. fisheries and marine resources (EPAP 1999). According to the EPAP, an FEP should contain and implement a management framework to control harvests of marine resources on the basis of available information regarding the structure and function of the ecosystem in which such harvests occur. The Panel recommended, for consideration by the regional fishery management councils (RFMCs), the following eight management and policy measures to further develop FEPs:

- Delineate the geographic extent of the ecosystem(s) that occur(s) within RFMC authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, and then "zone" the area for alternative uses.
- Develop a conceptual model of the food web.
- Describe the habitat needs of different life history stages for all plants and animals that represent the "significant food web" and how they are considered in conservation and management measures.
- Calculate total removals—including incidental mortality—and show how they related to standing biomass, production, optimum yields, natural mortality, and trophic structure.
- Assess how uncertainty is characterized and what kinds of buffers against uncertainty are included in conservation and management actions.
- Develop indices of ecosystem health as targets for management.
- Describe available long-term monitoring data and how they are used.
- Assess the ecological, human, and institutional elements of the ecosystem that most significantly affect fisheries, and that are outside Council/Department of Commerce authority.

In recognition of the Panel's findings, the Council recommended the initiation of an incremental shift toward an ecosystem approach for fisheries of the entire Western Pacific Region[6]. The first phase of this incremental shift (replacing the five FMPs with FEPs) will establish the appropriate institutional framework and foundation (place-based FEPs) for future fisheries management under an ecosystem approach. Although the proposed Federal action does not purport to adopt

[6] At its 130th meeting held December 20, 2005, the Council took final action to recommend implementation of place-based FEPs for the Western Pacific Region .

the EPAP's ecosystem principles, management measures, or polices, this action is necessary to create the infrastructure for future place-based management. This shift in focus to place will also facilitate ecosystem science and research that will enhance the understanding of and impacts on marine ecosystems. Subsequent phases of fishery management actions will expand on the FEP foundation using the best available information and adaptive management. Such phases may include, but are not limited to: the establishment of ecosystem indicators linked to various management responses, the development of ecosystem models, the establishment of community-based management and monitoring measures, the implementation of explicit upper limits on total removals, and other similar phased actions.

1.3 The Magnuson–Stevens Fishery Conservation and Management Act and the Regional Fishery Management Councils

The 1976 Magnuson Fishery Conservation and Management Act (also known as the Magnuson Act and later renamed the Magnuson–Stevens Fishery Conservation and Management Act [MSA]) established exclusive U.S. jurisdiction from the seaward boundary of the territorial sea out to 200 nautical miles from shore for the purposes of managing U.S. fishery resources. Subsequently, Presidential Proclamation 5030 (March 10, 1983), established this area as the U.S. exclusive economic zone (EEZ) and declared "to the extent permitted by international law . . . sovereign rights for the purpose of exploring, exploiting, conserving and managing natural resources, both living and non-living, of the seabed and subsoil and the superjacent waters." This increased jurisdiction over the EEZ provided a basis for expanded exploration, exploitation, scientific research, and protection of the marine environment and was recognized in the 1996 amendments to the MSA.

The MSA is the principal federal statute regarding the management of U.S. domestic marine fisheries. The purposes of the MSA include the following: the conservation and management of the fishery resources of the United States; the protection of essential fish habitat (EFH); the establishment of regional fishery management councils; the preparation and implementation of fishery management plans; the promotion of domestic, commercial, and recreational fishing; the support and encouragement of international fishery agreements; and the development of fisheries that are underutilized or not utilized. With respect to FEPs, the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 recognizes the importance of integrating ecosystem approaches in fisheries management.

The MSA established both required and discretionary provisions of an FMP and created ten National Standards to ensure that any FMP or FMP amendment is consistent with the MSA. Each FMP contains a suite of management measures that together characterize the fishery management regime. These measures are either a framework type measure that allows for annual or periodic adjustments using a streamlined implementation process, or are conventional measures that are fixed in the FMP and its implementing regulations and require a formal plan or regulatory amendment to change.

The Sustainable Fisheries Act of 1996 (SFA; Public Law 104-297) reauthorized and made significant amendments to the MSA. The SFA included provisions aimed at the development of sustainable fishing practices in order to guarantee a continued abundance of fish and continued opportunities for the U.S. fishing industry. The SFA included requirements that fishery management measures prevent overfishing, ensure the rebuilding of overfished stocks achieve optimum yields from U.S. fisheries, , minimize bycatch, take into account the importance of fishery resources to fishing communities, identify and conserve essential fish habitat, address impacts on fish habitat, and promote the safety of human life at sea.

The SFA emphasized the need to protect fish habitat. Under the law, regional Councils prepared amendments identifying EFH as areas necessary to manage fish species for their basic life functions. The EFH provisions of the MSA require NMFS to provide recommendations to Federal and State agencies for conserving and enhancing EFH for any actions that may adversely impact EFH.

The MSA created eight regional fishery management councils to provide advice and recommendations to the Secretary through the U.S. Department of Commerce, NOAA, and NMFS. The fishery management councils are responsible for the preparation and transmittal to the Secretary of appropriate, science-based FMPs (and amendments to those plans) for fisheries under their jurisdiction. The Secretary may approve, disapprove, or partially approve each FMP or amendment and, if approved, implements them through federal regulations and enforcement. Under the MSA, the Western Pacific Fishery Management Council has management responsibility for U.S. fisheries in the Pacific Ocean seaward of American Samoa, CNMI, Guam, Hawaii, and the PRIA (16 U.S.C. §302(a)(H)). The Council has 13 voting members, eight of which are appointed by the Secretary, and five of which are the principal Federal, and State, Territory or Commonwealth officials with fishery management responsibility. The Council also retains three non-voting members that include: U.S. Department of State, U.S. Fish and Wildlife Service, and the U.S. Coast Guard.

Fisheries that operate within the EEZ waters and high seas in the Western Pacific Region are currently managed under five FMPs: Bottomfish and Seamount Groundfish, Coral Reef Ecosystems, Crustaceans, Precious Corals, and Pelagics. Under the preferred alternatives in this proposed action, these existing FMPs would be replaced with new FEPs applicable to fisheries in the American Samoa Archipelago, Mariana Archipelago, Hawaiian Archipelago, PRIA and the Pacific Pelagics. The Secretary will use the criteria for new FMPs and amendments to FMPs to judge consistency with MSA of these replacement FEPs.

Under the MSA, the Secretary reviews FMPs or amendments transmitted by the regional fishery management councils for consistency with the National Standards and other provisions of the MSA, and with other applicable laws (16 U.S.C. §304(a)(1)). Generally, other applicable laws and executive orders which the Secretary reviews for consistency include the following:

- National Environmental Policy Act (NEPA)
- Endangered Species Act (ESA)
- Marine Mammal Protection Act (MMPA)
- Administrative Procedures Act (APA)
- Regulatory Flexibility Act (RFA)
- Information Quality Act (IQA)
- Coastal Zone Management Act (CZMA)

- Paperwork Reduction Act (PRA)
- Executive Order 12898: Environmental Justice
- Executive Order 13132: Federalism
- Executive Order 12630: Taking
- Executive Order 13158: Marine Protected Areas

A description of each of the laws and Executive Orders listed above is provided in the appendix.

1.3.1 Fishery Management Plans of the Western Pacific Region

Bottomfish and Seamount Groundfish FMP

The Bottomfish and Seamount Groundfish FMP was implemented in 1986 with the following management measures:

1. prohibition of certain destructive fishing techniques, including explosives, poisons, trawl nets, and bottom-set gillnets;
2. establishment of a moratorium on the commercial harvest of seamount groundfish stocks at the Hancock Seamounts (which has been extended until August, 31, 2010 [69 FR 51400]);
3 implementation a permit system for fishing for bottomfish in the EEZ around the Northwestern Hawaiian Islands (NWHI); and
4. establishment of a management framework that includes adjustments such as catch limits, size limits, area or seasonal closures, fishing effort limitation, fishing gear restrictions, access limitation, permit and/or catch reporting requirements, and a rules-related notice system.

Table 1-1 reflects the amendments to the Bottomfish and Seamount Groundfish FMP since 1986.

Table 2-1: Amendments to the Bottomfish and Seamount Groundfish FMP.

Amendments		
No.	**Effective Date**	**Action**
1	1987	Establishes potential limited access systems for bottomfish fisheries in the EEZ surrounding American Samoa and Guam within the framework measures of the FMP.
2	1988	Divides the EEZ around the NWHI into two management zones: the Hoomalu Zone to the northwest and the Mau Zone to the southeast. The amendment also establishes a limited access system for the Hoomalu Zone.
3	1991	Supplanted by Amendment 6, Amendment 3 defines recruitment overfishing as a condition in which the ratio of the spawning stock biomass per recruit at the current level of fishing to the spawning stock biomass per recruit that would occur in the absence of fishing is equal to or less than 20 percent.

4	1991	Requires vessel owners or operators to notify NMFS at least 72 hours before leaving port if they intend to fish in a 50 nautical mile “protected species study zone” around the NWHI. This notification allows federal observers to be placed on board bottomfish vessels.
5	1999	Establishes a limited access system for the Mau Zone and a framework for a Community Development Program.
6	1999	Identifies and describes EFH for managed species of bottomfish, discusses measures to minimize bycatch and bycatch mortality in the bottomfish fishery, provides new criteria for identifying when overfishing has occurred, and describes fishing communities in the region.
7	2004	Brings the Bottomfish FMP into conformity with the Coral Reef Ecosystems FMP by prohibiting fishing for Bottomfish MUS (BMUS) in the Coral Reef Ecosystems FMP’s no-take areas. Amends the BMUS list to exclude species now managed under the Coral Reef Ecosystems FMP.
8	2006	Includes CNMI and the PRIA in the FMP (i.e., bottomfish fisheries in these areas are now subject to applicable to FMP regulations).
9	2006	Prohibits vessels 50ft and larger from harvesting BMUS within 50 nm of Guam and requires federal permits and reporting for Guam-based bottomfish vessels 50ft or larger.

Coral Reef Ecosystems FMP

A final rule implementing the Coral Reef Ecosystems FMP was published on February 24, 2004 (69 FR 8336). The management measures of the Coral Reef Ecosystems FMP include the following:

1. designation of Howland, Baker, Jarvis Islands, Rose Atoll, and Kingman Reef as no-take marine protected areas (MPAs). Palmyra, Johnston Atolls, and Wake Islands are designated as low-use MPAs where fishing is allowed only under special fishing permits;
2. implementation of a federal permit and reporting system for controlling and monitoring the harvest of certain Coral Reef Ecosystem MUS for which there is little or no information. The FMP also uses data collected under existing local reporting systems to monitor the harvest of currently fished Coral Reef Ecosystems MUS;
3. prohibitions on the use of destructive and nonselective fishing gears;
4. prohibitions on the harvest of coral and live rock, but limited take is allowed under the permit system for collection of seed stock by aquaculture operations and religious/cultural use by indigenous peoples;
5. adaptive management approach using a framework process for rapid regulatory modifications in the event of major changes within coral reef ecosystems or coral reef fisheries;
6. consideration of the historical and cultural dependence of coral reef resources by indigenous people; and
7. identification of coral reef related research needs for each island area, including socioeconomic and cultural research for future potential allocation of resources.

To date, the Coral Reef Ecosystem FMP has not been amended.

Crustaceans FMP

The Crustaceans FMP was implemented in 1983 (48 FR 5560; February 7). Initial management measures of the FMP include the following:

1. prohibitions on fishing for spiny lobster within 20 nautical miles of Laysan Island and within the EEZ landward of the 10-fathom curve as depicted on National Ocean Survey Charts Numbers 19022, 19019, and 19016;
2. implementation of minimum size limits;
3. requirements for gear design;
4. prohibition on retention of ovigerous females; and
5. requirements for federal catch reporting

The following table reflects the amendments to the Crustaceans FMP since 1983.

Table 1-2: Amendments to the Crustaceans FMP.

Amendments		
No.	**Effective Date**	**Action**
1	1983	Adopts State of Hawaii regulations for the EEZ around the main Hawaiian Islands (MHI).
2	1984	Specifies gear requirements such as trap opening dimensions.
3	1986	Clarifies size restrictions such as definitions for minimum size and tail length.
4	1987	Prohibits all lobster fishing in the certain closed areas in the NWHI.
5	1987	Establishes a minimum size for retained slipper lobsters and requires escape panels in traps in the NWHI.
6	1991	Defines recruitment overfishing.
7	1992	Establishes a closed season, limited access system, and adjustable annual harvest quota for the NWHI.
8	1994	Eliminates the use-it-or-lose-it landing requirement for NWHI permit holders.
9	1996	Revises the NWHI annual harvest guideline to represent 13 percent of the exploitable population, which represents a 10 percent chance of overfishing the lobster stock at a particular permit area. Removes minimum size and condition restrictions in the NWHI fishery, and establishes a retain-all fishery in which every lobster brought aboard is counted against the annual harvest guideline.
10	1999	Identifies and describes EFH for Crustacean MUS, discusses measures to minimize bycatch and bycatch mortality, provides criteria for determining when overfishing has occurred, and

		describes fishing communities in the region.
11	2004	Brings the Crustaceans FMP into conformity with the Coral Reef Ecosystems FMP by prohibiting fishing for Crustaceans MUS (CMUS) in the Coral Reef Ecosystems FMP's no-take areas. Amends the CMUS list to exclude species now managed under the Coral Reef Ecosystems FMP.
12	2006	Includes CNMI and the PRIA in the FMP and establishes federal permitting and reporting requirements for crustacean fisheries operating in those areas.

Precious Corals FMP

The Precious Corals FMP was implemented in 1983 (48 FR 39229; September 29). The FMP management measures include the following:

1. establishment of harvest quotas for known precious coral beds;
2. implementation of minimum size limits for pink coral;
3. gear restrictions;
4. closed areas; and
5. fishing seasons.

Since 1983, the Precious Coral FMP has been amended several times (Table 1-4).

Table 1-4: Amendments to the Precious Corals FMP.

Amendments		
No.	**Effective Date**	**Action**
1	1988	Applies the management measures of the FMP to U.S. Pacific Insular Areas other than Guam, American Samoa, and the Northern Mariana Islands by incorporating them into a single exploratory permit area; expands the Precious corals MUS list to include any coral of the genus *Corallium*; and outlines provisions for experimental fishing permits.
2	1991	Defines a bed as overfished with respect to recruitment when the total spawning biomass (all species combined) has been reduced to 20 percent of its unfished condition.
3	1998	Establishes a framework procedure for adjustment of management measures.
4	1999	Identifies and describes EFH for managed species of precious corals, discusses measures to minimize bycatch and bycatch mortality in the precious corals fishery, provides criteria for identifying when overfishing has occurred, and describes fishing communities in the region.

5	2004	Prohibits the harvest of Precious Corals MUS in the no-take marine protected areas designated under the Coral Reef Ecosystem FMP (waters shallower than 50 fathoms around Jarvis Island, Howland Island, Baker Island, Kingman Reef, and Rose Atoll).
6	2006	Includes CNMI in the FMP and establishes federal permitting and reporting requirements for precious corals fisheries operating around CNMI

Pelagics FMP

The Pelagics FMP was implemented on February 27, 1987 (52 FR 5983). At the time the Pelagics FMP was drafted, the U.S. government was in the process of attempting to limit foreign longline fishing effort within the EEZ, and encouraging more domestic harvesting and utilization of fishery resources. The Pelagics FMP replaced a previous preliminary management plan (PMP), which governed foreign longline fishing in the EEZ of the Western Pacific Region. Management measures originally put in place under the Pelagics FMP included the following:

1. establishment of a triggering mechanism to institute new area closures for foreign longline vessels in the EEZ;
2. elimination of existing quotas on foreign longline catches in the EEZ;
3. requires federal longline catch reports, including interactions with protected species in the EEZ;
4. prohibition on the use of drift gill nets in the EEZ (except by domestic vessels fishing under an experimental permit); and
5. in cooperation with the U.S. State Department, establishment of a process to obtain data on the incidental catch of pelagic fishes in the EEZ by tuna pole-and-line and purse seine[3] vessels.

A subsequent rule effective November 26, 1990 (55 FR 42967) requires that catch-and-effort data for species managed under the FMP (Pelagic MUS) be reported to the State of Hawaii, the Territory of American Samoa, and the Territory of Guam in compliance with the respective laws and regulations of each area.[4]

Over the years, the FMP has been amended several times. Table 1-3 summarizes these amendments to the Pelagics FMP.

[3] The original Pelagics FMP contained no restrictions on foreign or domestic purse seine or pole-and-line tuna vessels, as tuna were not yet included as fish under the MSA or as MUS under the FMP. Amendment 6 to the FMP added tuna and related species to the FMP and closed the U.S. EEZ to foreign purse seine and pole-and-line tuna vessels. The U.S. tuna purse seine fleet in the Western Pacific is generally managed under the South Pacific Tuna Treaty, although provisions of the Pelagics FMP apply to those vessels when fishing within the U.S. EEZ.

[4] At that time, the CNMI was not yet included in the management area of the Pelagics FMP.

Table 1-3: Amendments to the Pelagics FMP.

AMENDMENTS		
No.	**Effective Date**	**Action**
1	1991	Provides: (a) a measurable definition of recruitment overfishing for billfishes, mahimahi, wahoo, and oceanic sharks; (b) a revised definition of OY; and (c) a revised set of objectives to conform to the MSA.
2	1991	(Proceeded by an emergency rule.) Requires longline and transshipping vessel owners to obtain permits for their vessels, and requires vessel operators to maintain and submit to NMFS logbook data on their fishing and transhipping activities. Extends the jurisdiction of the FMP to include the CNMI. Adds tuna to Pelagic MUS (PMUS) list. Establishes a protected species zone in the NWHI such that vessel operators intending to fish in this zone must notify NMFS in advance and carry an observer if requested. Requires notification of NMFS within 12 hours of return to port after any transshipment activity or landing.
3	1991	(Proceeded by an emergency rule.) Prohibits longline fishing within 50 nm of the NWHI as well as within corridors between those islands. Abrogates the requirement for observers established in Amendment 2. Requires notification of NMFS when transiting the protected species zone.
4	1991	(Proceeded by an emergency moratorium and establishment of a control date for possible use in a limited entry program.) Extends until April 1994 a moratorium on the issuance of new permits to participate in the Hawaii-based longline fishery. Provides a framework under which vessel monitoring systems (VMS) may be required.
5	1992	(Proceeded by an emergency rule.) Prohibits longline fishing within 75 nm of the islands of Oahu, Kauai, Niihau, and Kaula, and within 50 nm of the islands of Hawaii, Maui, Kahoolawe, Lanai, and Molokai. A longline closure of approximately 50 nautical miles is also implemented around Guam and its offshore banks. Establishes framework procedures to adjust the size of the closed areas and modify criteria for exemptions.
6	1992	Adds tuna and related species to FMP. Extends closed areas and requirements applicable to foreign longline vessels to foreign baitboat and purse seine vessels.
7	1994	Establishes a limited entry program for the Hawaii longline fishery for pelagic species. Includes broad framework measures for more efficient management of the fishery.
8	1999	Establishes permit and reporting requirement for pelagic troll and handline fishery in the PRIA..

9	In Revision	(Draft amendment establishing limits on shark landings was rendered moot by the Shark Finning Prohibition Act.)
10	2004	Prohibits fishing for PMUS in Coral Reef Ecosystems FMP no-take MPA. Amends the list of PMUS.
11	2005	Establishes a limited entry program for the American Samoa longline fishery.
FRAMEWORK AMENDMENTS		
No.	**Effective Date**	**Action**
1	2002	Prohibits vessels greater than 50 feet in length overall from fishing for PMUS between 3 and 50 nautical miles around the islands of American Samoa.
2	2002	(Proceeded by an emergency rule.) Requires Hawaii longline limited access vessels operating north of 23° N to employ a line-setting machine with weighted branch lines (45g minimum) or use basket style gear, and to use blue-dyed bait and strategic offal discards during setting and hauling longlines. Also requires certain seabird handling techniques and attendance by owners and operators at an annual protected species workshop conduced by NMFS.
REGULATORY AMENDMENTS		
1	2002	Prohibits targeting of swordfish north of the equator by Hawaii longline vessels, closes all fishing to longline vessels during April and May in waters south of the Hawaiian Islands (from 15° N to the equator and from 145° W to 180°), and prohibits the landing or possessing of more than 10 swordfish per trip by longline (limited entry or general) vessels and possession of light sticks. Vessels with a freeboard more than 3 feet must carry line clippers, dip nets, wire, or bolt cutters. Float lines must be longer than 20 meters. If monofilament longline is used, must have at least 15 branch lines between floats. If basket-style gear is used, must have at least 10 branch lines between floats. Deepest point of main longline between any 2 floats must be 100 meters. Vessel operators must attend and be certified for a protected species workshop.
2	2002	Establishes permit and reporting requirements for any U.S. fishing vessel that uses troll or handline gear to harvest PMUS in the EEZ around the PRIA.
3	2004	Reopens the swordfish-directed component of the Hawaii-based longline fishery and eliminates the seasonal closure for longline fishing in an area south of the Hawaiian Islands. For swordfish fishing, requires circle hooks and mackerel-type bait, annual fleet-wide limits on interactions with leatherback and loggerhead sea turtles, an annual fleet-wide limit on fishing effort, and other mitigation measures including the requirements for setting at night when fishing above 23° N.

For the complete list of regulations pertaining to each FMP as well as other fisheries regulations that apply the Western Pacific Region, see 50 CFR Part 665.

1.4 National Environmental Policy Act

NEPA (42 U.S.C. 4331, *et seq*.) establishes our national environmental policy, provides an interdisciplinary framework for environmental planning by Federal agencies, and contains procedures to ensure that Federal decision-makers take environmental factors into account. NEPA does not require that the most environmentally desirable alternative be chosen, but does require that the environmental effects of all the alternatives be analyzed equally for the benefit of decision-makers and the public.

NEPA has two principal purposes:

1. To require Federal agencies to evaluate the potential environmental effects of any major planned Federal action to ensure that public officials make well-informed decisions about the potential impacts.

2. To promote public awareness of potential impacts at the earliest planning stages of major Federal actions by requiring Federal agencies to prepare a detailed environmental evaluation for any major Federal action significantly affecting the quality of the human environment.

NEPA requires an assessment of the biological, social and economic consequences of major Federal actions and provides members of the public with an opportunity to be involved in and to influence decision-making on Federal actions. In short, NEPA ensures that environmental information is available to government officials and the public before decisions are made and actions taken.

Federal fishery management actions subject to NEPA requirements include the approval under the MSA of FMPs, FMP amendments, and regulations implementing FMPs. Such approval requires preparation of the appropriate level of NEPA analysis (Categorical Exclusion, Environmental Analysis, or Environmental Impact Statement). On the basis of a review of NEPA and NOAA Administrative Order 216-6, NMFS and the Council have determined that an EIS level analysis is the appropriate level of analysis to inform the decision considered here, replacement of the Western Pacific FMPs with one or more FEPs. The scope of the analysis is broad and at the program-level to inform future fishery management actions and decisions through incorporation by reference or tiering.

1.4.1 Lead Agency: National Marine Fisheries Service

The lead agency for this action is NMFS (also known as NOAA Fisheries Service). NMFS is a bureau within the U.S. Commerce Department’s NOAA, and is the primary federal agency responsible for stewardship of the nation’s living marine resources and their habitats. NMFS is represented in the Western Pacific Region by its Pacific Islands Regional Office and Pacific

Islands Fisheries Science Center, both located in Honolulu, Hawaii. Lead Agency is a term of art from NEPA. It means the agency or agencies preparing or having taken primary responsibility for preparing the environmental Impact statement (CEQ regulations 1508.16).

1.4.2 Roles and Responsibilities of the Federal Government, Council, State, Territories, and Commonwealth in Fisheries Management in the Western Pacific Region

The U.S. Environmental Protection Agency (EPA) has a responsibility to review and comment on major Federal actions significantly affecting the quality of the human environment, including FMPs and FMP amendments (Amendments) as developed under the MSA where those plans and amendments are subject to the EIS requirement of the NEPA.

The U.S. Army Corps of Engineers manages the planning, designing, building and operating water resources and other civil works projects (e.g., Navigation, Flood Control, Environmental Protection, Disaster Response, etc.). The Corps of Engineers is also in charge of the Clean Water Act (CWA) Section 404 permits for authorized discharge of sediment into waters of the U.S., including wetlands. With regard to commercial fishing, the Army Corps of Engineers is most often involved in near shore projects such as wharf construction and harbor improvements.

NOAA's Ocean Service co-manages the Hawaiian Islands Humpback Whale National Marine Sanctuary, manages the Fagatele Bay National Marine Sanctuary in American Samoa, and co-administers the NWHI Marine National Monument.

The U.S. Fish and Wildlife Service (USFWS) manages waters and submerged lands within Baker Island National Wildlife Refuge (NWR), Howland Island NWR, Jarvis Island NWR, Kingman Reef NWR, Palmyra Atoll NWR, Johnston Island NWR, Rose Atoll NWR, Guam NWR, Midway Atoll NWR and Hawaiian Islands NWR. The USFWS also co-administers the NWHI Marine National Monument. The Department of Defense, through the Air Force, Army, Navy, and Marine Corps, controls access and use of various marine waters throughout the region (e.g., Pearl Harbor).

The Territory of American Samoa, the Territory of Guam, and the State of Hawaii manage all marine resources and regulated fisheries within waters 0 to 3 miles from their shorelines. In the CNMI the submerged lands and marine resources from the shoreline to 200 miles have all been determined to be under the jurisdiction of the Federal government.

1.4.3 International Regional Fishery Management Organizations

Western and Central Pacific Fisheries Commission

The international Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean was opened for signature on September 5, 2000. The objective of the Convention is to assure the long-term conservation and sustainable use of highly migratory fish stocks in the region. The Convention entered into force on April 19, 2004 and most signatories including the U.S. have ratified or acceded to it. The Convention also provides for participation of fishing entities and Territories situated within the Convention area. 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 Fisheries Commission (WCPFC). A noteworthy aspect of the Convention is the fact that it will exercise management control on the high seas outside national EEZ waters in contrast to some international organizations. See Figure 1-2 for a schematic of the WCPFC convention area.

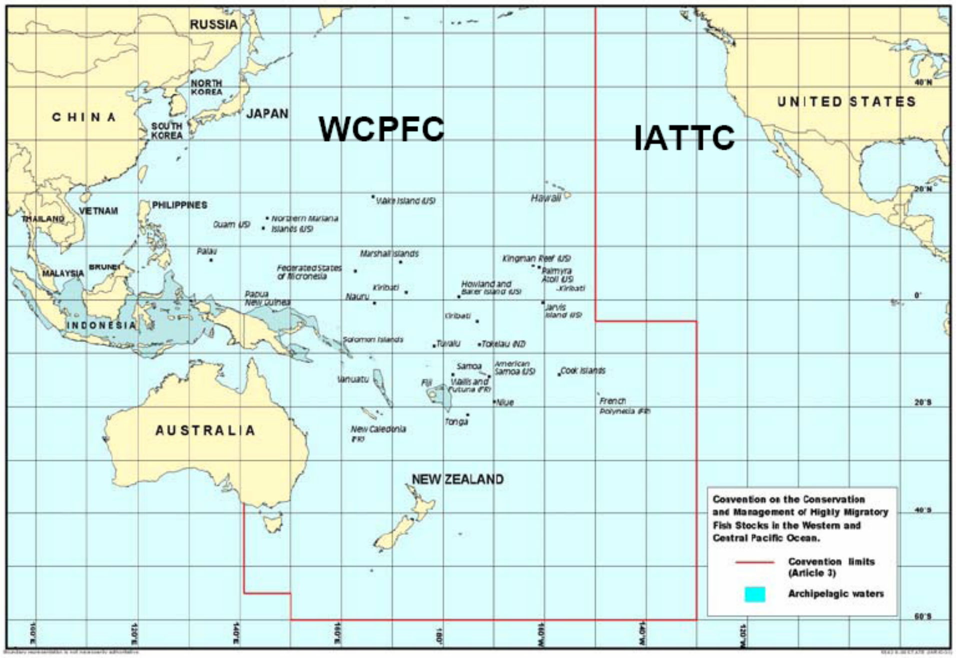
Inter-American Tropical Tuna Commission

The Inter-American Tropical Tuna Commission (IATTC) was established by international convention in 1949 and is responsible for the conservation and management of tuna fisheries and other species taken by tuna fishing activity in the eastern Pacific Ocean. The convention area of the IATTC is bounded by the coasts of the Americas to longitude 150° W, and to the 50° N and S lines of latitude. These boundaries were established in the Antigua Convention in 2003, which modified the original area of the IATTC established in 1949.

The organization consists of a Commission in which each member country may be represented by up to four commissioners and a Director of Investigations; the Director is responsible for drafting research programs, overseeing budgets, managing administrative support, directing technical staff, coordinating with other organizations and preparing reports to the Commission. The IATTC maintains a core staff of fishery scientists that coordinate and conduct research, observer programs, and the collection, compilation, analysis, and dissemination of fishery data and scientific findings.

The Council and NMFS also work closely with other international organizations across the Pacific such as the Forum Fisheries Agency, South Pacific Regional Environment Programme, and the Secretariat for the Pacific Community.

Figure 1-2: Western and Central Pacific Fisheries Commission Convention Area.



1.4.4 Public Participation in Development of the FEPs

A major function of NEPA is to ensure that federal agencies undergo a public disclosure process when making decisions that may affect the human environment. The NEPA process fosters public participation by requiring that Federal agencies conduct public scoping meetings prior to the development of a Draft EIS as well as make all Draft and Final EISs available for public review and comment. Public involvement occurs at a number of stages during development of FEPs and public comments are also welcome and encouraged throughout the Council and MSA process. Below are summaries of public involvement opportunities arranged by stages in the FEP and NEPA document development.

Notice of Intent and Public Scoping

The Notice of Intent to prepare the EIS was published in the Federal Register on October 18, 2004 (69 FR 61351). Between October and December 2004, eight public scoping meetings were advertised in local newspapers and held across the Western Pacific Region. The dates, locations and attendance of the meetings are listed in Table 1-5.

Table 1-5: EIS Public Scoping Meeting Schedule.

Date	Location	Number of Attendees
October 27, 2004	Hilo, Hawaii, HI	24
October 28, 2004	Kailua-Kona, Hawaii, HI	6
November 1, 2004	Honolulu, Oahu, HI	11
November 2, 2004	Kahului, Maui, HI	0
November 3, 2004	Lihue, Kauai, HI	1
November 16, 2004	Susupe, Saipan, CNMI	22
November 17, 2004	Hagatna, GU	23
December 8, 2004	Pago Pago, AS	19

The Council's proposed plan for an incremental, stepwise approach to ecosystem-based fisheries management was presented at each of the public scoping meetings, and similar comments were received at all the meetings. Generally, the members of the public who attended the scoping meetings were supportive of the Council's shift from species-based FMPs to place-based FEPs. Although much of the discussions at the scoping meetings were broad-based and conceptual, several comments focused on "mountain to sea" management, jurisdictional issues, indigenous rights, community-based management, education, and enforcement.

In 2005, the Council held a series of public informational meetings on its shift towards ecosystem fisheries management and the establishment of place-based FEPs as follows:

- October 22, 2005 – Pago Pago, AS
- October 25, 2005 – Susepe, Saipan, CNMI
- October 26, 2005 – Tinian, CMNI
- October 27, 2005 – Rota, CNMI
- November 1, 2005 – Honolulu, HI

Other public meetings where the Council's shift towards and fisheries ecosystem approach and the establishment of FEPs was discussed include the following:

- October 13, 2005 – Joint Plan Team Meeting, Honolulu, HI
- October 18, 2005 – 90th SSC Meeting, Honolulu, HI
- November 11, 2005 – 129th Council Meeting, Tumon, GU
- December 20, 2005 – 130th Council Meeting, Honolulu, HI

1.5 Topics in Ecosystem Approaches to Fisheries Management

An overarching goal of an ecosystem approach to fisheries management is to maintain and conserve the structure and function of marine ecosystems by managing fisheries in a holistic manner that considers the ecological linkages and relationships between a species and its environment, including its human uses and societal values (Garcia et al. 2003; Laffoley et al. 2004; Pitkitch et al. 2004). Although the literature on the objectives and principles of ecosystem approaches to management is extensive, there remains a lack of consensus and much uncertainty among scientists and policy makers on how to best apply these often theoretical objectives and principles in a real-world regulatory environment (Garcia et al. 2003; Hilborn 2004). In many cases, it is a lack of scientific information that hinders implementation (e.g., ecosystem indicators); in others cases, there are jurisdictional and institutional barriers that need to be overcome before the necessary changes can be accomplished to ensure healthy marine fisheries and ecosystems (e.g., ocean zoning). These and other topics are briefly discussed below to provide a context for the proposed actions analyzed in this document.

1.5.1 Ecosystem Boundaries

It widely recognized that ecosystems are not static, but that the structure and functions vary over time because of various dynamic processes (Christensen et al. 1996; Kay and Schneider 1994; Ecosystems Principles Advisory Panel 1999). The term "ecosystem" was coined in 1935 by A. G. Tansley, who defined ecosystems as "an ecological community together with its environment, considered as a unit" (Tansley 1935). The U.S. Fish and Wildlife Service has defined an ecosystem as "a system containing complex interactions among organisms and their non-living, physical environment" (USFWS 1994), while NOAA defines an ecosystem as "a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics" (NOAA 2004).

Although these definitions are more or less consistent (although only NOAA explicitly includes humans as part of ecosystems), the identification of ecosystems is often difficult and dependent on the scale of observation or application. Ecosystems can be reasonably identified, for example, for an intertidal zone on Maui, Hawaii, as well as the entire North Pacific Ocean. For this reason, hierarchical classification systems are often used in mapping ecosystem linkages between habitat types (Allen and Hoekstra 1992; Holthus and Maragos 1995). NOAA's Ecosystem Advisory Panel found that although marine ecosystems are generally open systems, bathymetric and oceanographic features allow their identification on a variety of bases. In order to be used as functional management units, however, ecosystem boundaries need to be geographically based and aligned with ecologically meaningful boundaries (Food and Agriculture Organization [FAO] 2002). Furthermore, if used as a basis for management measures, an ecosystem must be defined in a manner that is both scientifically and administratively defensible (Gonsalez 1996). Similarly, Sissenwine and Murawski (2004) found that delineating ecosystem boundaries is necessary to an ecosystem approach, but that the scale of delineation must be based on the spatial extent of the system that is to be studied or influenced by management. Thus, the identification of ecosystem boundaries for management purposes may differ from those identified from purely scientific assessments, but in all cases ecosystems are geographically defined, or in other words, place-based.

1.5.2 Precautionary Approach, Burden of Proof, and Adaptive Management

There is general consensus that a key component of ecosystem approaches to resource management is the use of precautionary approaches and adaptive management (EPAP 1999). The FAO Code of Conduct for Responsible Fisheries states that under a precautionary approach:

> In the absence of adequate scientific information, cautious conservation management measure such as catch limits and effort limits should be implemented and remain in force

> until there is sufficient data to allow assessment of the impacts of an activity on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. (FAO 1995)

This approach allows appropriate levels of resource utilization through increased buffers and other precautions where necessary to account for environmental fluctuations and uncertain impacts of fishing and other activities on the ecology of the marine environment (Pitkitch et al. 2004).

A notion often linked with the precautionary approach is shifting the "burden of proof" from resource scientists and managers to those who are proposing to utilize those resources. Under this approach, individuals would be required to prove that their proposed activity would not adversely affect the marine environment, as compared to the current situation that in general allows uses unless managers can demonstrate such impacts (Hildreth et al. 2005). Proponents of this approach believe it would appropriately shift the responsibility for the projection and analysis of environmental impacts to potential resource users and fill information gaps, thus shortening the time period between management decisions (Hildreth et al. 2005). Others believe that it is unrealistic to expect fishery participants and other resource users to have access to the necessary information and analytical skills to make such assessments.

The precautionary approach is linked to adaptive management through continued research and monitoring of approved activities (Hildreth et al. 2005). As increased information and an improved understanding of the managed ecosystem become available, adaptive management requires resource managers to operate within a flexible and timely decision structure that allows for quick management responses to new information or to changes in ecosystem conditions, fishing operations, or community structures.

1.5.3 Ecological Effects of Fishing and Nonfishing Activities

Fisheries may affect marine ecosystems in numerous ways, and vice versa. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can also affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, introduction of exotic species, pollution, shifts in trophic levels, species composition, ecosystem function, and habitat disturbance. Historically, federal fishery management focused primarily on ensuring long-term sustainability by preventing overfishing and by rebuilding overfished stocks. However, the reauthorization of the MSA in 1996 placed additional priority on reducing nontarget or incidental catches, minimizing fishing impacts to habitat, and eliminating interactions with protected species. As a result fisheries management has significantly improved in these areas in recent years, however there is now an increasing emphasis on the need to account for and minimize the unintended and indirect consequences of fishing activities on other components of the marine environment such as predator–prey relationships, trophic guilds, and biodiversity (Dayton et al. 2002; Browman et al. 2004a, 2004b).

For example, fishing for a particular species at a level which is below its maximum sustainable yield can nevertheless limit its availability to predators, which, in turn, may impact the abundance of the predator species. Similarly, removal of top-level predators can potentially increase populations of lower level trophic species, thus causing an imbalance or change in the community structure of an ecosystem (Pauly et al. 1998). Successful ecosystem management will require significant increases in our understanding of the impacts of these changes and the formulation of appropriate responses to adverse changes.

Marine resources are also affected by nonfishing aquatic and land-based activities. For example, according to NOAA's *State of Coral Reefs Ecosystems of the United States and Pacific Freely Associated States: 2005,* anthropogenic stressors that are potentially detrimental to coral reef resources include the following:

- Coastal development and runoff
- Coastal pollution
- Tourism and recreation
- Ships, boats, and groundings
- Anchoring
- Marine debris
- Aquatic invasive species
- Security training activities

Non-anthropogenic impacts such as weather cycles, hurricanes, and environmental regime changes also have an effect on the ecosystem. Although managers cannot regulate or otherwise control such events, their occurrence can often be predicted and management responses can lessen their adverse impacts.

Understanding the complex interrelationships between marine organisms and their physical environment is a fundamental component of successful ecosystem approaches to management. Obtaining the necessary information to comprehensively assess, interpret, and manage these interrelationships will require in-depth and long-term research on specific ecosystems.

1.5.4 Data and Information Needs

Numerous research and data collection projects and programs have been undertaken in the Western Pacific Region and have resulted in the collection of huge volumes of potentially valuable detailed bathymetric, biological and other data. Some of this information has been processed and analyzed by fishery scientists and managers; however, much has proven difficult to handle because of differences in collection methodologies coupled with a lack of metadata[7] or documentation of how the data were collected and coded. This has resulted in incompatible datasets as well as data that are virtually inaccessible to anyone except the primary researchers. The rehabilitation and integration of existing datasets, as well as the establishment of shared standards for the collection and documentation of new data, will be an essential part of successful and efficient ecosystem management in the Western Pacific Region.

[7] **Metadata** (Greek *meta* "about" and Latin *data* "information") are data that describe other data. Generally, a set of metadata describes a single data point or a set of data.

To this end, the Council has recently convened three workshops. The first was the Ecosystem Science and Management Planning Workshop held April 18–22, 2005 in Honolulu, Hawaii, which was attended by world-renowned ecosystem scientists as well as high-level government agency officials. The objective of this workshop was to determine the (biophysical) science and data needs to support the application of ecosystem principles into planning and management. The summary of the workshop proceedings is provided in the appendix and the full proceedings can be obtained online from www.wpcouncil.org or by mail[8] from the Council. Key points from the workshop include the following:

- Management and policy objectives need to be clearly and precisely stated prior to data collection or modeling/analyses being initiated;
- model or analysis choice must be driven firstly by management and policy objectives, and secondly by available or obtainable data;
- adaptive management experiments, involving deliberate spatial comparisons of management measures (e.g., marine protected areas) are of crucial importance for developing and implementing ecosystem-based management approaches;
- models cannot and should not determine the management decision, which, by its very nature, is choice driven and influenced by tradeoffs;
- some data collection efforts, while labeled as ecosystem-based, may not be appropriately scaled (in terms of spatio-temporal sampling) or may not target useful variables or parameters for ecosystem-based fisheries management;
- new or different data may need to be collected, depending on clearly identified management/policy issues, and the associated analysis/modeling needs. Such data activities should include data 'mining' and data recovery from old and/or unusual sources (e.g., research theses, unpublished grey literature, old print and electronic media etc.); and
- concerted efforts are required to reduce or overcome agency specific disagreements (e.g., jurisdictional boundaries) and miscommunication in an integrative approach to move towards system management as a centralized objective.

The following recommendations were produced from the ecosystem science workshop:

1. clearly define and articulate management and policy issues and objectives along lines of urgency and identified needs;
2. assign a centralized resource entity with sufficient seniority and appropriate financial and human resources to establish and maintain a centralized data reference and contact point (the "who, what, where, when, and how" of data);
3. review and evaluate all currently available data and data collection schemes (biological, social, economic etc.), and initiate and maintain data 'mining' and recovery activities;
4. undertake initial assessments and analyses of available data, based on key management/policy issues identified by management and stakeholders. This is primarily aimed at identifying strengths and weaknesses of current data and data collection programs, and pointing out obvious data gaps;
5. identify and initiate adaptive management experiments at ecosystem scale;

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6. ensure that data collection and models/analyses for ecosystem-based management are coordinated with and driven by clearly identified management needs and issues;
7. encourage keeping all models/analyses at the most 'simple' level possible, avoid temptation to build large, exceedingly complex models;
8. ensure adequate support and resources for clearly identified ecosystem-scale monitoring, research and modeling/analytical investigations; and
9. evaluate a suite of indicators (both existing fishery-based, as well as new and emerging ecosystem-based) in an evolving and adaptive process.

The second workshop the Council convened was the Ecosystem Social and Policy Science Workshop. This workshop addressed human dimensions of ecosystems and facilitated informed discussion of social science requirements for effectively supporting an ecosystem approach to fisheries management in the Western Pacific Region. Participants included social science experts with experience in marine resources management issues as well as fishery managers and scientists. Based on presentations made at the workshop, the preparers of the proceedings recommended the following steps to incorporate social science methods, models, and principals in the development and implementation of an appropriate ecosystem approach.

1. *Establish a venue for choosing priorities and specific management measures*. Establishment of a venue for Council, NMFS , and regional social scientists to work toward (a) prioritization of FEP objectives vis-à-vis social science applications, and (b) identification of specific management measures and related information needs to meet those objectives, may serve to resolve complexity.
2. *Design research to meet prioritized objectives and information needs*. Once prospective management measures are identified in association with the prioritized objectives, expertise should ideally be applied to formulate specific plans for conducting social research in the region as needed to assess the possible effects of implementing those measures. Given that extant data may contribute both to the design of the research and to the necessary analyses, the first and indispensable step in the process would be compilation and organization of relevant data.
3. *Implement a research and monitoring strategy.* In cases where existing data is insufficient for assessing the prospective management measures, a strategy for sponsoring and conducting the necessary research and analyses needs to be implemented.
4. *Develop and implement liaison and performance evaluation programs.* There is utility in establishing means by which resource user groups may readily interact and communicate on a regular, non-contentious, and interactive basis with management entities in the region.

A summary of the social science workshop proceedings is provided in in the appendix and the full proceedings can be obtained online at www.wpcouncil.org or by mail[9] from the Council. A third workshop on data needs for FEPs was convened in October 2006 and attended by federal and Western Pacific Region State, Territory and Commonwealth fisheries scientists and managers. The objective of the workshop was to review data needs for FEPs. A fourth workshop

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is scheduled for January 2007 to build off of the recommendations and discussions generated in the April 2005 and January 2006 ecosystem workshops.

1.5.5 Use of Indicators and Models

Ecosystem-based management is enhanced by the ability to understand and predict environmental changes, as well as the development of measurable characteristics (e.g., indices or indicators) related to the structure, composition, or function of an ecological system (de Young et al. 2004; EPAP 1999; Marine Fisheries Advisory Committee Ecosystem Approach Task Force 2003).

Indicators

The development and use of indicators are an integral part of an ecosystem approach to management as they provide a relatively simple mechanism to track complex trends in ecosystems or ecosystem components. Indicators can be used to help answer what is changing and to what extent (state variables; e.g., coral reef biomass); why is it changing (pressure variables; e.g., bleaching); and why it is important and what should be done (response variables; e.g., management measures). This pressure–state–response framework provides a mechanism for causal change analyses of complex phenomena in the marine environment, and can clarify the presentation and communication of such analyses to a wide variety of stakeholders (R.Wakeford, MRAG, personal communication).

While much has been written on potential marine ecosystem indicators (FAO 1999; ICES 2000, 2005), to date there are no established reference points for optimal ecosystem structures, composition, or functions. Because of the subjective nature of describing or defining the desirable ecosystems that would be associated with such reference points (e.g., a return to some set of prehistoric conditions vs. an ecosystem capable of sustainable harvests), this remains a topic of much discussion.

Models

The ecosystem approach is regarded by some as endlessly complicated as it is assumed that managers need to completely understand the detailed structure and function of an entire ecosystem in order to implement effective ecosystem-based management measures (Browman and Stergiou 2004a, 2004b). Although true in the ideal, interim approaches to ecosystem management need not be overly complex to achieve meaningful improvements.

Increasing interest in ecosystem approaches to management has led to significant increases in the modeling of marine ecosystems, using various degrees of parameter and spatial resolution. Ecosystem modeling of the Western Pacific Region has progressed from simple mathematical models to dynamically parameterized simulation models[10] (Polovina 1984; Polovina et al. 1994; Polovina et al. 2004).

While physical oceanographic models are well developed, modeling of trophic ecosystem components has lagged primarily because of the lack of reliable, detailed, long-term data. Consequently, there is no single, fully integrated model that can simulate all of the ecological linkages between species and the environment (de Young et al. 2004).

De Young et al. (2004) also examined the challenges of ecosystem modeling and presented several approaches to incorporating uncertainty into such models. However, Walters (2005) cautioned against becoming overly reliant on models to assess the relative risks of various management alternatives and suggests that modeling exercises should be used as aids in experimental design rather than as precise prescriptive tools.

1.5.6 Single-Species Management vs. Multispecies Management

A major theme in ecosystem approaches to fisheries management is the movement from conventional, single-species management to multi-species management (Mace 2004; Sherman and Alexander 1986). Multispecies management is generally defined as management based on the consideration of all fishery impacts on all marine species rather than focusing on the maximum sustainable yield for any one species. The fact that many of the ocean's fish stocks are believed to be overexploited (FAO 2002) has been used by some as evidence that single-species models and single-species management have failed (Hilborn 2004; Mace 2004). However, Hilborn (2004) noted that some of the species that were historically overexploited (e.g., whales, bluefin tuna) were not subject to any management measures, single-species or otherwise. In other cases (e.g., northern cod), it was not the models that failed but the political process surrounding them (Hilborn, 2004). Thus, a distinction must be made between the use of single-species or multi-species models and the application of their resultant management recommendations. Ecosystem management requires that a full range of fishery impacts be considered when formulating management measures, and both single-species and multi-species models are valuable tools in this analysis.

Although successful ecosystem management will require the holistic analysis and consideration of marine organisms and their environment, the use of single-species models and management measures will remain an important part of fishery management (Mace 2004). If applied to all significant fisheries within an ecosystem, conservative single-species management has the potential to address many ecosystem management issues (ICES 2000; Witherell et al. 2000; Murawski 2005). Recognizing the lack of a concise blueprint to implement ecosystem indicators and models, there is growing support for building upon traditional single-species management to incrementally integrate and operationalize ecosystem principles through the use of geographically parameterized indicators and models (Browman and Stergiou 2004a, 2004b; Sissenwine and Murawski 2004). At this time the agency is reporting the status of stocks based on single species and multi-species stock complexes as it moves towards EBM.

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[10] A computer simulation or a computer model that attempts to simulate an abstract model of a particular system.

1.5.7 Ocean Zoning

The use of ocean zoning to regulate fishing and nonfishing activities has been a second major theme in the development of marine ecosystem management theory (Browman and Stergiou 2004a, 2004b). In general, these zones are termed Marine Protected Areas (MPAs) and are implemented for a wide variety of objectives ranging from establishing wilderness areas to protecting economically important spawning stocks (Lubchenco et al. 2003). In 2000, Executive Order 13158 was issued for the purpose of expanding the nation's existing system of MPAs to "enhance the conservation of our Nation's natural and cultural marine heritage and the ecologically and economically sustainable use of the marine environment for future generations." The Executive Order also established an MPA Federal Advisory Committee charged with providing expert advice and recommendations on the development of a national system of MPAs. In June 2005, this Committee released its first report, which includes a range of objectives and findings including the need for measurable goals, objectives, and assessments for all MPAs (NOAA 2005a). Today, MPAs can be found throughout the Western Pacific Region and are considered an important tool for marine resource management. Ongoing research and outreach are anticipated to result in the implementation of additional MPAs as ecosystem research provides additional insights regarding appropriate MPA locations and structures to achieve specific objectives.

1.5.8 Intraagency and Interagency Cooperation

To be successful, ecosystem approaches to management must be designed to foster intra-agency and interagency cooperation and communication (Schrope 2002). As discussed in Section 1.2.3, the Western Pacific Region includes various federal, state, commonwealth, territory, and local government agencies, as well as international management bodies with marine management authority. Given that these many agencies (or groups) either share or each have jurisdiction over certain areas or activities, reaching consensus on how best to balance resource use with resource protection is essential to resolving currently fragmented policies and conflicting objectives. The U.S. Ocean Action Plan (issued in response to the report of the U.S. Ocean Commission on Policy) recognized this need and established a new cabinet level Committee on Ocean Policy (U.S. Ocean Action Plan 2004) to examine and resolve issues regarding coordination among federal and local government agencies. In the Western Pacific Region, coordination between federal, state and local governments will be especially important to the successful implementation of an ecosystem approach to fisheries management.

1.5.9 Community-Based Management

Communities are created when people live or work together long enough to generate local societies. Community members associate to meet common needs and express common interests, and relationships built over many generations lead to common cultural values and understandings through which people relate to each other and to their environment. At this point, collective action may be taken to protect local resources if they appear threatened, scarce, or subject to overexploitation. This is known as community-based resource management.

As ecosystem principles shift the focus of fishery management from species to places, increased participation from the primary stakeholders (i.e., community members) can enhance marine management by (a) incorporating local knowledge regarding specific locations and ecosystem conditions; (b) encouraging the participation of stakeholders in the management process, which has been shown to lead to improved data collection and compliance; and (c) improving relationships between communities and often centralized government agencies (Dyer and McGoodwin 1994).

Top-down management tends to center on policy positions that polarize different interest groups and prevent consensus (Yaffee 1999). In contrast, “place”—a distinct locality imbued with meaning—has value and identity for all partners and can serve to organize collaborative partnerships. Despite often diverse backgrounds and frequently opposing perspectives, partners are inspired to take collective on-the-ground actions organized around their connections and affiliations with a particular place (Cheng et al. 2003).

In August 2004, President George W. Bush issued Executive Order 13352 to promote partnerships between federal agencies and states, local governments, tribes, and individuals that will facilitate cooperative conservation and appropriate inclusion of local participation in Federal decision making regarding the nation’s natural resources. Similarly the U.S. Ocean Action Plan (2004) found that “local involvement by those closest to the resource and their communities is critical to ensuring successful, effective, and long-lasting conservation results.”

1.6 An Incremental Approach

Fishery scientists and managers have recognized that a comprehensive ecosystem approach to fisheries management must be implemented through an incremental and collaborative process (Jennings 2004; NOAA 2004; Sissenwine and Murawski 2004). As described previously, successful ecosystem management will require an increased understanding of a range of social and scientific issues such as biological and trophic relationships, ecosystem indicators and models, and socioeconomic factors. While work on some of these issues has been conducted, there is a need for increased efforts in ecosystem research as well as a need for how information derived from such research should be incorporated into fishery management decisions.

It is clear from the EPAP’s recommendations as well as the outcomes of the Council’s workshops, there is much work to be done to fully implement an ecosystem approach to fisheries management in the Western Pacific Region. Therefore, an incremental approach toward full implementation is realistic at this time and future fishery management actions will use new information as it becomes available. Linked to the new information will be the development of management tools that advance the implementation of ecosystem approaches to fisheries management in the Western Pacific Region. Examples of such tools may include the use of food webs in predictive models and the use of indicators to monitor ecosystem conditions.

Although the administrative and operational costs to advance the implementation of ecosystem science and management in the Western Pacific Region are unknown at this time, adequate funding support will be needed to enable the Council and NMFS to effectively shift from a species-based resources management approach to an ecosystem approach. It will also take increased coordination among the Council, NMFS, and state and local government agencies to fully implement effective ecosystem management. As new information becomes available, and adaptive management through the Council process occurs, any potential future actions will be analyzed and implemented in compliance with all applicable laws (including NEPA) as required under the MSA.

CHAPTER 2: ALTERNATIVES

2.0 Introduction

This chapter presents the alternatives considered in this analysis. These alternatives represent a reasonable range of actions for the first phase of incremental steps towards the implementation of an ecosystem approach to fishery management. Alternatives under the following five components were identified: (1) Replacing the existing FMPs with FEPs; (2) Species to be managed under each FEP; (3) Council advisory structure; (4) Regional coordination; and, (5) International coordination.

Components 1 and 2 are regulatory in nature and considered the Federal action in this document. Components 3, 4, and 5 are nonregulatory (i.e., they have no regulatory effect), and their consideration is included to assist the Council in identifying an appropriate advisory structure and coordination activities under an ecosystem-based fishery management structure. Component 2 is contingent upon selecting one of the action alternatives under Component 1. Table 2-1 provides a brief description of the alternatives considered in detail for each component.

Table 2-1: Alternatives considered in detail.

Components of the Federal Action and the Alternatives	Description
Component 1:	***Replace FMPs with FEPs.*** Included in Component 1 for Alternatives 1B through 1E is the associated reorganization of existing species-based FMP regulations into place-based FEP regulations.
Alternative 1A - No Action	Do not approve or implement FEPs; Do not replace FMPs with FEPs
Alternative 1B	For one area only, approve and implement an FEP, which will replace existing FMPs
Alternative 1C	Approve and implement FEPs that include EEZ waters around each archipelagic area (American Samoa, Hawaiian, Marianas, PRIA), these FEPs will replace existing FMPs; Retain the Pelagic FMP for the domestic pelagic fisheries operating on the surrounding high seas
Alternative 1D - Preferred	Approve and implement four demersal FEPs and one pelagic FEP, which will replace existing FMPs
Alternative 1E	Approve and implement FEPs for each biogeographic and pelagic zones, which will replace existing FMPs

Component 2:	***List of MUS***
Alternative 2A - No Action	Do not change the current MUS lists
Alternative 2B - Preferred	Define FEP MUS as those current MUS that are *known*[11] to be present within each FEP boundary
Alternative 2C	Define FEP MUS as those current MUS *known* to occur within the boundaries of the FEP, *plus* incidentally caught and associated species that are known to occur within each FEP boundary
Alternative 2D	Define FEP MUS as those current MUS *believed*[12] to potentially occur, *plus* incidentally caught and associated species believed to potentially occur within each FEP boundary
Component 3:	***Council Advisory Structure***
Alternative 3A - No Action	Do not change the current advisory structure
Alternative 3B	Add a single FEP Plan Team to the current advisory structure
Alternative 3C	Replace the current FMP advisory panels, plan teams, and five standing committees with FEP advisory panels, FEP plan teams, and FEP standing committees
Alternative 3D - Preferred	Replace the current FMP advisory panels, plan teams, and five standing committees with FEP advisory panels, FEP standing committees, and two FEP plan teams
Component 4:	***Regional Coordination***
Alternative 4A - No Action	Do not establish Ocean Council type groups
Alternative 4B - Preferred	Establish Regional Ecosystem Council Committees
Alternative 4C	Participate in and support existing Ocean Council type groups
Alternative 4D	Establish independent Regional Ecosystem Councils

[11] For the purpose of this EIS, *Known* is used as a species generally recognized as being established within a particular ecosystem.
[12] For the purpose of this EIS, *Believe* is used as an opinion that a species exists within a particular ecosystem or a similar ecosystem of the Western Pacific Region, especially when there is no absolute proof of its existence or reality.

Component 5:	*International Coordination*
Alternative 5A - No Action	Continue to participate in international fisheries management fora and international workshops
Alternative 5B - Preferred	Increase participation in international fisheries management fora and establish meetings/workshops with neighboring nations of island areas of the Western Pacific Region
Alternative 5C	Do not participate in international management fora

The alternatives considered in detail are described below. In general, each component's alternatives range from no action or *status quo* to the implementation of a detailed and specific approach to the component at hand. Alternatives selected as "preferred" by the Council are identified for each component. Several alternatives were also considered but regarded as not reasonable and were therefore eliminated from detailed study. These alternatives and the reasons that they were not considered in detail are also summarized below.

2.1 Component 1: Replace the Existing FMPs with FEPs

As discussed in Chapter 1, the purpose of the proposed Federal Action is to establish an institutional framework that would allow a shift to an ecosystem approach to fisheries management in the Western Pacific Region. This would be accomplished, in part, through the approval and implementation of place-based FEPs (Component 1 of the Federal Action). Although Component 1 of the proposed Federal Action also includes the reorganization of existing species-based fishery management plan regulations into place-based ecosystem fishery management plan regulations, no substantive changes to current fishing regulations would occur in any of the alternatives. Under Alternative 1D, the Preferred Alternative, once the Secretary has approved the FEPs, the FEPs would replace the existing FMPs as the operating management plans for the fisheries, pursuant to MSA.

As described in Chapter 1, an ecosystem can be defined as a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics. Ecosystems can be considered at various geographic scales, from a coral reef ecosystem with its diverse species and benthic habitats to a large marine ecosystem such as the Pacific Ocean. From a marine ecosystem management perspective, defining the boundary of an ecosystem is challenging as it depends on many factors such as, but not limited to, oceanographic conditions for instance water circulation, salinity, temperature, and substrate, in addition to biological considerations of various marine species including life history characteristics, habitat requirements, geographic ranges, and genetic connectivity. Additionally, processes that affect and influence abundance and distribution of natural resources such as climate cycles, extreme natural events, and acute or chronic anthropogenic impacts, must be considered. Substantial consideration must also be given to social, economic, and political constraints.

Description of Fishery Ecosystem Plans (FEPs)

The proposed FEPs do not substantively change existing regulations or management; rather at this stage they would just reorganize the existing fishery management measures into geographically defined management plans. The geographically-based FEPs would replace the FMPs and provide the underlying management plan for fisheries in the Western Pacific Region, pursuant to MSA. The proposed FEPs would establish a framework under which the Council and NMFS would improve their abilities to incorporate ecosystem science and principles in management decisions, consistent with the MSA. To achieve this outcome, the Council has adopted the following objectives for the FEPs.

> *Objective 1:* To maintain biologically diverse and productive marine ecosystems and foster the long-term sustainable use of marine resources in an ecologically and culturally sensitive manner through the use of a science-based ecosystem approach to resource management.
>
> *Objective 2:* To provide flexible and adaptive management systems that can rapidly address new scientific information and changes in environmental conditions or human use patterns.
>
> *Objective 3:* To improve public and government awareness and understanding of the marine environment in order to reduce unsustainable human impacts and foster support for responsible stewardship.
>
> *Objective 4:* To encourage and provide for the sustained and substantive participation of local communities in the exploration, development, conservation, and management of marine resources.
>
> *Objective 5:* To minimize fishery bycatch and waste to the extent practicable.
>
> *Objective 6:* To manage and comanage protected species, protected habitats, and protected areas.
>
> *Objective 7:* To promote the safety of human life at sea.
>
> *Objective 8:* To encourage and support appropriate compliance and enforcement with all applicable local and federal fishery regulations.
>
> *Objective 9:* To increase collaboration with domestic and foreign regional fishery management and other governmental and nongovernmental organizations, communities, and the public at large to successfully manage marine ecosystems.
>
> *Objective 10:* To improve the quantity and quality of available information to support marine ecosystem management.

Description of procedure that will be used to approve the Fishery Ecosystem Plans (FEPs)

The procedures the Secretary will use to review and approve the FEPs are outlined in the MSA. As provided for under MSA, Section 302 (h)(1), for each fishery under the Council's authority that requires conservation and management, the Council shall prepare and submit to the Secretary a fishery management plan (for the purpose of MSA, FEPs are considered fishery management plans). Section 303 of MSA provides the required provisions of a fishery management plan. Section 304 of MSA outlines the actions of the Secretary for reviewing fishery management plans as submitted by the Council.

In particular, Section 304 (a) REVIEW OF PLANS reads, in part, as follows:

> (1) Upon transmittal by the Council to the Secretary of a fishery management plan or plan amendment, the Secretary shall--
>
> > (A) immediately commence a review of the plan or amendment to determine whether it is consistent with the national standards, the other provisions of this Act, and any other applicable law; and
> >
> > (B) immediately publish in the Federal Register a notice stating that the plan or amendment is available and that written information, views, or comments of interested persons on the plan or amendment may be submitted to the Secretary during the 60-day period beginning on the date the notice is published.
>
> (2) In undertaking the review required under paragraph (1), the Secretary shall--
>
> > (A) take into account the information, views, and comments received from interested persons;
> >
> > (B) consult with the Secretary of State with respect to foreign fishing; and
> >
> > (C) consult with the Secretary of the department in which the Coast Guard is operating with respect to enforcement at sea and to fishery access adjustments referred to in section 303(a)(6).
>
> (3) The Secretary shall approve, disapprove, or partially approve a plan or amendment within 30 days of the end of the comment period under paragraph (1) by written notice to the Council. A notice of disapproval or partial approval shall specify--
>
> > (A) the applicable law with which the plan or amendment is inconsistent;
> >
> > (B) the nature of such inconsistencies; and
> >
> > (C) recommendations concerning the actions that could be taken by the Council to conform such plan or amendment to the requirements of applicable law.

> If the Secretary does not notify a Council within 30 days of the end of the comment period of the approval, disapproval, or partial approval of a plan or amendment, then such plan or amendment shall take effect as if approved.

Under all alternatives under Component 1 considered in detail, continuing adaptive management actions may occur to refine the fishery management plan boundaries if and when supported by scientific data, management requirements, or management authority. Any such future actions, if proposed as part of the regulatory or management structure under the MSA, will be considered in accordance with all applicable law, including NEPA.

2.1.1 Component 1: Alternatives Considered in Detail

Alternative 1A (No Action): Do not approve or implement FEPs; Do not replace FMPs with FEPs

This alternative represents the *status quo* under which FEPs would not be approved or implemented, and the existing five FMPs and their corresponding regulatory structures would not be changed. As promulgated under the MSA, the councils are responsible for the preparation of FMPs or amendments to those FMPs for each fishery under their authority that requires conservation and management. The councils transmit these FMPs to NMFS, acting on behalf of the Secretary, for review and approval, disapproval, or partial approval. Once approved, NMFS implements the FMP or FMP amendment through regulations and enforcement. Federal fisheries in the Western Pacific Region are currently managed under five species-based FMPs: Pelagics, Bottomfish and Seamount Groundfish, Coral Reef Ecosystems, Crustaceans, and Precious Corals. Under this alternative, fishery operations would continue to be adaptively managed under each FMP in accordance with the MSA and other applicable laws and statutes.

Alternative 1B: For one area only, approve and implement an FEP, which will replace existing FMPs

A demersal[13] FEP for the Mariana Archipelago was selected as an example under this alternative, and the other archipelagos of Western Pacific Region could be substitute for the Marianas for the purposes of this analysis. Under this alternative, for the Federal waters of the Mariana Archipelago (Guam and Northern Mariana Islands combined), all demersal marine resources and the associated habitats would be delineated as distinct ecosystems. The fisheries associated with that demersal ecosystem would be managed under a Mariana Archipelago FEP. The management of the pelagic marine resources and habitats within the Federal waters of the Mariana Archipelago, along with the remaining areas within the Western Pacific Region will continue to be managed under the existing five species-based FMPs (Table 2-2). Under Alternative 1B, existing regulations relevant to the Mariana Archipelago would be reorganized as ecosystem-based regulations specific to that area. Although the regulations would be

[13] Demersal means living near the bottom of the sea.

reorganized under Alternative 1B, no substantive changes would occur to current fishing regulations.

Table 2-2: Current and Proposed Management Structure under Alternative 1B.

Current Management Structure	Proposed Management Structure under Alternative 1B
Bottomfish FMP	***Bottomfish FMP*** *No Change - Except for the elimination of relevant portions of the Bottomfish FMP that would be included in the Mariana Archipelago FEP*.
Coral Reef Ecosystem FMP	***Coral Reef Ecosystem FMP*** *No Change - Except for the elimination of relevant portions of the Coral Reef Ecosystem FMP that would be included in the Mariana Archipelago FEP*.
Crustaceans FMP	***Crustaceans FMP*** *No Change - Except for the elimination of relevant portions of the Crustaceans FMP that would be included in the Mariana Archipelago FEP*.
Precious Corals FMP	***Precious Corals FMP*** *No Change - Except for the elimination of relevant portions of the Precious Coral FMP that would be included in the Mariana Archipelago FEP*.
Pelagics FMP	**Pelagics FMP** *No Change*
	Mariana Islands FEP *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, and Precious Coral FMP.*

Alternative 1C: Approve and implement FEPs that include EEZ waters around each archipelagic area (American Samoa, Hawaiian, Marianas, PRIA), these FEPs will replace existing FMPs; Retain the Pelagic FMP for the domestic pelagic fisheries operating on the surrounding high seas)

Under Alternative 1C, the fisheries currently managed under the species-based FMPs would be replaced by FEPs within all Federal waters surrounding each of the Western Pacific Region's archipelagic areas (Table 2-2). Because of their close proximity, ecological links, and social connections, Federal waters and the associated marine resources surrounding Guam and the

Northern Mariana Islands would be delineated as an ecosystem and the fisheries associated with this area would be managed under a Mariana Archipelago FEP. For the same reasons, Federal waters surrounding the Hawaiian Islands would be delineated as an ecosystem and managed under a Hawaiian Archipelago FEP. Federal waters surrounding the islands of American Samoa would be delineated as an ecosystem and managed under an American Samoa Archipelago FEP. Federal waters around the U.S. Pacific Remote Islands, some of which are part of the Line and Phoenix Islands, would be managed under the PRIA FEP.

With the exception of the waters around CNMI and the PRIA, the boundaries of the FEPs would encompass all Federal waters from 3 to 200 miles from shore for each of the Western Pacific Region's archipelagic areas. The Federal waters around CNMI and the PRIA are recognized as 0 to 200 miles from shore. Within these boundaries, both the demersal and pelagic fisheries would be managed under the proposed FEPs (Table 2-4). Under Alternative 1C, the management of the domestic pacific pelagic fisheries operating within areas outside one of the Western Pacific Region's archipelagic areas, as defined in Table 2-3, would remain under the Pelagic FMP. In addition, existing regulations relating to the current FMPs would be reorganized to reflect the boundaries under each FEP. Although the regulations would be reorganized under Alternative 1C, no substantive changes would occur to current fishing regulations.

Table 2-3: Delineated Ecosystems for FEPs under Alternative 1C.

FEP	Delineated Ecosystem//Management Area
American Samoa Archipelago	All Federal waters surrounding American Samoa.[14]
Mariana Archipelago	All Federal waters surrounding Guam and CNMI
Hawaiian Archipelago	All Federal waters surrounding Hawaii.
Pacific Remote Island Areas (PIRA)[15]	All Federal waters surrounding Howland Island, Baker Island, Jarvis Island, Johnston Island, Kingman Reef, Palmyra Atoll, and Wake Island.

Note: See Figure 1-1 for a map of the Western Pacific Region and the boundaries of the proposed ecosystems under each FEP.

[14] Because of their ecological and cultural connections between Independent Samoa and America Samoa, an advisory relationship with independent Samoa would be sought to facilitate the development of collaborative management activities.

[15] Because state and territorial waters do not exist in the PRIA, jurisdiction over nearshore fishery resources and habitat is the responsibility of the U.S. Department of the Interior (DOI) and U.S. Department of Commerce. Jurisdictional boundaries in this area are expressed in varying terms ranging from fathoms, miles, the territorial sea, to the EEZ. In addition, seaward boundaries are not clearly defined because some islands in the PRIA do not appear to have a seaward boundary as defined by U.S. law (i.e., MSA). Furthermore, administrative authority over the PRIA has been conferred by various Executive Orders to either the Department of Defense or the DOI. As a result, agencies often assert differing interpretations of regulatory authority.

Table 2-4: Current and Proposed Management Structure under Alternative 1C.

Current Management Structure	Proposed Management Structure under Alternative 1C
Bottomfish FMP	**American Samoa FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, the Precious Coral FMP, and the Pelagic FMP.*
Coral Reef Ecosystem FMP	**Mariana Islands FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, the Precious Coral FMP, and the Pelagic FMP.*
Crustaceans FMP	**Hawaii FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, the Precious Coral FMP, and the Pelagic FMP.*
Precious Corals FMP	**Pacific Remote Island FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, the Precious Coral FMP, and the Pelagic FMP.*
Pelagics FMP	**Pacific Pelagics FMP** *No Change - Except for the elimination of relevant portions of the Pelagic FMP that will be included under the American Samoa FEP, Mariana Islands FEP, Hawaii FEP, and Pacific Remote Island FEP.*

Alternative 1D - Preferred Alternative: Approve and implement four demersal FEPs and one pelagic FEP, which will replace existing FMPs

Under Alternative 1D, the Preferred Alternative, the four archipelagic ecosystems described in Alternative 1C would be defined and four demersal FEPs would be approved and implemented. Additionally, a fifth FEP, the Pacific Pelagic FEP, would be approved and implemented. The Pacific Pelagic FEP would include the associated marine resources within all Federal waters and the management of the U.S. domestic fisheries in the high seas of the Western Pacific Region. Alternative 1C and Alternative 1D, the Preferred Alternative, are similar, with the following exceptions: (1) Alternative 1D would establish a Pacific Pelagic FEP, which would replace the current Pelagics FMP, and (2) under Alternative 1D, the pelagic ecosystem and the management of the pelagic fisheries within the boundaries of the four archipelagic FEPs would remain with the Pacific Pelagic FEP.

The boundary of the Pacific Pelagic FEP would overlap with the boundaries of the four demersal FEPs; however, the Pacific Pelagic FEP would specifically manage those resources and habitats associated with the pelagic ecosystem (Table 2-5). In addition, existing regulations relating to the current FMPs would be reorganized to reflect the boundaries of the FEPs (Table 2-6). Although the existing fishery regulations would be reorganized, no substantive changes would occur to current fishing regulations.

Table 2-5: Delineated Ecosystems and FEPs under Alternative 1D, the Preferred Alternative.

FEP	Delineated Ecosystem
American Samoa Archipelago	Federal waters surrounding American Samoa[16] - Demersal Ecosystem.
Mariana Archipelago	Federal waters surrounding Guam and CNMI - Demersal Ecosystem.
Hawaiian Archipelago	Federal waters surrounding Hawaii - Demersal Ecosystem.
Pacific Remote Island Areas (PIRA)[17]	Federal waters surrounding Howland Island, Baker Island, Jarvis Island, Johnston Island, Kingman Reef, Palmyra Atoll, and Wake Island - Dermeral Ecosystem.
Pacific Pelagic	All Federal waters and domestic pelagic fisheries operating in the high seas surrounding American Samoa, CNMI, Guam, Hawaii and the PRIA - Pelagic Ecosystem.

Table 2-6: Current and Proposed Management Structure under Alternative 1D, the Preferred Alternative.

Current Management Structure	Proposed Management Structure
Bottomfish FMP	**American Samoa FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, and the Precious Coral FMP. Demersal ecosystem only.*

[16] Because of their ecological and cultural connections between Independent Samoa and America Samoa, an advisory relationship with independent Samoa would be sought to facilitate the development of collaborative management activities.

[17] Because state and territorial waters do not exist in the PRIA, jurisdiction over nearshore fishery resources and habitat is the responsibility of the U.S. Department of the Interior (DOI) and U.S. Department of Commerce. Jurisdictional boundaries in this area are expressed in varying terms ranging from fathoms, miles, the territorial sea, to the EEZ. In addition, seaward boundaries are not clearly defined because some islands in the PRIA do not appear to have a seaward boundary as defined by U.S. law (i.e., MSA). Furthermore, administrative authority over the PRIA has been conferred by various Executive Orders to either the Department of Defense or the DOI. As a result, agencies often assert differing interpretations of regulatory authority.

Coral Reef Ecosystem FMP	**Mariana Islands FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, and the Precious Coral FMP. Demersal ecosystem only.*
Crustaceans FMP	**Hawaii FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, and the Precious Coral FMP. Demersal ecosystem only.*
Precious Corals FMP	**Pacific Remote Island FEP** *Would include relevant portions from the Bottomfish FMP, Coral Reef Ecosystem FMP, Crustaceans FMP, and the Precious Coral FMP. Demersal ecosystem only.*
Pelagic FMP	**Pelagic FEP** *Would include all relevant portions from the Pelagic FMP, Pelagic ecosystem only.*

The preliminary draft FEPs, proposed under Alternative 1D, are available from the Council's website at www.wpcouncil.org or by mail[18] from the Council. Additionally, a Compact Disc containing electronic copies of the preliminary draft FEPs are included with this DEIS.

Alternative 1E: Approve and implement FEPs for each biogeographic and pelagic zones, which will replace existing FMPs

Under this alternative, major biogeographic zones for each island area and all demersal and pelagic marine resources and habitats associated with those, not necessarily in contiguous zones, would be delineated as distinct ecosystems and the fisheries associated with them would be managed under separate FEPs. Specifically, within each island area the coral reef ecosystem, the deep reef slope benthic ecosystem, the bank-seamount ecosystem, the deep ocean floor ecosystem, and the pelagic environment would be delineated as separate and distinct ecosystems and managed under separate FEPs. Additionally, under Alternative 1E, the management of the domestic pacific pelagic fisheries operating outside one of these biogeographic and pelagic FEPs for each island area would be managed under a Pacific Pelagic FEP.

To illustrate the application of this alternative in CNMI, all coral reef ecosystems from Uracas to Rota would be delineated as an ecosystem and managed under a CNMI Coral Reef Ecosystem

[18] Western Pacific Fishery Management Council, 1164 Bishop Street, Suite 1400 Honolulu, Hawaii 96813

FEP. Similarly, the fisheries associated with the seamounts located west of CNMI would be managed under a CNMI Bank-Seamount FEP. In addition, existing fishery regulations relating to the current FMPs would be reorganized to reflect the boundaries of the FEPs (Table 2-7). The regulations would be reorganized and no substantive changes would occur to current fishing regulations.

Table 2-7: Current and Proposed Management Structure under Alternative 1E.

<table>
<tr><th>Current Management Structure</th><th>Proposed Management Structure</th></tr>
<tr><td>Bottomfish FMP</td><td rowspan="5">American Samoa Coral Reef FEP
American Samoa Bank and Seamount FEP
American Samoa Deep Reef Slope FEP
American Samoa Deep Ocean Floor FEP
American Samoa Pelagics FEP

CNMI Coral Reef FEP
CNMI Bank and Seamount FEP
CNMI Deep Reef Slope FEP
CNMI Deep Ocean Floor FEP
CNMI Pelagics FEP

Guam Coral Reef FEP
Guam Bank and Seamount FEP
Guam Deep Reef Slope FEP
Guam Deep Ocean Floor FEP
Guam Pelagics FEP

Hawaii Coral Reef FEP
Hawaii Bank and Seamount FEP
Hawaii Deep Reef Slope FEP
Hawaii Deep Ocean Floor FEP
Hawaii Pelagics FEP

PRIA Coral Reef FEP
PRIA Bank and Seamount FEP
PRIA Deep Reef Slope FEP
PRIA Deep Ocean Floor FEP
PRIA Pelagics FEP

Pacific Pelagics FEP</td></tr>
<tr><td>Coral Reef Ecosystem FMP</td></tr>
<tr><td>Crustaceans FMP</td></tr>
<tr><td>Precious Corals FMP</td></tr>
<tr><td>Pelagic FMP</td></tr>
</table>

2.1.2 Component 1: Alternatives Considered but Eliminated From Further Detailed Study

FEP for Entire Pacific Ocean Ecosystem

Under this alternative, the entire Pacific Ocean, including all marine resources and habitats found within, would be delineated as a single ecosystem and the fisheries managed under a single Pacific Ocean FEP regardless of jurisdiction or claim to continental shelf resources or submerged lands by states and territories of the United States or foreign coastal nations. While this delineation would provide a theoretical mechanism for implementing the broadest application of an ecosystem approach to management, it is anticipated that the regulated area would be of such a scope and complexity as to preclude flexible and effective management. In addition, there are numerous nations within the Pacific Ocean that are not subject to the MSA that assert jurisdiction over their respective territorial seas and EEZs. The Council's lack of authority over these countries and inability to control their actions would further preclude effective management under this broad approach. Similarly, asserting Federal management authority over submerged lands and marine resources of coastal states would conflict with the interests of those states. Finally, this approach presents an additional challenge of requiring that management considerations for pelagic species be combined with those for benthic species, an approach that would be difficult to implement, not only because of the scale of this proposal, but also because of the divergent scientific principles applied with regard to the different types of species. For these reasons, this alternative is not considered in further detail.

FEP for Insular Pacific- Hawaii Large Marine Ecosystem

This alternative would utilize the definitions of large marine ecosystems (LME) presented by Sherman and Alexander (1986). LMEs are regions of ocean space encompassing coastal areas from river basins and estuaries to the seaward boundaries of continental shelves and the outer margins of the major current systems. However, most of these features are not prevalent in the Western Pacific Region. Currently, the only delineated LME in the Western Pacific Region is the Insular Pacific LME defined by Morgan (1989) and only includes waters from the shoreline out to 200 nm surrounding the Hawaiian Archipelago, including all marine resources and habitats found within. Under this alternative, only one FEP, the Hawaii LME FEP would be established. However, the State of Hawaii would still retain primary management authority for marine resources from 0 to 3 miles within this FEP.

Under this alternative, fisheries with the Hawaiian Archipelago would shift to an LME-based management approach that would require fully coordinated Federal and state actions to ensure consistent management. All other areas in the Western Pacific Region would continue to be managed by the species-based FMPs and would not shift to an ecosystem approach. This alternative poses several problems: (1) Effective management within the Hawaiian LME FEP would require similar regulations at the Federal and state levels, as well as management and enforcement coordination; (2) Fishery management regulations would impose species-based requirements in some areas but an ecosystem approach in the fisheries within the Hawaiian LME FEP, possibly leading to confusion; (3) the Council and NMFS would face additional regulatory burdens when considering management proposals because a species-based approach would be required for some areas but an ecosystem approach would be required for the fisheries managed under the Hawaiian LME FEP. Consequently, for these reasons, as well as its similarity to Alternative 1B, this alternative is not considered in further detail.

FEPs for Each Island, Atoll, Seamount, or Other Major Benthic Feature

Under this alternative, Federal waters and associated marine habitats and resources around each island, atoll, reef, seamount, bank, or other major benthic feature in the Western Pacific Region would be delineated as a separate and discrete ecosystem and the fisheries within these ecosystems managed under a separate and discrete FEP. Local, state, territorial, and commonwealth governments would retain primary management authority for marine resources from 0 to 3 miles.

To illustrate the application of this alternative in the Hawaii Archipelago, the islands of Hawaii, Maui, Kahoolawe, Lanai, Oahu, Molokai, Kauai, Niihau, Nihoa, Necker, French Frigate Shoals, Laysan, Lisianski, Maro Reef; the Pearl and Hermes, Midway, and Kure Atolls; and Pioneer and Raita Banks would each be delineated as a distinct ecosystem and managed under a separate FEP. Under this alternative, FEPs would be developed for hundreds of locations throughout the Western Pacific Region. Taking such an approach would provide a mechanism to develop very discrete management measures tailored specifically to meet the needs of an area on the basis of the scientific information regarding that particular location.

However, such a detailed level of management would significantly burden management agencies and increase the need for site-specific scientific data, administration, management, and personnel in order to be successful. While this may be an appropriate in the future, constraints on funding and capacity to support such a management regime make it impracticable at this time. For this reason, this alternative is not considered in further detail.

Umbrella FEP for the Western Pacific Region

Under the "umbrella approach," FEPs would be a consolidation of individual fishery management plans. An FEP would contain information on the structure and function of the ecosystem in which fishing activities occur, so that managers can be aware of the effects that their decisions have on the ecosystem, and the effects other components of the ecosystem may have on fisheries. The goal of this approach is to improve consideration of ecosystem principles in individual FMPs. While this approach is currently being developed by other fishery management councils (i.e., North Pacific and South Atlantic Fishery Management Councils), unlike the other regions, the Western Pacific Region is composed of distinct and distant archipelagos, each with different species and ecological conditions. This unique aspect of the Western Pacific Region allows for adoption of an ecosystem-based approach for each archipelago rather than one combined area which would simply consolidate existing FMPs under one document. Moreover, the umbrella approach would impose an additional level of complexity to the management of fisheries in the Western Pacific Region by maintaining the existing FMPs but providing for the consideration of ecosystem elements in a separate plan. Full adoption of ecosystem-based plans would better achieve the purpose of the Federal action with less complexity. For these reasons, this alternative is not considered in further detail.

2.1.3 Component 1: Amending the Existing FMPs to Adopt an Ecosystem Approach and Implement FEPs

Under this alternative, the existing FMPs would be amended to adopt an ecosystem approach through the implementation of FEPs. This alternative would amend the existing fishery management plans rather than replacing the FMPs with fishery ecosystem management plans. This alternative would require an ongoing series of "omnibus" amendments to implement future place-based measures. This would require significant agency resources and result in a complex regulatory process that would likely be confusing to stakeholders. Also, merely amending the existing species based plans would not accurately reflect the fundamental shift to ecosystem based management and for this reason, this alternative is not considered in further detail.

2.2 Component 2: Management Unit Species (MUS)

Section 3 of the MSA contains the definition of terms. Section 3 of the MSA defines the term "stock of fish" as meaning a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. Consistent with National Standard 3 of the MSA, the MUS lists currently contained in the Council's existing FMPs consist of those species that are caught in the region in quantities sufficient to warrant management or specific monitoring by NMFS and the Council. Each of the existing Western Pacific Region FMPs have a specific list of MUS to which its regulations apply. Each of the FMPs is applied throughout the entire Western Pacific Region, and, therefore, the MUS of each plan are presently made up of those species that are significantly harvested by fisheries across the region.

The primary impact of including species in an MUS list is that the species (i.e., the fishery targeting that species) can be directly managed. In an ecosystem approach to fishery management, the need for a list of MUS under each FEP remains, and the species listed in each FEP should reflect the status of those species within a particular FEP's boundaries. In addition, MUS managed under each FMP are currently categorized into stocks or stock complexes for the purposes of stock assessments and determinations regarding overfishing and overfished conditions. For example, because of the genetic connectivity between the NWHI and the MHI, Hawaii stocks managed under the Bottomfish and Seamount Groundfish FMP are classified as one multispecies complex. Although the Council has preliminarily discussed including CNMI bottomfish stocks with those around Guam in a Mariana multispecies bottomfish stock complex, because of a lack of information, none of the alternatives considered here would do so or otherwise change the current stock and stock complex geographic classifications or overfishing control rules and reference points now in effect.

2.2.1 Component 2: Alternatives Considered in Detail

Alternative 2A: No Action - Do Not Change the Current MUS Lists

Under this alternative, the existing list of MUS from the five existing FMPs (see Appendix A) would remain unchanged. Using this approach, the MUS lists for all FEPs would be identical and would be made up of the current MUS regardless of whether the species is known to exist within the particular FEP's boundaries.

Alternative 2B - Preferred Alternative: Define FEP MUS as Those Current MUS That Are Known to be Present Within Each FEP Boundary

Under this alternative, each FEP would include as MUS only those current bottomfish and seamount MUS, crustacean MUS, precious coral MUS, coral reef ecosystems MUS and pelagic MUS that are known to be present within each FEP boundary

Alternative 2C: Define FEP MUS as Those Current MUS Known To Occur Within the Boundaries of the FEP, Plus Incidentally Caught and Associated Species That Are Known to Occur Within Each FEP Boundary

Under this alternative, each FEP would include as MUS those target, incidentally caught, and associated species (species that occupy the same or similar niche such as prey competitors or habitat competitors) that are known to occur within each FEP boundary.

Alternative 2D: Define FEP MUS as Those Current MUS Believed to Potentially Occur, Plus Incidentally Caught and Associated Species Believed to Potentially Occur Within Each FEP Boundary

Under this alternative, each FEP would include as MUS those target, incidentally caught, and associated species (species that occupy the same or similar niche such as prey competitors or habitat competitors) that are believed to potentially occur within each FEP boundary.

2.2.2 Component 2: Alternatives Considered but Eliminated From Further Detailed Study

Define FEP MUS as All Species Believed to Occur Within the FEP Boundary

Under this alternative, all species (primary producer to top-level predator) believed to occur within each FEP boundary would be included on that FEP's MUS list. While principles of an ecosystem approach to fisheries management direct managers to consider predator–prey relationships for each target species, it does not require managers to specifically manage all species within an ecosystem. Because of there are literally thousands of species that are believed to occur in a particular FEP boundary, and in light of no commercial or recreational interest to harvest, to list all species as an MUS would serve no function and impose an unnecessary burden on fishery managers and scientists. Therefore, this alternative was eliminated at this time without further study.

Define FEP MUS as All Species Known to Occur Within the FEP Boundary

Under this alternative, all species (primary producer to top-level predator) known to occur within each FEP boundary would be included on that FEP's MUS list. This alternative would require managers to identify as a MUS any and all species known to occur within the boundary of an FEP. For the reasons discussed above, this alternative was eliminated at this time without further detailed study.

2.3 Component 3: Council Advisory Structure

The Council's current advisory process follows the MSA and includes the general public, fishery participants and support sectors, social and biological scientists, and local and Federal resource managers in the development of its fishery management recommendations. The existing structure for these advisory bodies is based on a combination of species and stakeholder interest groupings. For example, Plan Teams exist for each of the five species-based FMPs, while Advisory Panels are organized around commercial, recreational and subsistence fisheries, and other interest groups. Given the place-based nature of ecosystem management, several alternatives for modifying the existing structure toward a more geographic orientation are considered in this DPEIS. Important decision criteria are the overall budget implications associated with funding additional advisory bodies from the Council's budget which is authorized under the MSA. The annual budget varies somewhat dependent on Congressional considerations.

2.3.1 Component 3: Alternatives Considered in Detail

Alternative 3A: No Action - Do Not Change the Current Council Advisory Structure

Under this alternative, the Council's current advisory structure would not change to one reflecting the geographical orientation of ecosystem management and the need for increased participation by land-based interests. The Council would continue to utilize its existing five Plan Teams, Advisory Panels, Scientific and Statistical Committee (SSC), and Standing Committees to provide scientific and management recommendations to the Council. The structure and responsibilities of each group would remain as described below.

Plan Teams

The Council's five Plan Teams provides input and guidance in the development of FMPs and review information pertaining to the performance of the fisheries and the status of the stocks managed under each FMP. Plan Teams meet at least once annually and are made up of individuals from local and Federal marine resource management agencies and nongovernmental organizations. Plan Teams are led by Chairs who are appointed by the Council Chair after consultation with the SSC and the Executive Standing Committee. Plan Team findings and recommendations are reported to the Council at their regular meetings.

Advisory Panels

The Council's Advisory Panels advise the Council on fishery management problems; provide input to the Council regarding fishery management planning efforts; and advise the Council on the content and likely effects of management plans, amendments, and management measures. Advisory Panel membership is arranged by fishery sector, with two representatives from each island area selected by the Council Chair to serve on each panel (except for Hawaii, which has four representatives on each panel because of its larger population; see Table 2-8). Advisory Panel members are fishermen and other knowledgeable stakeholders who meet at the direction of the Council to provide continuing and detailed participation by industry members and other members of the public.

Table 2-8: Current Council Advisory Panel Structure.

	Commercial Panel	**Recreational Panel**	**Subsistence Panel**	**Ecosystems and Habitat Panel**
American Samoa	Two members	Two members	Two members	Two members
Guam	Two members	Two members	Two members	Two members
Hawaii	Four members	Four members	Four members	Four members
CNMI	Two members	Two members	Two members	Two members

Scientific and Statistical Committee

The Council's SSC is composed of scientists (currently 17) from local and Federal agencies, academic institutions, and other organizations. Appointed by the Council, these scientists represent the range of disciplines required for the scientific oversight of fishery management in the Western Pacific Region. The role of the SSC is to (1) identify scientific resources required for the development of FMPs and amendments and recommend resources for Plan Teams; 2) provide multidisciplinary review of management plans or amendments and advise the Council on their scientific content; (3) assist the Council in the evaluation of such statistical, biological, economic, social, and other scientific information as is relevant to the Council's activities, and recommend methods and means for the development and collection of such information; and (4) advise the Council on the composition of Plan Teams.

Standing Committees

The Council's 12 Standing Committees (Pelagics, Crustaceans, Bottomfish and Seamount Groundfish, Precious Corals, Ecosystems and Habitat, International Fisheries, Enforcement, Vessel Monitoring Systems, Fishery Rights of Indigenous People, Executive, Budget and Program, and Research) are composed of Council members and meet on the first day of each Council meeting to review available information and data for components to be considered by the Council. The recommendations of the Standing Committees, along with the recommendations from all of the other advisory bodies described above, are then presented to the full Council for their consideration prior to taking action on specific measures or recommendations.

Under the no-action alternative, these existing advisory bodies would continue to be responsible for considering and integrating ecosystem impacts when providing advice to the Council on the development and implementation of FMPs or FEPs.

Alternative 3B: Add a Single FEP Plan Team to the Current Advisory Structure

Under this alternative, the existing Advisory Panels, Plan Teams, SSC, and Standing Committees would be maintained and one new FEP Plan Team would be established to monitor the development and implementation of FEP(s) for the Western Pacific Region. The FEP Plan Team would be made up of scientists from local and Federal agencies, academic institutions, and other sources with expertise in the following areas: (1) fish stock assessment; (2) habitat; (3) oceanography; (4) ecosystem modeling; (5) socioeconomics; (6) geographic information systems; and (7) marine ecology and ecosystem dynamics. The FEP Plan Team would identify ecosystem components for all management actions and provide appropriate advice to the Council and its advisory bodies regarding these components.

The FEP Plan Team would likely consist of five to seven members that would coordinate and consult directly with selected agencies and organizations for each geographic region regarding FEP development and implementation. The existing advisory bodies would continue their duties as assigned with respect to industry components, fisheries science, statistical analyses, and environmental impacts for each FEP.

Alternative 3C: Replace the Current FMP Advisory Panels, Plan Teams, and Five Standing Committees with FEP Advisory Panels, FEP Plan Teams, and FEP Standing Committees

Under this alternative, the existing Advisory Panels, FMP Plan Teams, and five Standing Committees (Pelagics, Crustaceans, Bottomfish and Seamount Groundfish, Precious Corals, and Ecosystems, and Habitat) would be replaced with FEP-based Advisory Panels and FEP Plan Teams based on each FEP's boundaries (e.g., a Hawaiian Archipelago FEP Plan Team, Mariana Archipelago Advisory Panel). The single SSC would continue to function as at present. The FEP Advisory Panels, Plan Teams, and Standing Committees would assume all of the duties and responsibilities of the existing groups, including the review of fisheries catch and effort data and the development of appropriate management measures based on ecosystem principles. Each FEP Plan Team would develop annual reports for all fisheries within the FEP boundaries for which it is responsible, and all groups would provide advice to the Council as under the current process described in Alternative 3A.

Alternative 3D - Preferred Alternative: Replace the Current FMP Advisory Panels, Plan Teams, and Five Standing Committees With FEP Advisory Panels, FEP Standing Committees, and Two FEP Plan Teams

As in Alternative 3C, this alternative would replace the existing Advisory Panels and five of the Standing Committees with FEP Advisory Panels and FEP Standing Committees. However, this alternative would replace the existing five FMP Plan Teams with a single Demersal FEP Plan Team and a single Pacific Pelagic FEP Plan Team that would each be responsible for overseeing the development and implementation of all Demersal and Pelagic FEPs, respectively. All groups would provide advice to the Council as under the current process described in Alternative 3A. Under this alternative, the existing SSC structure would be maintained.

2.3.2 Component 3: Alternatives Considered but Eliminated From Further Detailed Study

Include International Representatives on Existing Advisory Bodies

Under this alternative, the structure of the Council's advisory bodies would remain the same but they would each include additional representatives from various sectors and government agencies from the U.S. Pacific Islands as well as from foreign countries or island groups within or bordering the Pacific Ocean. Although this could increase the reach and scope of the Council's recommendations, the logistical and fiscal implications of this alternative are unclear. For this reason, this alternative is rejected at this time without further consideration.

Establish LME Advisory Bodies

Under this alternative, the structure of the Council's existing advisory bodies would remain the same, but an additional LME advisory body would be created whose members would consist of stakeholders, scientists, and managers from the Hawaii LME. This alternative could provide additional expertise to the management of the Hawaii LME; however, because no LMEs have been identified for the remaining waters of the Western Pacific Region, there would be no corresponding advisory bodies for the non-Hawaii areas. For this reason, this alternative is rejected without further consideration.

2.4 Component 4: Regional Coordination

In the Western Pacific Region, management of ocean and coastal activities is administered by a number of agencies at the Federal, state, county, and even village level. Many individual agencies administer programs and initiatives that address sometimes overlapping ocean and coastal components. In some instances, programs and initiatives are also in conflict with one another. A primary reason for including regional coordination as a component for consideration in the establishment of FEPs is its ability to address nonfishing impacts on marine ecosystems. A common sentiment expressed in public scoping was a need for coordinated and consistent management from "mountain to sea." The primary objective for including and analyzing regional coordination options is to develop a mechanism by which the Council may participate in broader ecosystem initiatives such as these.

As noted by the U.S. Commission on Ocean Policy and the President's U.S. Ocean Action Plan, the first step in enhancing the management of oceans and coasts is improving coordination among Federal programs and those of state, local, and county departments and agencies. While there has been some progress made to increase interagency coordination through the establishment of memorandums of agreements and the formation of ad hoc committees, task forces, and interagency working groups, a formalized long-term process between NOAA, the Council, and other Federal, state, and local agencies is still needed. Alternatives considered here would provide the Council a mechanism to actively participate in broader ecosystem initiatives that consider the impacts of land-based and nonfishing activities on the marine environment. The mechanism considered is the establishment and participation of Councils or Committees made up of representatives from Federal, state, local, and county agencies, as well as private entities, which are responsible for the permitting or implementation of both land- and ocean-based activities that affect marine ecosystems. This would allow member agencies to share information on programs and activities and to coordinate management efforts or resources to address nonfishing-related components beyond the jurisdiction of the Council that could affect ocean and coastal resources. As there are no statutory requirements regarding the development and function of regional coordination groups, all groups considered below would have advisory capacity and their recommendations would not be obligatory to member agencies.

2.4.1 Component 4: Alternatives Considered in Detail

Alternative 4A: No Action - Do Not Establish Ocean Council Type Groups

Under this alternative, the Council would not establish or support additional Ocean Council type groups, but would continue to provide information regarding the impacts of land-based and nonfishing activities through its membership on the existing Hawaii Ocean and Coastal Committee and as requested on an ad hoc basis.

Alternative 4B - Preferred Alternative: Establish Regional Ecosystem Council Committees

Under this alternative, the Council would establish Regional Ecosystem Advisory Committees made up of Council members and representatives from Federal, state, and local government agencies; businesses; and nongovernmental organizations that have responsibility or interest in land-based and nonfishing activities that potentially affect the marine environment.

Committee membership would be by invitation and would provide a mechanism for the Council and member agencies to share information on programs and activities and to coordinate management efforts or resources to address fishing and nonfishing-related components that may affect ocean and coastal resources within and beyond the jurisdiction of the Council. Committee meetings would coincide with regularly scheduled Council meetings, and recommendations made by the committee to the Council would be advisory, as would recommendations made by the Council to member agencies. Under the MSA, the Council has the authority to create such advisory panels and committees (16 U.S.C § 1852).

Alternative 4C: Participate in and Support Ocean Council Type Groups

Under this alternative, the Council would not establish any new committees or other groups, but would instead participate in and support and the establishment of Ocean Council type groups established by the governor of each inhabited island area served by the Council (i.e., American Samoa, Guam, Hawaii, and the Commonwealth of the Northern Mariana Islands). Such a group has been established by the governor of Hawaii (the Hawaii Ocean and Coastal Committee) and is made up primarily of local and county agencies with oversight of development, ocean recreation, tourism, and natural resource management. This committee is tasked with the development of policies to improve the permitting and implementation of actions that affect ocean and coastal resources under its combined jurisdiction. Federal agencies, including the Council, are members of this committee that was established in 2005.

Alternative 4D: Establish Independent Regional Ecosystem Councils

Under this alternative, the Council, NOAA, and NMFS would together establish and administer independent Regional Ecosystem Councils to supplement the existing decision-making process. These Regional Ecosystem Councils would be made up of executive level representatives from Federal, state, and local government agencies; businesses; and nongovernmental organizations that have responsibility or interest in land-based and nonfishing activities that potentially affect the marine environment.

The Regional Ecosystem Councils would provide a mechanism for the Council and other member agencies to share information on programs and activities and to coordinate management efforts or resources to address nonfishing-related components beyond the jurisdiction of the Council that could affect ocean and coastal resources. Regional Ecosystem Council meetings would coincide with regularly scheduled Council meetings, and recommendations to the Council would be advisory, as would recommendations made by the Council to other member agencies.

2.5 Component 5: International Coordination

The Council is an active participant in the development and implementation of international agreements regarding marine resources. These include agreements made by the Inter-American Tropical Tuna Commission (of which the United States is a member) and the Western and Central Pacific Fisheries Commission (of which the United States is a cooperating nonmember). The U.S. delegation that attends meetings of these international commissions is headed by representatives from NMFS and the U.S. Department of State. The Council also participates in and promotes the formation of regional and international arrangements for assessing and conserving all marine resources throughout their range, including the ecosystems and habitats that they depend on (i.e. the Forum Fisheries Agency and the Secretariat of the Pacific Community's Oceanic Fisheries Programme). The Council is developing similar linkages with the Southeast Asian Fisheries Development Center and its turtle conservation program. The Council participates in various international workshops and seminars such as the ongoing International Fishers' Forum (three forums since 2000), the 2005 South Pacific Commission/Western Pacific Regional Fishery Management Council/Food and Agriculture Organization (United Nations) Workshop on Legislation and Community-Based Management, the International Marine Debris Conference series (four since 1986), and the 2004 Asia Pacific Economic Cooperation Seminar on Derelict Fishing Gear and Related Marine Debris.

The western and central Pacific Ocean is dotted with thousands of islands governed by several nations. American Samoa, for example, is surrounded by the EEZs of five independent nations, and the PRIA are part of larger archipelagic island chains. As marine ecosystems are generally considered “open” systems, and large-scale impacts can be observed within smaller units, international coordination will be a necessary component of successful implementation of an ecosystem approach within the Western Pacific Region. The following alternatives represent a range of nonregulatory actions that the Council has considered in relation to its participation in discussions and meetings that are international in scope, but have implications for local management of marine resources.

2.5.1 Component 5: Alternatives Considered in Detail

Alternative 5A: No Action - Continue to Participate in International Fisheries Management Fora and International Workshops

Currently, the Council participates in two international Pacific pelagic fisheries management bodies: the Western and Central Pacific Fisheries Commission and the Inter-American Tropical Tuna Commission. The Council also participates in various international workshops and seminars as discussed previously. Under this alternative, the Council would continue work with the U.S. Department of State and the NMFS’s Office of International Affairs to maintain its current level of participation in international commissions, meetings, workshops, and seminars.

Alternative 5B - Preferred Alternative: Increase Participation in International Fisheries Management Fora and Establish Meetings/Workshops with Neighboring Nations of Island Areas of the Western Pacific Region

Under this alternative, the Council’s level of participation in international commissions, meetings, workshops, and seminars would be increased to include the establishment of meetings and workshops with neighboring nations of Western Pacific Region island areas. For example, the EEZ of American Samoa is bounded by the EEZs of five neighboring countries, and Samoa (Upolu Island) is located only 70 kilometers west of American Samoa (Tutuila Island). The PRIA of Palmyra and Jarvis lie within the Line Island Archipelago, of which Kiribati governs the remaining islands. Discussions and meetings between the Council and fishery managers of neighboring nations would facilitate information exchange and promote coordination of fishery ecosystem management components. Under this alternative, the Council would work with the U.S. Department of State and the NMFS’s Office of International Affairs on proper protocols to facilitate meetings and workshops with neighboring nations.

Alternative 5C: Do Not Participating in International Management Fora

Under this alternative, the Council would not participate in international meetings, workshops, and seminars.

CHAPTER 3: AFFECTED ENVIRONMENT

3.0 Introduction

Chapter 3 describes the natural and human environment and resources potentially affected by the alternatives described in Chapter 2. The information presented in Chapter 3 represents a general summary of the potentially affected environment that the impact analysis in Chapter 4 will use as the environmental baseline.

3.1 Physical Environment

The following discussion presents a broad summary of the physical environment of the Pacific Ocean. The dynamics of Pacific Ocean's physical environment have direct and indirect effects on the occurrence and distribution of life in marine ecosystems.

3.1.1 The Pacific Ocean

The Pacific Ocean is the world's largest body of water. Named by Ferdinand Magellan as *Mare Pacificum* (Latin for peaceful sea), the Pacific Ocean covers about one third of Earth's surface (approximately 69 million square miles). From north to south, it is over 9,000 miles long; from east to west, the Pacific Ocean is nearly 12,000 miles wide (on the Equator). The Pacific Ocean contains several large seas including: on its western margin,, the Celebes Sea, Coral Sea, Japan Sea, Philippine Sea, Sea of Okhotsk, South China Sea, and the Tasman Sea; in the north, the Bearing Sea; and, in the east, the Sea of Cortez.

3.1.2 Geology and Topography

Pacific islands have been formed by geologic processes associated with plate tectonics, volcanism, and reef accretion. The theory of plate tectonics provides that Earth's outer shell, the "lithosphere," is constructed of more than a dozen large solid "plates" that migrate across the planet surface over time and interact at their edges. The plates sit above a solid rocky mantle that is hot, and capable of flow. Figure 3-1 is a schematic diagram of Earth's lithospheric plates. These are made of various kinds of rock with different densities and can be thought of as pieces of a giant jigsaw puzzle, where the movement of one plate affects the position of others. Generally, the oceanic portion of plates is composed of basalt enriched with iron and magnesium which is denser than the continental portion composed of granite which is enriched with silica.[19]

Tectonic processes and plate movements define the contours of the Pacific Ocean. Generally, the abyssal plain or seafloor of the central Pacific basin is relatively uniform, with a mean depth of about 4270 m (14,000 feet).[20] Within the Pacific basin, however, are underwater plate boundaries that define long mountainous chains, submerged

[19] http://academic.reed.edu/chemistry/courses/chem391/401/earth.pdf (accessed January 2007).
[20] http://www.physicalgeography.net/fundamentals/8o.html (accessed January 2007)

volcanoes, islands and archipelagos, and various other bathymetric features that influence the movement of water and the occurrence and distribution of marine organisms.

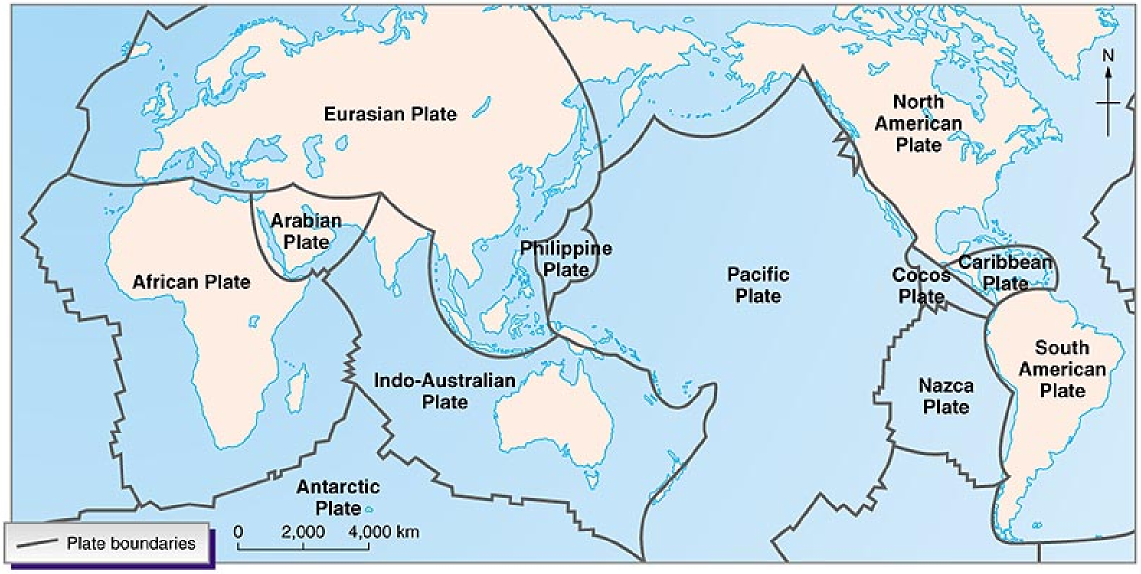

Figure 3-1: Schematic Diagram of Earth's Lithospheric Plates.
Source: Dr. C.H. Fletcher III, UH Dept. of Geology and Geophysics, personal communication, December 2005.

Divergent plate boundaries —locations where lithospheric plates separate from each other—form "spreading centers" where new seafloor is constructed atop high mid-ocean ridges. These ridges stretch for thousands of kilometers[21] and are characterized by active submarine volcanism and earthquakes. At these ridges, magma is generated at the top of the mantle immediately underlying an opening, or rift, in the lithosphere. As magma pushes up under the spreading lithosphere it inflates the ridges until a fissure is created and lava erupts onto the sea floor (Fryer and Fryer 1999). The erupted lava, and its subsequent cooling, forms new seafloor on the edges of the separating plates. This process is responsible for the phenomenon known as "seafloor spreading", where new ocean floor is constantly forming and sliding away from either side of the ridge.[22]

Convergent plate boundaries are locations where two plates move together and one plate, usually composed of denser basalt, subducts or slides beneath the other which is composed of less dense rock, and is recycled into the mantle. When two plates of equivalent density converge, the rock at the boundary fractures and shears like the front ends of two colliding cars, and forms a large mountain range. The Himalayan Range has this origin. There are three different types of plate convergence: 1) ocean-continent convergence, 2) ocean-ocean convergence, and 3) continent-continent convergence

[21] http://www.washington.edu/burkemuseum/geo_history_wa/The Restless Earth v.2.0.htm (accessed July 2005)
[22] Ibid

(Fryer and Fryer 1999). A well known example of ocean-ocean convergence is observed in the western Pacific, where the older and denser Pacific Plate subducts under the younger and less dense Philippine Plate at a very steep angle. This results in the formation of the Marianas Trench which at nearly 11 km (approximately 36,000 feet) is the deepest point of the seafloor.[23] Ocean-ocean convergent boundary movements may result in the formation of island arcs, where the denser (generally older) plate subducts under the less dense plate. Melting in the upper mantle above the subducting plate generates magma that rises into the overlying lithosphere and may lead to the formation of a chain of volcanoes known as an island arc.[24] The Indonesian Archipelago has this geologic origin, as does the Aleutian Island chain.

Transform boundaries, a third type of plate boundary, occur when lithospheric plates neither converge nor diverge, but shear past one another horizontally, like two ships at sea that rub sides. The result is the formation of very hazardous seismic zones of faulted rock, of which California's San Andreas Fault is an example (Fryer and Fryer 1999).

In addition to the formation of island arcs from ocean-ocean convergence, dozens of linear island chains across the Pacific Ocean are formed from the movement of the Pacific Plate over stationary sources of molten rock known as hot spots (Fryer and Fryer 1999). A well known example of hot spot island formation is the Hawaiian Ridge-Emperor Seamounts chain that extends some 6,000 km from the "Big Island" of Hawaii (located astride the hotspot) to the Aleutian Trench off Alaska where ancient islands are recycled into the mantle.[25] Although less common, hot spots can also be found at mid-ocean ridges, exemplified by the Galapagos Islands in the Pacific Ocean.[26]

The Pacific Ocean contains nearly 25,000 islands which can be simply classified as high islands or low islands. High islands, like their name suggests, extend higher above sea level, and often support a larger number of flora and fauna and generally have fertile soil. Low islands are generally atolls built by layers of calcium carbonate secreted by reef building corals and calcareous algae on a volcanic core of a former high island that has submerged below sea level. Over geologic time, the rock of these low islands has eroded or subsided to where all that is remaining near the ocean surface is a broad reef platform surrounding a usually deep central lagoon (Nunn 2003).

3.1.3 Ocean Water Characteristics

Over geologic time, the Pacific Ocean basin has been filled in by water produced by physical and biological processes. A water molecule is the combination of two hydrogen atoms bonded with one oxygen atom. Water molecules have asymmetric charges exhibiting a positive charge on the hydrogen sides and a negative charge on the oxygen side of the molecule. This charge asymmetry allows water to be an effective solvent, thus the ocean contains a diverse array of dissolved substances. Relative to other molecules,

[23] http://www.soest.hawaii.edu/coasts/chip/ch02/ch_2_7.asp (accessed July 2005)
[24] Ibid
[25] http://pubs.usgs.gov/publications/text/Hawaiian.html (accessed July 2005)
[26] http://pubs.usgs.gov/publications/text/hotspots.html#anchor19620979 (accessed July 2005)

water takes a great deal of heat to change temperature, thus the oceans have the ability to store large amounts of heat. When water evaporation occurs, large amounts of heat are absorbed by the ocean (Tomzack and Godfrey 2003). The overall heat flux observed in the ocean is related to the dynamics of four processes: (a) incoming solar radiation, (b) outgoing back radiation, (c) evaporation, and (d) mechanical heat transfer between ocean and atmosphere (Bigg 2003).

The major elements (greater than 100 ppm) present in ocean water include chlorine, sodium, magnesium, calcium, and potassium, with chlorine and sodium being the most prominent, and their residue (sea salt [NaCl]) is left behind when seawater evaporates. Minor elements (1 to 100 ppm) include bromine, carbon, strontium, boron, silicon, and fluorine. Trace elements (greater than 1 ppm) include nitrogen, phosphorus, and iron (Levington 1995).

Oxygen is added to seawater by two processes: (a) atmospheric mixing with surface water and (b) photosynthesis. Oxygen is subtracted from water through processes such as the respiration of bacterial decomposition of organic matter (Tomzack and Godfrey 2003).

3.1.4 Ocean Layers

On the basis of the effects of temperature and salinity on the density of water (as well as other factors such as wind stress on water), the ocean can be separated into three layers: (a) the surface layer or mixed layer, (b) the thermocline or middle layer, and (c) the deep layer. The surface layer generally occurs from the surface of the ocean to depth of around 400 meters or less, depending on location (e.g., 0 to 150 m in the central Pacific), and is an area where the water is mixed by currents, waves, and weather. The thermocline is generally from 400 to 800 meters and is where water temperatures significantly differ from the surface layer, thus forming a temperature gradient that inhibits mixing with the surface layer. More than 90 percent of the ocean by volume occurs in the deep layer, which is generally below 800 meters and consists of water temperatures around 0 to 4° C. The deep zone is void of sunlight and experiences high water pressure (Levington 1995).

The temperature of ocean water is important to oceanographic systems. For example, the temperature of the mixed layer has an affect on the evaporation rate of water into the atmosphere, which in turn is linked to the formation of weather. The temperature of water also produces density gradients within the ocean that prevent mixing of the ocean layers (Bigg 2003). See Figure 3-2 for a generalized representation of water temperatures and depth profiles.

The amount of dissolved salt or salinity varies between ocean zones as well as across oceans. For example, the Atlantic Ocean has higher salinity levels than the Pacific Ocean because of input from the Mediterranean Sea (several large rivers flow into the Mediterranean). The average salt content of the ocean 35 parts per thousand, but can vary at different latitudes depending on evaporation and precipitation rates. Salinity is lower near the equator than at middle latitudes because of higher rainfall amounts. Salinity also varies with depth, causing vertical salinity gradients (Bigg 2003). See below for a generalized representation of salinity at various ocean depths.

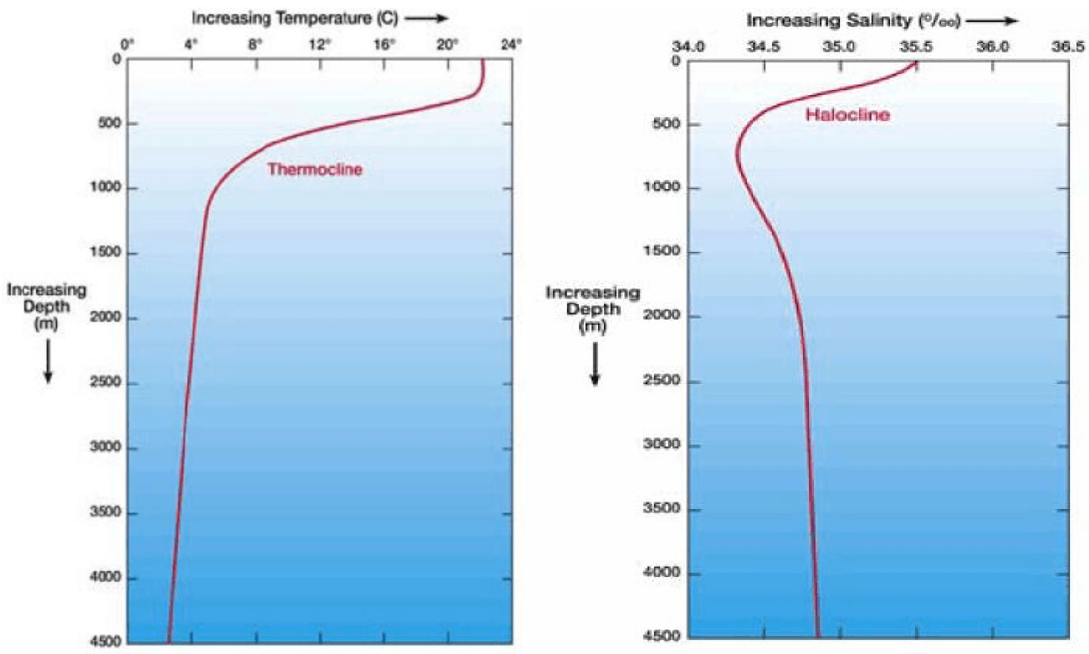

Figure 3-2: Temperature and Salinity Profiles of the Ocean.
Sources: http://www.windows.ucar.edu/tour/link=/earth/Water/temp.html&edu=high (accessed July 2005) and http://www.windows.ucar.edu/tour/link=/earth/Water/salinity_depth.html&edu=high (accessed July 2005).

3.1.5 Ocean Depth Zones

The ocean can be separated into the following five zones (see Figure 3-3) relative to the amount of sunlight that penetrates through seawater: (a) epipelagic, (b) mesopelagic, Sunlight is one of the principal factors for determining the amount of primary production (phytoplankton) in marine ecosystems. Because sunlight diminishes with ocean depth, the amount of sunlight penetrating seawater, as well as its affect on the occurrence and distribution of marine organisms is important. The epipelagic zone extends to nearly 200 meters in the ocean. The mesopelagic zone occurs between 200 meters and 1,000 meters and is sometimes referred to as the "twilight zone." Although the light that penetrates to the mesopelagic zone is extremely faint, this zone is home to a wide variety of marine species. The bathypelagic zone occurs from 1,000 meters to 4,000 meters, and the only visible light seen is the product of marine organisms producing their own light, which is called "bioluminescence." The next zone is the abyssalpelagic zone (4,000 m–6,000 m), where there is extreme pressure and the water temperature is near freezing. This zone does not provide habitat for very many creatures except small invertebrates such as squid and basket stars. The last zone is the hadalpelagic (6,000 meters and below) and occurs in trenches and canyons. Surprisingly, marine life such as tubeworms and starfish are found is this zone, often near hydrothermal vents.

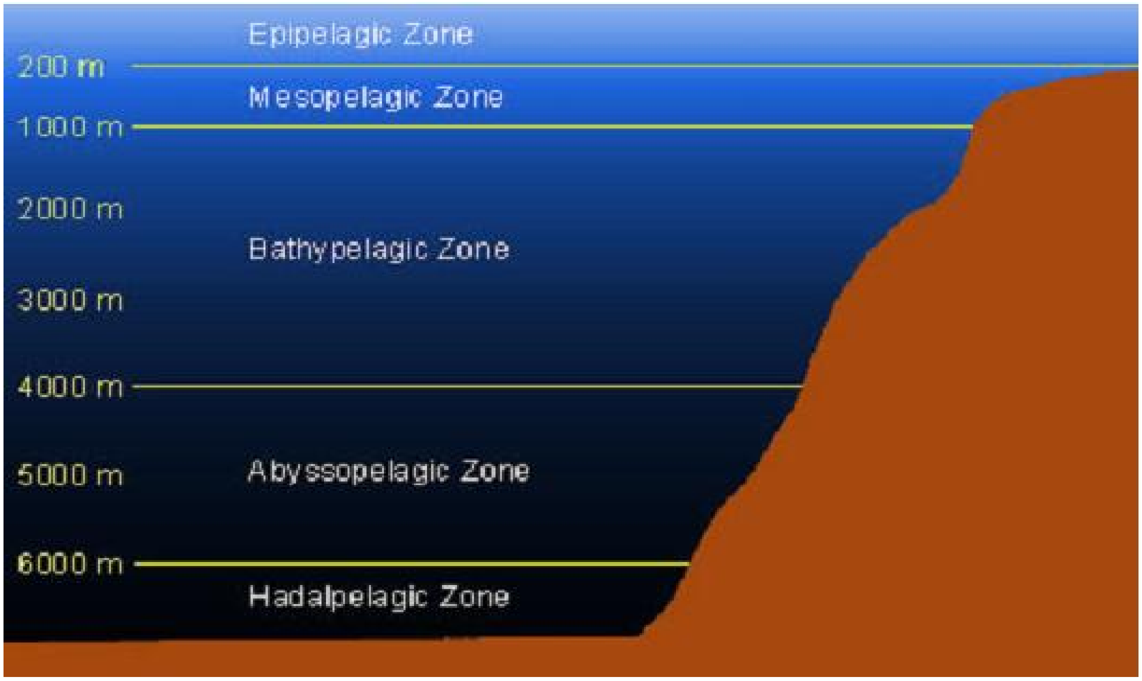

Figure 3-3: Depth Profile of Ocean Zones
Source: Image reproduced by WPRFMC 2005. Concept from http://www.seasky.org/monsters/sea7a4.html (accessed July 2005).

3.1.6 Ocean Water Circulation

The circulation of ocean water is a complex system involving the interaction between the oceans and atmosphere. The system is primarily driven by solar radiation, which results in wind being produced from the heating and cooling of ocean water and the evaporation and precipitation of atmospheric water. Except for the equatorial region, which receives a nearly constant amount of solar radiation, the latitude and seasons affect how much solar radiation is received in a particular region of the ocean. This, in turn, has an affect on sea-surface temperatures and the production of wind through the heating and cooling of the system (Tomzack and Godfrey 2003).

3.1.7 Surface Currents

Ocean surface currents can be thought of as organized flows of water that can exist on a pan-oceanic scale with water being transported from one part of the ocean basin to another (Levington 1995). In addition to water, ocean currents also transport plankton, heat, salts, oxygen, and carbon dioxide. Wind is the primary force that drives ocean surface currents. The sun and moon also influence ocean water movements by creating tidal flow, which is more readily observed in coastal areas rather than in open ocean environments (Tomzack and Godfrey 2003). Figure 3-4 shows the major surface currents of the Pacific Ocean.

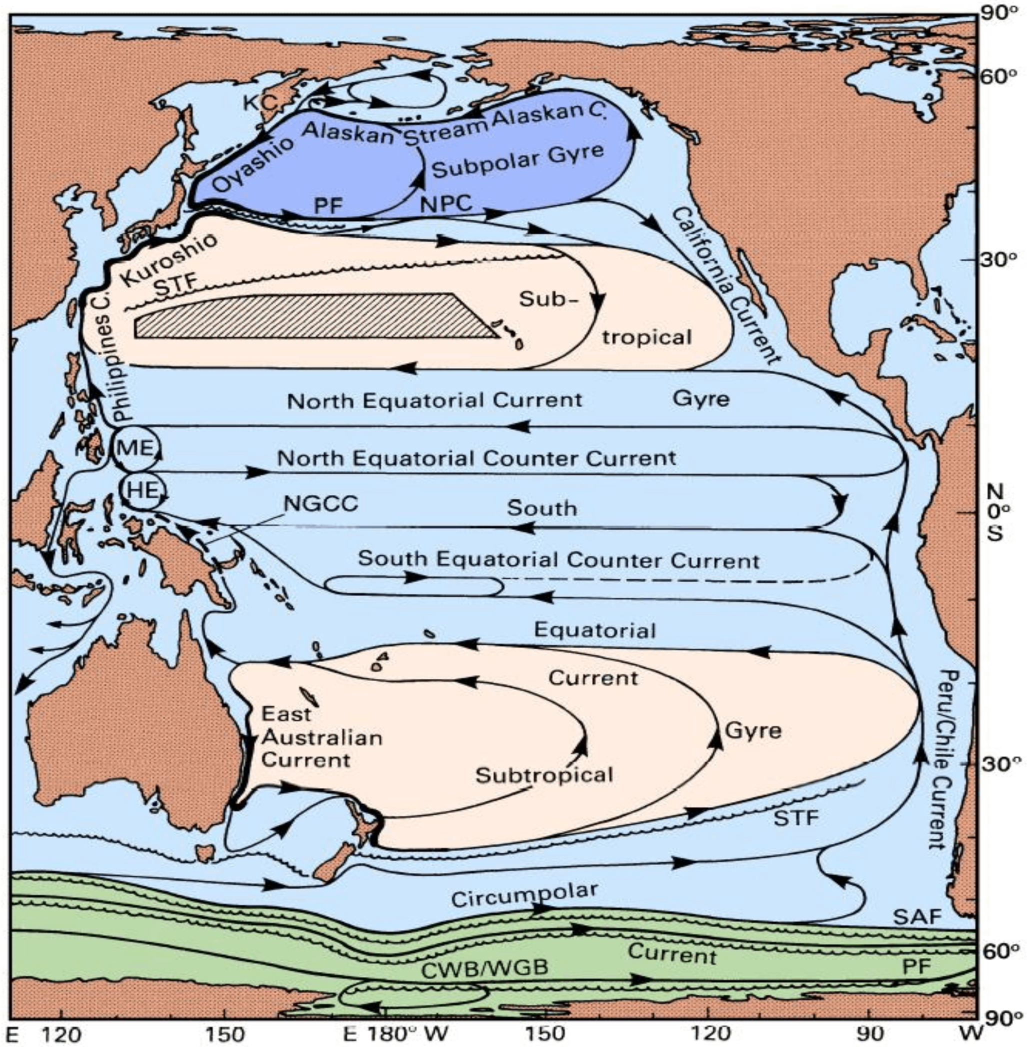

Figure 3-4: Major Surface Currents of the Pacific Ocean.
Source: Tomzack and Godfrey 2003.

Note: Abbreviations are used for the Mindanao Eddy (ME), the Halmahera Eddy (HE), the New Guinea Coastal (NGCC), the North Pacific (NPC), and the Kamchatka Current (KC). Other abbreviations refer to fronts: NPC (North Pacific Current), STF (Subtropical Front), SAF (Subantarctic Front), PF (Polar Front), and CWB/WGB (Continental Water Boundary/Weddell Gyre Boundary). The shaded region indicates banded structure (Subtropical Countercurrents). In the western South Pacific Ocean, the currents are shown for April–November when the dominant winds are the Trades. During December–March, the region is under the influence of the northwest monsoon, flow along the Australian coast north of 18° S and along New Guinea reverses, the Halmahera Eddy changes its sense of rotation, and the South Equatorial Current joins the North Equatorial Countercurrent east of the eddy (Tomzack and Godfrey 2003).

3.1.8 Transition Zones

Transition zones are areas of ocean water bounded to the north and south by large-scale surface currents originating from subartic and subtropical locations (Polovina et al. 2001). Located generally between 32° N and 42° N, the North Pacific Transition Zone is an area between the southern boundary of the Subartic Frontal Zone (SAFZ) and the northern boundary of the Subtropical Frontal Zone (STFZ; see Figure 3-5). Individual temperature and salinity gradients are observed within each front, but generally the SAFZ is colder (approximately 8° C) and less salty (approximately 33.0 ppm) than the STFZ (18° C, approximately 35.0 ppm, respectively). The North Pacific Transition Zone (NPTZ) supports a marine food chain that experiences variation in productivity in localized areas due to changes in nutrient levels brought on, for example, by storms or eddies. A common characteristic among some of the most abundant animals found in the Transition Zone such as flying squid, blue sharks, Pacific pomfret, and Pacific saury is that they undergo seasonal migrations from summer feeding grounds in subartic waters to winter spawning grounds in the subtropical waters. Other animals found in the NPTZ include swordfish, tuna, albatross, whales, and sea turtles (Polovina et al. 2001).

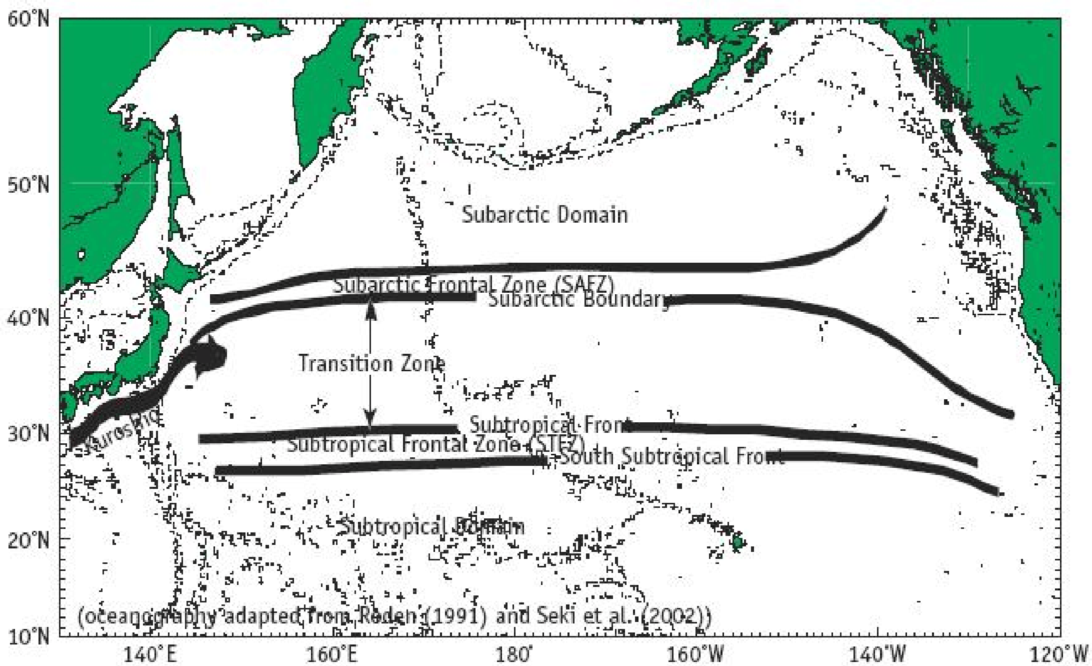

Figure 3-5: North Pacific Transition Zone.
Source: http://www.pices.int/publications/special_publications/NPESR/2005/File_12_pp_201_210.pdf (accessed July 2005).

3.1.9 Eddies

Eddies are generally short to medium term water movements that spin off of surface currents and can play important roles in regional climate (e.g., heat exchange) as well as the distribution of marine organisms. Large-scale eddies spun off of the major surface currents often blend cold water with warm water, the nutrient-rich with the nutrient poor, and the salt laden with fresher waters (Bigg 2003). The edges of eddies, where the mixing is greatest, are often targeted by fishermen as these are areas of high biological productivity. In the Hawaiian Islands, the prevailing northeasterly trade winds combined with the topography of the area generate eddies on the leeward (western) sides of the islands. These eddies have been observed to last 50 to 70 days and have been attributed with enhancing the upwelling of nutrients into the euphotic zone and to increasing levels of primary productivity, as compared to non-eddy areas (Seki et al. 2001). As geostrophic surface currents are sometimes weak or nonexistent, eddies can also play an important role for larval transport of many organisms (E. Firing, UH SOEST, personal communication, July 2005). See Figure 3-6 for examples of compiled satellite based data to monitor an eddy.

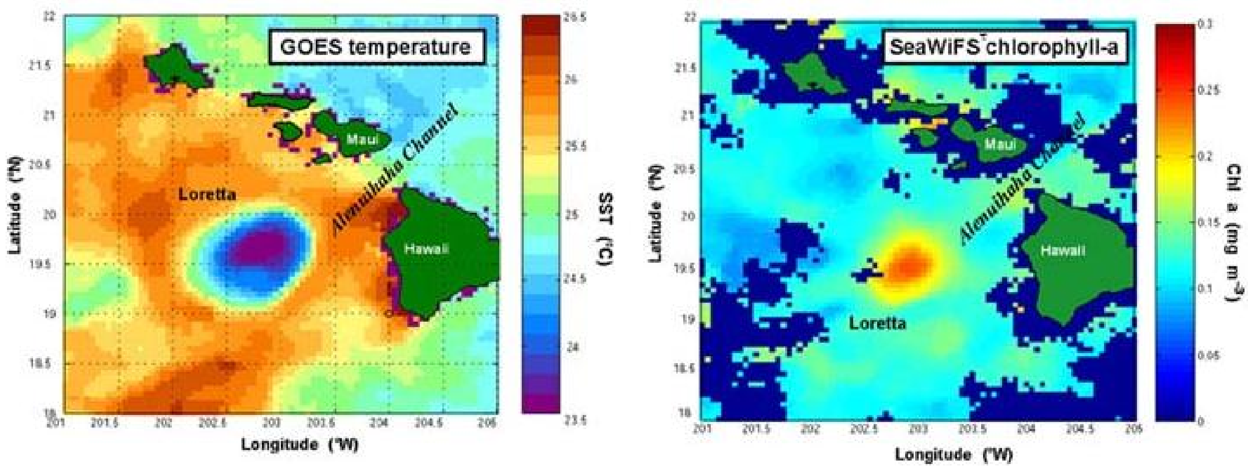

Figure 3-6: Example of Eddy West of Hawaiian Islands.
Source: http://www.gsfc.nasa.gov/topstory/20010413oceaneddy.html (accessed August 2006).
Note: The above eddy, named Lorretta, persisted in waters west of Hawaii Island for nearly eight months. Lorretta upwelled, cool, nutrient rich water that resulted in increases in primary productivity (i.e., chlorophyll).

3.1.10 Deep-Ocean Currents

As described in Tomzack and Godfrey (2003), deep-ocean currents or thermohaline movements, result from the effects of salinity and temperature on the density of seawater. In the Southern Ocean, for example, water exuded from sea ice is extremely dense because of its high salt content. The movement of the dense water is influenced by bathymetry as it sinks to the bottom and flows "down slope," thus filling up the deep polar ocean basins. For example, the Arctic Ocean does not contribute much of its dense water to the Pacific Ocean due to the narrow shallows of the Bering Strait. Generally, the deep-water currents flow through the Atlantic Basin, around South Africa, into the Indian Ocean, past Australia, and into the Pacific Ocean. This process has been labeled the "ocean conveyor belt," taking nearly 1,200 years to complete one cycle. The movement of the thermohaline conveyor belt is believed to affect global weather patterns (Gelbspan

2004), and has been the focus of much research. See Figure 3-7 for a simplified schematic diagram of the deep-ocean conveyor belt system.

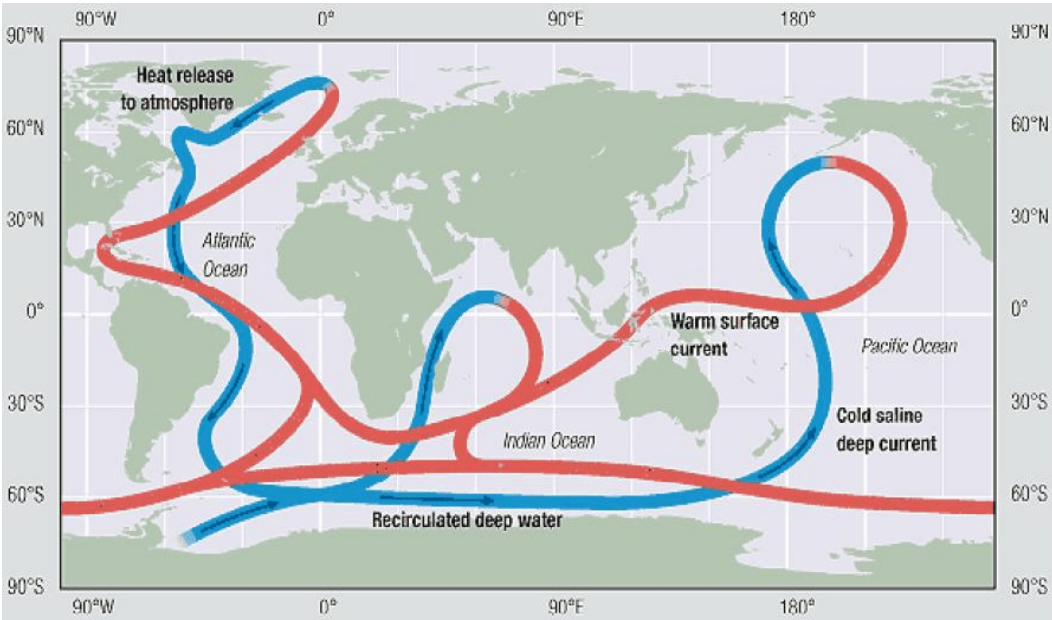

Figure 3-7: Deep-Ocean Water Movement.
Source: UN GEO Yearbook 2004.

3.1.11 Prominent Pacific Ocean Meteorological Features

The air–sea interface is a dynamic relationship in which the ocean and atmosphere exchange energy and matter. This relationship is the basic driver for the circulation of surface water (through wind stress) as well as for atmospheric circulation (through evaporation). The formation of weather systems and atmospheric pressure gradients are linked to exchange of energy (e.g., heat) and water between air and sea (Bigg 2003).

Near the equator, intense solar heating causes air to rise and water to evaporate, thus resulting in areas of low pressure. The air that has risen in equatorial region fans out in to the higher troposphere layer of the atmosphere and settles back toward Earth at middle latitudes. As the air settles towards Earth it creates areas of high pressure known as subtropical high-pressure belts. One of these high-pressure areas in the Pacific is called the "Hawaiian High Pressure Belt," which is responsible for the prevailing trade wind pattern observed in the Hawaiian Islands (Sturman and McGowan 2003).

Air flowing from higher trade wind pressure areas move to low pressure areas such as the Intertropical Convergence Zone (ITCZ) and the South Pacific Convergence Zone (SPCZ), which are located around 5° N and 30° S, respectively. Converging trade winds in these areas do not produce high winds, but instead often form areas that lack significant wind speeds. These areas of low winds are known as the "doldrums." The convergence zones are associated near ridges of high sea-surface temperatures, with temperatures of 28° C and above, and are areas of cloud accumulation and high rainfall amounts. The high rainfall amounts reduce ocean water salinity levels in these areas (Sturman and McGowan 2003).

The Aleutian Low Pressure System is another prominent weather feature in the Pacific Ocean and is caused by dense polar air converging with air from the subtropical high-pressure belt. As these air masses converge around 60° N, air is uplifted creating in an area of low pressure. When the relatively warm surface currents (Figure 3-4) meet the colder air temperatures of subpolar regions, latent heat is released, which causes precipitation. The Aleutian Low is an area where large storms with high winds are produced. Such large storms and wind speeds have the ability to affect the amount of mixing and upwelling between ocean layers (e.g., mixed layer and thermocline; Polovina et al. 1994).

The dynamics of the air–sea interface do not produce steady states of atmospheric pressure gradients and ocean circulation. As discussed in the previous sections, there are consistent weather patterns (e.g., ITCZ) and surface currents (e.g., NPC); however, variability within the ocean–atmosphere system results in changes in winds, rainfall, currents, water column mixing, and sea-level heights, which can have profound effects on regional climates as well as on the abundance and distribution of marine organisms.

One example of a shift in ocean–atmospheric conditions that can affect global fisheries in the Pacific Ocean is El Niño Southern Oscillation (ENSO). ENSO is linked to climatic changes in normal prominent weather features of the Pacific and Indian Oceans, such as the location of the intertropical convergence zone, ITCZ. ENSO, which can occur every 2 to 10 years, results in the reduction of normal trade winds, which reduces the intensity of the westward-flowing equatorial surface current (Sturman and McGowan 2003). In turn, the eastward-flowing countercurrent tends to dominate circulation, bringing warm, low-salinity, and low-nutrient water to the eastern margins of the Pacific Ocean. As the easterly trade winds are reduced, the normal nutrient-rich upwelling system does not occur, leaving warm surface water pooled in the eastern Pacific Ocean.

The impacts of ENSO events are strongest in the Pacific through disruption of the atmospheric circulation, generalized weather patterns and fisheries. ENSO affects the ecosystem dynamics in the equatorial and subtropical Pacific by considerable warming of the upper ocean layer, rising of the thermocline in the western Pacific and deepening of the thermocline in the east, strong variations in the intensity of ocean currents, low trade winds with frequent westerlies, high precipitation at the dateline and drought in the western Pacific (Sturman and McGowan 2003). ENSO events have the ability to significantly influence the abundance and distribution of organisms within marine ecosystems. Human communities also experience a wide range of socioeconomic impacts from ENSO such as changes in weather patterns resulting in catastrophic events (e.g., mudslides in California because of high rainfall amounts) as well as reductions in fisheries harvests (e.g., collapse of the anchovy fishery off Peru and Chile; Levington 1995; Polovina 2005).

Changes in the Aleutian Low Pressure System are another example of how interannual variation in a prominent Pacific Ocean weather feature profoundly effects on the abundance and distribution of marine organisms. Polovina et al. (1994) found that between 1977 and 1988, the intensification of the Aleutian Low Pressure System in the North Pacific resulted in a deeper mixed-layer depth, which led to higher nutrients levels in the top layer of the euphotic zone. This, in turn, led to an increase in phytoplankton production that resulted in higher productivity levels (higher abundance levels for some organisms) in the NWHI. Changes in the Aleutian Low Pressure System, and the resulting effects on phytoplankton productivity, have been observed on decadal scales (10 years), as well as for longer periods such as 20 to 30 years. The phenomenon is often referred to as "Pacific Decadal Oscillation" (Polovina 2005; Polovina et al. 1994).

3.1.12 Pacific Island Geography

The Pacific islands can be generally grouped into three major areas: (a) Micronesia, (b) Melanesia, and (c) Polynesia. The islands of Japan and the Aleutian Islands in the North Pacific are generally not included in these three areas, thus they are not included or described here as this analysis focuses on the Western Pacific Region and its ecosystems. Information used in this section was obtained from the online version of the U.S. Central Intelligence Agency's World Fact Book (2005).[27]

Micronesia

Micronesia, which is primarily located in the western Pacific Ocean, is made up of hundreds of high and low islands within six archipelagos: (a) Caroline Islands, (b) Marshall Islands, (c) Mariana Islands, (d) Gilbert Islands, (e) Phoenix Islands, and (f) Line Islands.

The Caroline Islands (approximately 640 square miles) are composed of many low coral atolls, with a few high islands. Politically, the Caroline Islands are separated into two countries: Palau and the Federated States of Micronesia (FSM). Palau contains six island groups (approximately 458 square miles) composed of volcanic and coral islands. The population of Palau is estimated to be around 20,000 and the capitol is located in Korror. Palau's EEZ is 232,861 square miles.

The FSM contains hundreds of low lying coral islands (approximately 278 square miles) separated into four groups. The population of FSM is around 110,000 with the most populated states being Yap, Pohnpei (capitol), Kosrae, and Chuuk. FSM's EEZ is 1,156,944 square miles.

The Marshall Islands (approximately 180 square miles) are made up of 34 low-lying atolls separated by two chains: the southeastern Ratak Chain and the northwestern Ralik Chain. The population of the Marshall Islands is around 60,000, with Ebeye being one of

[27] http://www.cia.gov/cia/publications/factbook/index.html

the most densely populated islands in the Pacific. The capital is Majuro. The EEZ around the Marshall Islands is 768,561 square miles.

The Mariana Islands (approximately 396 square miles) are composed of 15 volcanic islands that are part of a submerged mountain chain that stretches nearly 1,500 miles from Guam to Japan. Politically, the Mariana Islands are split into the Territory of Guam and the CNMI, both of which are U.S. possessions (See sections 3.5.2 and 3.5.3). The EEZ around Guam and CNMI are 81,470 square miles and 292,717 square miles, respectively.

Nauru (approximately 21 square miles), located southeast of the Marshall Islands, is a raised coral reef atoll rich in phosphate. The island has a population of around 13,500 people and the Republic of Nauru is considered the smallest independent nation in the world. Nauru's EEZ is 119,106 square miles.

The Republic of Kirabati consists of 33 low lying coral islands (approximately 315 square miles) within three major island chains (Gilbirt, Phoenix, Line) separated by hundreds of miles. The population of Kiribati is nearly 105,000 people. The Gilbert Islands are located south of the Marshall Islands and are made up of 16 low-lying atolls, including Tarawa, the capital of Kiribati. The Phoenix Islands, located to the southwest of the Gilbert Islands, are composed of eight coral atolls. Howland and Baker Islands (U.S. possessions) are located within the Phoenix Archipelago. The Line Islands, located in the central South Pacific, are made up of ten coral atolls, of which Kirimati is the largest in the world (approximately 250 square miles). The U.S. possessions of Kingman Reef, Palmyra Atoll, and Jarvis Island are part the Line Islands. Kiribati has one of the largest EEZs in the Pacific at 1,328,913 square miles.

Melanesia

Melanesia is composed of several archipelagos that include the following: (a) Fiji Islands, (b) New Caledonia, (c) Solomon Islands, (d) New Guinea, (e) Bismark Archipelago, (f) Louisiade Islands, (g) Tobriand Islands, (h) Maluku Islands, (i) Torres Strait Islands, and (j) Vanuatu Islands.

Located approximately 3,500 miles northeast of Sydney, Australia, the Fiji Archipelago (approximately 18,700 square miles) is composed of nearly 800 islands: the largest islands are volcanic in origin and the smallest islands are coral atolls. The two largest islands, Viti Levu and Vanua Levu, make up nearly 85 percent of the Republic of total land area of the Fiji Islands. Fiji's population is estimated at 905,949 people and the capitol is located in Suva. Fiji's EEZ is 495,369 square miles.

Located nearly 750 miles east–northeast of Australia, is the volcanic island of Grande Terre or New Caledonia (approximately 6,300 square miles). New Caledonia is French Territory and includes the nearby Loyalty Islands and the Chesterfield Islands, which are groups of small coral atolls. The population of New Caledonia is approximately 219,246 people and the capitol is located in Noumea. The EEZ around New Caledonia is 549,170 square miles.

The Solomon Islands (approximately 27,500 square miles) are located northwest of New Caledonia and east of Papua New Guinea. Thirty volcanic islands and several small coral atolls make up this former British colony, which is now a member of the Commonwealth of Nations. The Solomon Islands are made up of smaller groups of islands such as the New Georgia Islands, the Florida Islands, the Russell Islands, and the Santa Cruz Islands. Approximately 1,500 miles separate the western and eastern island groups of the Solomon Islands. The population of the Solomon Islands is approximately 552,438 people and the capitol is located in Honiara. The Solomon Islands' EEZ is 613,711 square miles.

New Guinea is the world's second largest island and is thought to have separated from Australia around 5000 BC. New Guinea is split between two nations: Indonesia (west) and Papua New Guinea (east). Papua New Guinea (approximately 178,700 square miles) is an independent nation that also governs several hundred small islands within several groups. These groups include the Bismark Archipelago and the Louisiade Islands, which are located north of New Guinea, and Tobriand Islands, which are southeast of New Guinea. Most of the islands within the Bismark and Lousiade groups are volcanic in origin, whereas the Tobriand Islands are primarily coral atolls. Papua New Guniea's population is estimated at 5,670,544 people and the capitol is located in Port Moresby. Papua New Guniea's EEZ is 927,545 square miles.

The Maluku Islands (east of New Guinea) and the Torres Strait Islands (between Australia and New Guniea) are also classified as part of Melanesia. Both of these island groups are volcanic in origin. The Maluku Islands are under Indonesia's governance, while the Torres Strait Islands are governed by Australia.

The Vanuatu Islands (4,700 square miles) comprise an archipelago that is located to the southeast of the Solomon Islands. There are 83 islands in the approximately 500 mile-long Vanuatu chain, most of which are volcanic in origin. The population of Vanuatu is approximately 208,869 people and the capitol is located in Port-Vila. Vanuatu's EEZ is 256,087 square miles.

Polynesia

Polynesia is composed of several archipelagos and island groups including (a) New Zealand and associated islands, (b) Tonga, (c) Samoa Islands, (d) Cook Islands (e) Tuvalu, (f) Tokelau, (g) Territory of French Polynesia, (h) Pitcairn Islands, (i) Easter Island (Rapa Nui), and (j) Hawaii.

New Zealand (approximately 103,470 square miles) is composed of two large islands: North Island and South Island and several small-island groups and islands. North Island (approximately 44,035 square miles) and South Island (approximately 58,200 square miles) extend for nearly 1,000 miles on a northeast–southwest axis, and have a maximum width of 450 miles. The other small island groups within the former British colony include the Chatham Islands and the Kermadec Islands. The Chatham Islands are a group of ten volcanic islands located 800 kilometers east of South Island. The four emergent islands of the Kermadec Islands are located 1,000 kilometers northeast of North Island and are part of a larger island arc with numerous subsurface volcanoes. The Kermadec Islands are known to be an active volcanic area where the Pacific Plate subducts under the Indo-Australian Plate. The population of New Zealand is approximately 4,076,140 people and the capitol is located in Wellington. New Zealand's EEZ is 1,339,411 square miles.

The Tonga Islands (approximately 290 square miles) are located 450 miles east of Fiji and consist of 169 islands of volcanic and raised limestone origin. The largest island, Tongatapu (approximately 260 square miles), is home to two thirds of Tonga's population of approximately 106,000 people. Tonga's EEZ is 254,672 square miles.

The Samoa Archipelago is located northeast of Tonga and consists of seven major volcanic islands, several small islets, and two coral atolls. The largest islands in this chain are Upolu (approximately 436 square miles) and Savaii (approximately 660 square miles). Upolu and Savaii and its surrounding islets and small islands are governed by the Independent State of Samoa with a population of approximately 178,000 people. Samoa's EEZ is 49,402 square miles.

Tutuila (approximately 55 square miles), the Manua Islands (a group of four volcanic islands with a total land area of less than 20 square miles), and two coral atolls (Rose Atoll and Swains Island) are governed by the U.S. Territory of American Samoa. More than 90 percent of American Samoa's population (approximately 68,000 people) lives on Tutuila. The EEZ around American Samoa is 156,246 square miles.

To the east of the Samoa Archipelago are the Cook Islands (approximately 90 square miles), which are separated into the Northern Group and Southern Group. The Northern Group consists of six sparsely populated coral atolls and the Southern Group consists of seven volcanic islands and two coral atolls. Rorotonga (approximately 26 square miles), located in the Southern Group, is the largest island in the Cook Islands and also serves as the capitol. From north to south, the Cook Islands spread nearly 900 miles, and the width between the most distant islands is nearly 450 miles. The population of the Cook Islands is approximately 21,388 people and the EEZ is approximately 755,781 square miles.

Approximately 600 miles northwest of the Samoa Islands is Tuvalu (approximately 10 square miles), an independent nation made up of nine low-lying coral atolls. None of the islands have elevation higher than 14 feet, and the total population of the country is approximately 11,000 people. Tuvalu's coral island chain extends for nearly 360 miles and the country has an EEZ of 289,500 square miles.

East of Tuvalu and north of Samoa are the Tokelau Islands (approximately 4 square miles). Three coral atolls make up this territory of New Zealand, and a fourth atoll (Swains Island) is of the same group, but is controlled by the U.S Territory of American Samoa. Tokelau has a population of approximately 1,392 people and an EEZ of 123,343 square miles.

The 32 volcanic islands and 180 coral atolls of the Territory of French Polynesia (approximately 1,622 square miles) are made up of the following six groups: Austral Islands, Bass Islands, Gambier Islands, Marquesas Islands, Society Islands, and the Tuamotu Islands. The Austral Islands are a group of six volcanic islands in the southern portion of the territory. The Bass Islands are a group of two islands in the southernmost part of the territory, with their volcanism appearing to be much more recent than that of the Austral Islands. The Gambier Islands are a small group of volcanic islands in the southeastern portion of the territory and are often associated with the Tuamotu Islands because of their relative proximity; however, they are a distinct group because they are of volcanic origin rather than being coral atolls. The Marquesa Islands are an isolated group of islands located in the northeast portion of the territory, and are approximately 1,000 miles northeast of Tahiti. All but one of the 17 Marquesas Islands are volcanic in origin. The Society Islands are group of several volcanic islands that include the island of Tahiti. Tahiti is home to nearly 70 percent of French Polynesia’s population of approximately 275,578 people. The capitol city of Papeete is located on Tahiti. The Tuamotu Islands, of which there are 78, are located in the central portion of the territory and are the world’s largest chain of coral atolls. French Polynesia has one of the largest EEZs in the Pacific Ocean at nearly 1,835,669 square miles.

The Pitcairn Islands (governed by the United Kingdom) are a group of five islands thought to be an extension of the Tuamotu Archipelago. Pitcairn Island is the only volcanic island, with the others being coral atolls or uplifted limestone. Henderson Island is the largest in the group; however, Pitcairn Island is the only one that is inhabited with approximately 45 people. The EEZ around Pitcairn Islands is 323,325 square miles.

Easter Island, a volcanic high island located approximately 2,185 miles west of Chile, is thought to be the eastern extent of the Polynesian expansion. Easter Island, which is governed by Chile, has a total land area of 63 square miles and a population of approximately 3,790 people. The EEZ around Easter Island is 275,475 square miles.

The northern extent of the Polynesian expansion is the Hawaiian Islands, which are made up of 137 islands, islets, and coral atolls. The exposed islands are part of a great undersea mountain range known as the Hawaiian-Emperor Seamount Chain, which was formed by a hotspot within the Pacific Plate. The Hawaiian Islands extend for nearly 1,500 miles from Kure Atoll in the northwest to the Island of Hawaii in the southeast. The Hawaiian Islands are often grouped into the Northwestern Hawaiian Islands (Nihoa to Kure) and the Main Hawaiian Islands (Hawaii to Niihau). The total land area of the 19 primary islands and atolls is approximately 6,423 square miles, and the more than 75 percent of the 1.2-million population lives on the island of Oahu. The EEZ around Hawaii is 810,232 square miles.

3.2 Biological Environment

This section contains general descriptions of pelagic marine trophic levels, food chains and food webs, A broad description of the types of marine organisms found within this environments is provided, as well as a description of organisms important to fisheries. Protected species are also described in this section.

3.2.1 Marine Food Chains, Trophic Levels, and Food Webs

Food chains are often thought of as a representation of the basic flow of organic matter and energy through a series of organisms. Food chains in marine environments are generally segmented into the following six trophic levels: primary producers, primary consumers, secondary consumers, tertiary consumers, quaternary consumers, and decomposers.

Generally, primary producers in the marine ecosystems are organisms that fix inorganic carbon into organic carbon compounds using external sources of energy (i.e., sunlight). Such organisms include single-celled phytoplankton. These organisms share common cellular structures called "chloroplasts," which contain chlorophyll. Chlorophyll is a pigment that absorbs the energy of light to drive the biochemical process of photosynthesis. Photosynthesis results in the transformation of inorganic carbon into organic carbon such as carbohydrates, which are used for cellular growth.

Primary consumers in the marine environment are organisms that feed on primary producer. Secondary, tertiary, and quaternary consumers in the marine environment are organisms that feed on primary consumers and include fish, mollusks, crustaceans, mammals and other carnivorous. Decomposers live off dead phytoplankton and animals and are essential in food chains as they break down organic matter and make it available for primary producers (Valeila 2003).

Marine food webs are simplified representations of overall patterns of feeding among organisms. An example of a marine food web is presented in Figure 3-8. The openness of marine ecosystems, lack of specialists, long lifespans, and large size changes and food preferences across the life histories of many marine species make marine food webs more complex than their terrestrial and freshwater counterparts (Link 2002). Nevertheless, food webs are important tools in understanding ecological relationships among organisms.

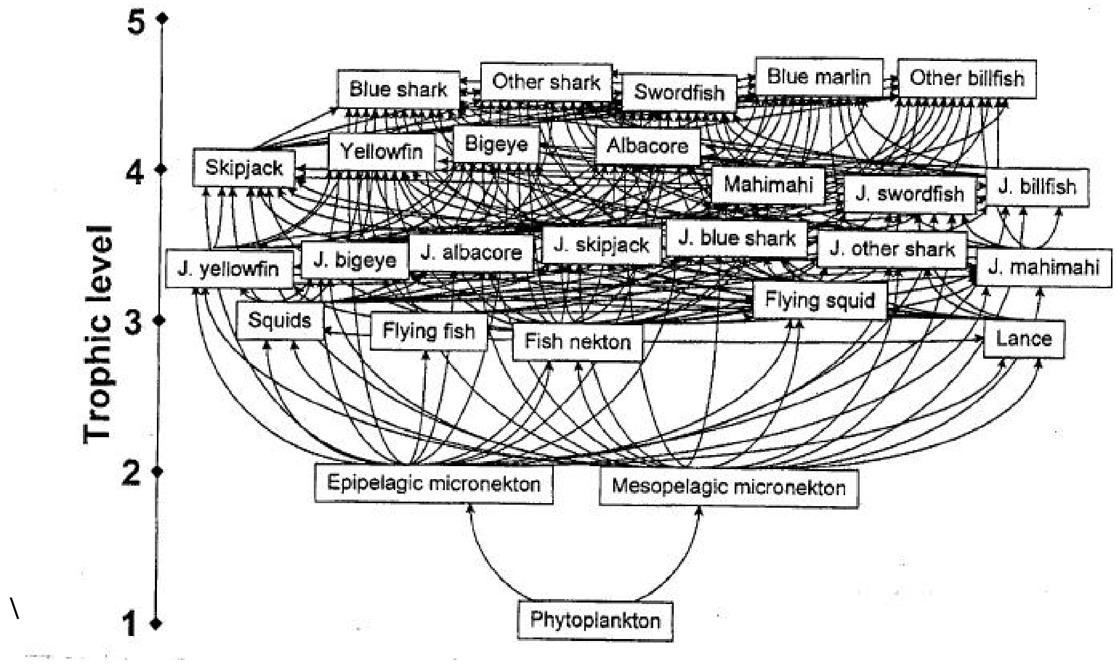

Figure 3-8: Central Pacific Pelagic Food Web. Source: Kitchell et al. 1999.

3.2.2 Benthic Environment

The word benthic comes from the Greek word *benthos* or "depths of the sea." The benthic or demersal environment is quite general in that it is regarded as extending from the hide-tide mark to the deepest depths of the ocean floor. Benthic habitats are home to a wide range of marine organisms forming complex community structures. This section presents a simple description of the following benthic zones: (a) intertidal, (b) subtidal (e.g., coral reefs), (c) banks and seamounts, (d) deep-reef slope, and (e) deep-ocean bottom (see Figure 3-9).

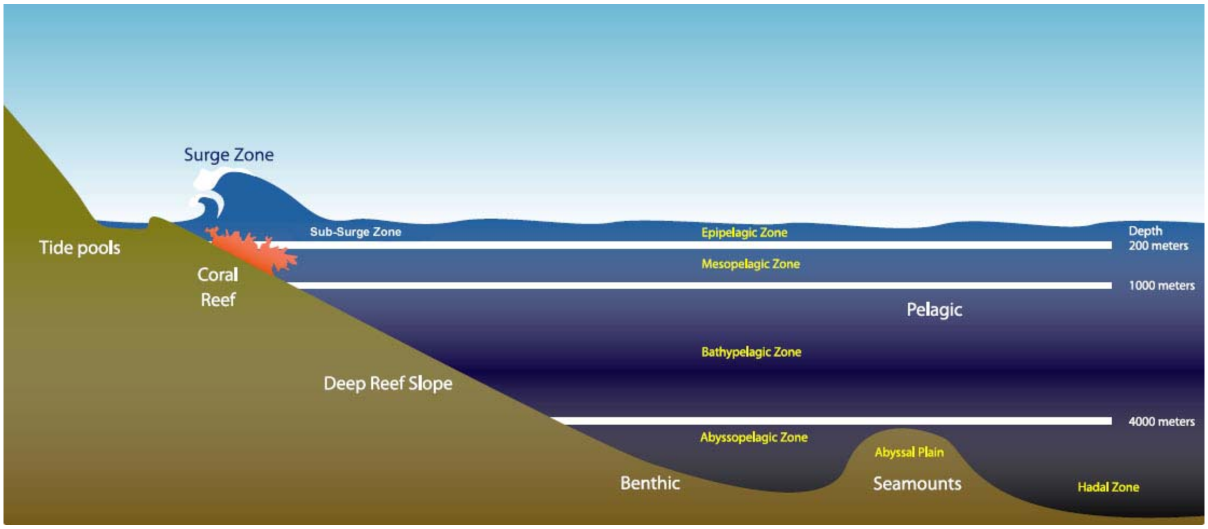

Figure 3-9: Benthic Environment and Associated Ocean Zones.
Source: WPRFMC 2005.

Intertidal Zone

The intertidal zone is a relatively small margin of seabed that exists between the highest and lowest extent of the tides. Because of wave action on unprotected coastlines, the intertidal zone can sometimes extend beyond tidal limits due to the splashing effect of waves. Vertical zonation among organisms is often observed in intertidal zones, where the lower limits of some organisms are determined by the presence of predators or competing species, whereas the upper limit is often controlled by physiological limits and species' tolerance to temperature and drying (Levington 1995). Organisms that inhabit the intertidal zone include algae, seaweeds, mollusks, crustaceans, worms, echinoderms (starfish), and cnidarians (e.g., anemones).

Many organisms in the intertidal zone have adapted strategies to combat the effects of temperature, salinity, and desiccation due to the wide-ranging tides of various locations. Marine algae are the primary produces in most intertidal areas. Many species primary consumers such as snails graze on algae growing on rocky substrates in the intertidal zone. Secondary and tertiary consumers in intertidal zones include starfish, anemones, and seabirds. Because of the proximity of the intertidal zone to the shoreline, intertidal organisms are important food items to many human communities. In Hawaii, for example, intertidal limpet species (snails; *Cellana* spp.) such as `opihi (*Cellana exarata*) have long been eaten by native Hawaiian communities. In addition to mollusks, intertidal seaweeds are also important food items for Pacific Islanders.

Seagrass Beds

Seagrasses are found in many marine ecosystems and are a regular feature of many inshore areas adjacent to coral reefs in the Pacific. According to Hatcher et al. (1989), seagrasses stabilize sediments because leaves slow current flow, thus increasing sedimentation of particles. The roots and rhizomes form a complex matrix that binds sediments and stops erosion. Seagrass beds provide habitat for certain commercially valuable shrimps as well as habitat for reef-associated species such as surgeonfishes (*Acanthuridae*) and rabbitfishes (*Siganidae*). Seagrasses are also important sources of nutrition for higher vertebrates such as green sea turtles. A concise summary of the seagrass species found in the western tropical South Pacific is given by Coles and Kuo (1995). From the fisheries perspective, the fishes and other organisms harvested from the reef coral and associated habitats, such as mangroves, seagrass beds, shallow lagoons, bays, inlets and harbors, and the reef slope beyond the limit of coral reef growth, contribute to the total yield from coral reef associated fisheries.

Mangrove Forests

Mangroves are terrestrial shrubs and trees that are able to live in the salty environment of the intertidal zone. Their prop roots form important substrate on which sessile organisms can grow, and they provide shelter for fishes. Mangroves are believed to also provide important nursery habitat for many juvenile reef fishes. The natural eastern limit of mangroves in the Pacific is American Samoa, although the red mangrove (*Rhizophora mangle*) was introduced into Hawaii in 1902, and has become the dominant plant within a number of large protected bays and coastlines on both Oahu and Molokai (Gulko 1998). Apart from the usefulness of the wood for building, charcoal, and tannin, mangroves are important to Pacific Islanders as they protect coastlines from erosion and stabilize sediment as well as provide habitat to a wide variety of mollusks, crustaceans, fish, and shorebirds. Threats to mangroves include filling from development, disease, and sea level rise associated with global climate change (Gilman et al. 2006).

Coral Reefs

Coral reefs are carbonate rock structures at or near sea level that support viable populations of reef-building corals. Apart from a few exceptions in the Pacific Ocean, coral reefs are confined to the warm tropical and subtropical waters lying between 30° N and 30° S. Coral reef ecosystems are some of the most diverse and complex ecosystems on Earth. Their complexity is manifest on all conceptual dimensions, including geological history, growth and structure, biological adaptation, evolution and biogeography, community structure, organism and ecosystem metabolism, physical regimes, and anthropogenic interactions (Hatcher et al. 1989).

Coral reefs and reef-building organisms are confined to the shallow upper euphotic zone. Maximum reef growth and productivity occur between 5 and 15 meters (Hopley and Kinsey 1988) and maximum diversity of reef species occurs at 10 to 30 meters (Huston 1985). Thirty meters has been described as a critical depth below which rates of growth (accretion) of coral reefs are often too slow to keep up with changes in sea level. This was true during the Holocene transgression over the past 10,000 years, and many reefs below this depth drowned during this period. Coral reef habitat does extend deeper than 30 meters, but few well-developed reefs are found below 50 meters. Many coral reefs are bordered by broad areas of shelf habitat (reef slope) between 50 and 100 meters that were formed by wave erosion during periods of lower sea level. These reef slope habitats consist primarily of carbonate rubble, algae and microinvertebrate communities, some of which may be important nursery grounds for some coral reef fish, as well as a habitat for several species of lobster. However, the ecology of this habitat is poorly known, and much more research is needed to define the lower depth limits of coral reefs, which by inclusion of shelf habitat, could be viewed as extending to 100 meters.

The symbiotic relationship between the animal coral polyps and algal cells (dinoflagellates) known as zooxanthellae is a key feature of reef building corals. Incorporated into the coral tissue, these photosynthesizing zooxanthellae provide much of the polyp's nutritional needs, primarily in the form of carbohydrates. Most corals supplement this food source by actively feeding on zooplankton or dissolved organic nitrogen, because of the low nitrogen content of the carbohydrates derived from photosynthesis. Because of reef-building coral's symbiotic relationship with photosynthetic zooxanthellae, reef-building corals do not generally occur at depths greater than 100 meters (300feet; Hunter 1995).

Primary production on coral reefs is associated with phytoplankton, algae, sea grasses, and zooxanthellae. Primary consumers include many different species of corals, mollusks, crustaceans, echinoderms, gastropods, sea turtles, and fish (e.g., parrot fish). Secondary consumers include anemones, urchins, crustaceans, and fish. Tertiary consumers include eels, octopus, barracudas, and sharks.

The corals and coral reefs of the Pacific are described in Wells and Jenkins (1988) and Veron (1995). The number of coral species declines in an easterly direction across the western and central Pacific, which is in common with the distribution of fish and invertebrate species. More than 330 species are contained in 70 genera on the Australian Barrier Reef, compared with only 30 coral genera present in the Society Islands of French Polynesia, and 10 genera in the Marquesas and Pitcairn Islands. Hawaii, by virtue of its isolated position in the Pacific, also has relatively few species of coral (about 50 species in 17 genera) and, more importantly, lacks most of the branching or "tabletop" *Acropora* species that form the majority of reefs elsewhere in the Pacific. The *Acropora* species provide a large amount of complex three-dimensional structure and protected habitat for a wide variety of fishes and invertebrates. As a consequence, Hawaiian coral reefs provide limited "protecting" three-dimensional space. This is thought to account for the exceptionally high rate of endemism among Hawaiian marine species. Furthermore, many believe that this is the reason certain fish and invertebrate species look and act very differently from similar members of the same species found in other parts of the South Pacific (Gulko 1998).

Coral Reef Productivity

Coral reefs are among the most biologically productive environments in the world. The global potential for coral reef fisheries has been estimated at nine million metric tons per year, which is impressive given the small area of reefs compared with the extent of other marine ecosystems, which collectively produce between 70 and 100 million metric tons per year (Munro 1984; Smith 1978). An apparent paradox of coral reefs, however, is their location in the low-nutrient areas of the tropical oceans. Coral reefs themselves are characterized by the highest gross primary production in the sea, with sand, rubble fields, reef flats, and margins adding to primary production rates. The main primary producers on coral reefs are the benthic microalgae, macroalgae, symbiotic microalgae of corals, and other symbiont-bearing invertebrates (Levington 1995). Zooxanthellae living in the tissues of hard corals make a substantial contribution to primary productivity in zones rich in corals due to their density, greater than 10^6 cells cm^{-2} of live coral surface, and the high rugosity of the surfaces on which they live, as well as their own photosynthetic potential. However, zones of high coral cover make up only a small part of entire coral reef ecosystems, and so contribution to total coral reef primary productivity is small (WPRFMC 2001).

Although the ocean's surface waters in the tropics generally have low productivity, these waters are continually moving. Coral reefs, therefore, have access to open-water productivity and thus, particularly in inshore continental waters, shallow benthic habitats such as reefs are not always the dominant sources of nutrients for fisheries. In coastal waters, detrital matter from land, plankton, and fringing marine plant communities are particularly abundant. There may be passive advection of particulate and dissolved detrital carbon onto reefs, as well as active transport onto reefs via fishes that shelter on reefs but that feed in adjacent habitats. There is, therefore, greater potential for nourishment of inshore reefs than offshore reefs by external sources, and this inshore nourishment is enhanced by large land masses (Birkeland 1997a, 1997b).

For most of the Pacific Islands, rainfall typically ranges from 2.0 to 3.5 meters per year. Low islands, such as atolls, tend to have less rainfall and may suffer prolonged droughts. Furthermore, when rain does fall on coral islands that have no major catchment area, there is little nutrient input into surrounding coastal waters and lagoons. Lagoons and embayments around high islands in the South Pacific are likely to be more productive than atoll lagoons. There are, however, some exceptions to the typical amount of rainfall on atolls; Palmyra Atoll and Rose Atoll receive up to 4.3 meters of rain per year. However, overall the productivity of high-island coastal waters, particularly where there are lagoons and sheltered waters, is possibly reflected in the greater abundance of small pelagic fishes such as anchovies, sprats, sardines, scads, mackerels, and fusiliers. In addition, the range of different environments that can be found in the immediate vicinity of the coasts of high islands also contributes to the greater range of biodiversity found in such locations.

Coral Reef Communities

A major portion of the primary production of the coral reef ecosystem comes from complex interkingdom relationships of animal/plant photosymbioses hosted by animals of many taxa, most notably stony corals. Most of the geological structure of reefs and habitat is produced by these complex symbiotic relationships. Complex symbiotic relationships for defense from predation, removal of parasites, building of domiciles, and other functions are also prevalent. About 32 of the 33 animal phyla are represented on coral reefs (only 17 are represented in terrestrial environments), and this diversity produces complex patterns of competition. The diversity also produces a disproportionate representation of predators, which have strong influences on lower levels of the food web in the coral reef ecosystem (Birkeland 1997a).

In areas with high gross primary production—such as rain forests and coral reefs—animals and plants tend to have a higher variety and concentration of natural chemicals as defenses against herbivores, carnivores, competitors, and microbes. Because of this tendency, and the greater number of phyla in the system, coral reefs are now a major focus for bioprospecting, especially in the southwest tropical Pacific (Birkeland 1997b).

Typically, spawning of coral reef fish occurs in the vicinity of the reef and is characterized by frequent repetition throughout a protracted time of the year, a diverse array of behavioral patterns, and an extremely high fecundity. Coral reef species exhibit a wide range of strategies related to larval dispersal and ultimately recruitment into the same or new areas. Some larvae are dispersed as short-lived, yolk-dependent (lecithotrophic) organisms, but the majority of coral reef invertebrate species disperse their larvae into the pelagic environment to feed on various types of plankton (planktotrophic; Levington 1995). For example, larvae of the coral Pocillopora damicornis, which is widespread throughout the Pacific, has been found in the plankton of the open ocean exhibiting a larval life span of more than 100 days (Levington 1995). Because many coral reefs are space limited for settlement, therefore, planktotrophic larvae are a likely strategy to increase survival in other areas (Levington 1995). Coral reef fish experience their highest predation mortality in their first few days or weeks, thus rapid growth out of the juvenile stage is a common strategy.

The condition of the overall populations of particular species is linked to the variability among subpopulations: the ratio of sources and sinks, their degrees of recruitment connection, and the proportion of the subpopulations with high variability in reproductive capacity. Recruitment to populations of coral reef organisms depends largely on the pathways of larval dispersal and "downstream" links.

Reproduction and Recruitment

The majority of coral reef associated species are very fecund, but temporal variations in recruitment success have been recorded for some species and locations. Many of the large, commercially targeted coral reef species are long lived and reproduce for a number of years. This is in contrast to the majority of commercially targeted species in the tropical pelagic ecosystem. Long-lived species adapted to coral reef systems are often characterized by complex reproductive patterns like sequential hermaphroditism, sexual maturity delayed by social hierarchy, multispecies mass spawnings, and spawning aggregations in predictable locations (Birkeland 1997b).

Growth and Mortality Rates

Recruitment of coral reef species is limited by high mortality of eggs and larvae, and also by competition for space to settle out on coral reefs. Predation intensity is due to a disproportionate number of predators, which limits juvenile survival (Birkeland 1997b). In response, some fishes, such as scarids (parrotfish) and labrids (wrasses), grow rapidly compared with other coral reef fishes. But they still grow relatively slowly compared with pelagic species. In addition, scarids and labrids may have complex haremic territorial social structures that contribute to the overall effect of harvesting these resources. It appears that many tropical reef fishes grow rapidly to near-adult size, and then often grow relatively little over a protracted adult life span; they are thus relatively long lived. In some groups of fishes, such as damselfish, individuals of the species are capable of rapid growth to adult size, but sexual maturity is still delayed by social pressure. This complex relationship between size and maturity makes management of these species more difficult (Birkeland 1997b).

Community Variability

High temporal and spatial variability is characteristic of reef communities. At large spatial scales, variation in species assemblages may be due to major differences in habitat types or biotopes. Seagrass beds, reef flats, lagoonal patch reefs, reef crests, and seaward reef slopes may occur in relatively close proximity, but represent notably different habitats. For example, reef fish communities from the geographically isolated Hawaiian Islands are characterized by low species richness, high endemism, and exposure to large semiannual current gyres, which may help retain planktonic larvae. The NWHI are further characterized by (a) high-latitude coral atolls; (b) a mild temperate to subtropical climate, where inshore water temperatures can drop below 18° C in late winter; (c) species that are common on shallow reefs and attain large sizes, which to the southeast occur only rarely or in deep water; and (d) inshore shallow reefs that are largely free of fishing pressure (Maragos and Gulko 2002).

Deep Reef Slopes

As most Pacific islands are oceanic islands versus continental islands, they generally lack an extensive shelf area of relatively shallow water extending beyond the shoreline. For example, the average global continental shelf extends 40 miles, with a depth of around 200 feet (Postma and Zijlstra 1988). While lacking a shelf, many oceanic islands have a deep reef slope, which is often angled between 45° and 90° toward the ocean floor. The deep reef slope is home to a wide variety of marine of organisms that are important fisheries target species such as snappers and groupers. Biological zonation does occur on the reef slope, and is related to the limit of light penetration beyond 100 meters. For example, reef-building corals can be observed at depths less than 100 meters, but at greater depths gorgonian and black corals are more readily observed (Colin et al. 1986).

Banks and Seamounts

Banks are generally volcanic structures of various sizes and occur both on the continental shelf and in oceanic waters. Coralline structures tend to be associated with shallower parts of the banks as reef-building corals are generally restricted to a maximum depth of 100 meters. Deeper parts of banks may be composed of rock or coral rubble, sand, or shell deposits. Banks thus support a variety of habitats, which in turn support a variety of fish species (Levington 1995).

These types of assemblages may be regarded as consisting of metapopulations that are associated with specific features or habitats and are interconnected through larval dispersal. From a genetic perspective, individual patch assemblages may be considered as the same population; however, in many locations, not enough is known about exchange rates to distinguish discrete populations.

Seamounts are undersea mountains, mostly of volcanic origin, which rise steeply from the sea bottom to below sea level (Rogers 1994). On seamounts and surrounding banks, species composition is closely related to depth. Deep-slope fisheries typically occur in the 100 to 500-meter depth range. A rapid decrease in species richness typically occurs between 200 and 400 meters deep, and most fishes observed there are associated with hard substrates, holes, ledges, or caves (Chave and Mundy 1994). Territoriality is considered to be less important for deep-water species of serranids, and lutjanids tend to form loose aggregations. Adult deep-water species are believed to not normally migrate between isolated seamounts.

Seamounts have complex effects on ocean circulation. One effect, known as the Taylor column, relates to eddies trapped over seamounts to form quasi-closed circulations. It is hypothesized that this helps retain pelagic larvae around seamounts and maintain the local fish population. Although evidence for retention of larvae over seamounts is sparse (Boehlert and Mundy 1993), endemism has been reported for a number of fish and invertebrate species at seamounts (Rogers 1994). Wilson and Kaufman (1987) concluded that seamount species are dominated by those on nearby shelf areas, and that seamounts act as stepping stones for transoceanic dispersal. Snappers and groupers both produce pelagic eggs and larvae, which tend to be most abundant over deep reef slope waters, while larvae of Etelis snappers are generally found in oceanic waters. It appears that populations of snappers and groupers on seamounts rely on inputs of larvae from external sources.

Deep-Ocean Floor

At the end of a reef slope lays the dark and cold world of the deep ocean floor. Composed of mostly mud and sand, the deep ocean floor is home to deposit feeders and suspension feeders, as well as fish and marine mammals. Compared with shallower benthic areas (e.g. coral reefs), benthic deep-slope areas are lower in productivity and biomass. Because of the lack of sunlight, primary productivity is low, and many organisms rely on deposition of organic matter that sinks to the bottom. The occurrence of secondary and tertiary consumers decreases the deeper one goes due to the lack of available prey. With increasing depth, suspension feeders become less abundant and deposit feeders become the dominant feeding type (Levington 1995).

Although most of the deep seabed is homogenous and low in productivity, there are hot spots teeming with life. In areas of volcanic activity such as the mid-oceanic ridge, thermal vents exist that spew hot water loaded with various metals and dissolved sulfide. Bacteria found in these areas are able to make energy from the sulfide (chemotrophs), and are considered primary producers. A variety of organisms either feed on these bacteria directly. Others contain the bacteria in special organs within their bodies called "trophosomes." Types of organisms found near these thermal vents include crabs, limpets, tubeworms, and bivalves (Levington 1995).

Benthic Species of Economic Importance

The following subsections provide brief descriptions of species harvested in noteworthy numbers in the Western Pacific Region. These species, and the fisheries that harvest them, have been most recently discussed in detail in a 2005 Final EIS for the Bottomfish FMP, the 2006 Draft Supplemental EIS to end bottomfish overfishing in the Hawaiian Archipelago, a 2001 Final EIS for the Coral Reef Ecosystems FMP, a 2002 Environmental Assessment under the Precious Corals FMP, and a 2000 Environmental Assessment under the Crustaceans FMP. Please see those documents, which can be accessed at www.wpcouncil.org or by contacting the Council[28] for further information.

Coral Reef Associated Species

The most commonly harvested species of coral reef associated organisms include the following: surgeonfishes (Acanthuridae), triggerfishes (Balistidae), jacks (Carangidae),

[28] WPRFMC. 1164 Bishop St. Ste. 1400. Honolulu, HI. 96813.

soldierfishes/squirrelfishes (Holocentridae), wrasses (Labridae), parrotfishes (Scaridae), octopus (Octopus cyanea, O. ornatus), goatfishes (Mullidae), and giant clams (Tridacnidae). Studies on coral reef fisheries are relatively recent, commencing with the major study by Munro and his coworkers during the late 1960s in the Caribbean (Munro 1983). Even today, only a relatively few in-depth studies on reef fisheries are available.

It was initially thought that the maximum sustainable yields for coral reef fisheries were in the range of 0.5 to 5 t km^{-2} yr^{-1}, based on limited data (Marten and Polovina 1982; Stevenson and Marshall 1974). Much higher yields of around 20 t km^{-2} yr^{-1}, for reefs in the Philippines (Alcala 1981; Alcala and Luchavez 1981) and American Samoa (Wass 1982), were thought to be unrepresentative (Marshall 1980), but high yields of this order have now been independently estimated for a number of sites in the South Pacific and Southeast Asia (Dalzell and Adams 1997; Dalzell et al. 1996). These higher estimates are closer to the maximum levels of fish production predicted by trophic and other models of ecosystems (Polunin and Roberts 1996). Dalzell and Adams (1997) suggested that the average maximum sustainable yield (MSY) for Pacific reefs is in the region of 16 tkm^{-2} yr^{-1} based on 43 yield estimates where the proxy for fishing effort was population density.

However, Birkeland (1997b) has expressed some skepticism about the sustainability of the high yields reported for Pacific and Southeast Asian reefs. Among other examples, he noted that the high values for American Samoa reported by Wass (1982) during the early 1970s were followed by a 70 percent drop in coral reef fishery catch rates between 1979 and 1994. Saucerman (1995) ascribed much of this decline to a series of catastrophic events over the same period. This began with a crown of thorns infestation in 1978, followed by hurricanes in 1990 and 1991, which reduced the reefs to rubble, and a coral bleaching event in 1994, probably associated with the El Niño phenomenon. These various factors reduced live coral cover in American Samoa from a mean of 60 percent in 1979 to between 3 and 13 percent in 1993 (Saucerman 1995).

Furthermore, problems still remain in rigorously quantifying the effects of factors on yield estimates such as primary productivity, depth, sampling area, or coral cover. Polunin et al. (1996) noted that there was an inverse correlation between estimated reef fishery yield and the size of the reef area surveyed, based on a number of studies reported by Dalzell (1996). Arias-Gonzales et al. (1994) have also examined this feature of reef fisheries yield estimates and noted that this was a problem when comparing reef fishery yields. The study noted that estimated yields are based on the investigator's perception of the maximum depth at which true reef fishes occur. Small pelagic fishes, such as scads and fusiliers, may make up large fractions of the inshore catch from a particular reef and lagoon system, and if included in the total catch can greatly inflate the yield estimate. The great variation in reef yield summarized by authors such as Arias-Gonzales et al. (1994), Dalzell (1996), and Dalzell and Adams (1997) may also be due in part to the different size and trophic levels included in catches.

Another important aspect of the yield question is the resilience of reefs to fishing, and recovery potential when overfishing or high levels of fishing effort have been conducted on coral reefs. Evidence from a Pacific atoll where reefs are regularly fished by community fishing methods, such as leaf sweeps and spearfishing, indicates that depleted biomass levels may recover to preexploitation levels within 1 to 2 years. In the Philippines, abundances of several reef fishes have increased in small reserves within a few years of their establishment (Russ and Alcala 1994) although recovery in numbers of fish is much faster than recovery of biomass, especially in larger species such as groupers. Other studies in the Caribbean and Southeast Asia (Polunin et al. 1996) indicate that reef fish populations in relatively small areas have the potential to recover rapidly from depletion in the absence of further fishing.

Estimating the recovery from, and reversibility of, fishing effects over large reef areas appears more difficult to determine. Where growth overfishing predominates, recovery following effort reduction may be rapid if the fish in question are fast growing, as in the case of goatfish (Garcia and Demetropolous 1986). However, recovery may be slower if biomass reduction is due to recruitment overfishing because it takes time to rebuild adult spawning biomasses and high fecundities (Polunin and Morton 1992). Furthermore, many coral reef species have limited distributions and may be confined to a single island or a cluster of proximate islands. Widespread heavy fishing could cause global extinctions of some such species, particularly if there is also associated habitat damage.

Crustaceans

Crustaceans are harvested on small scales throughout the inhabited islands of the Western Pacific Region. The most common crustacean harvests include lobster species of the taxonomic groups *Palinuridae* (spiny lobsters) and *Scyllaridae* (slipper lobsters). Adult spiny lobsters are typically found on rocky substrate in well-protected areas, in crevices, and under rocks. Unlike many other species of *Panulirus*, the juveniles and adults of *P. marginatus* are not found in separate habitats apart from one another (MacDonald and Stimson 1980; Parrish and Polovina 1994). Juvenile *P. marginatus* recruit directly to adult habitat; they do not utilize separate shallow-water nursery habitat apart from the adults as do many Palinurid lobsters (MacDonald and Stimson 1980; Parrish and Polovina 1994). Juvenile and adult *P. marginatus* shelter differently from one another (MacDonald and Stimson 1980). Similarly, juvenile and adult *P. pencillatus* also share the same habitat (Pitcher 1993).

Pitcher (1993) observed that, in the southwestern Pacific, spiny lobsters are typically found in association with coral reefs. Coral reefs provide shelter as well as a diverse and abundant supply of food items, he noted. Pitcher also stated that in this region, *P. pencillatus* inhabits the rocky shelters in the windward surf zones of oceanic reefs, an observation also noted by Kanciruk (1980). Other species of *Panulirus* show more general patterns of habitat utilization. At night, *P. penicillatus* moves onto reef flat to forage.

Spiny lobsters are nonclawed, decapod crustaceans with slender walking legs of roughly equal size. Spiny lobster have a large spiny carapace with two horns and antennae projecting forward of their eyes, and a large abdomen terminating in a flexible tailfan (Uchida et al. 1980). The appearance of the slipper lobster is notably different than that of the spiny lobster.

Uchida and Uchiyama (1986) provided a detailed description of the morphology of slipper lobsters (*S. squammosus* and *S. haanii*) and note that the two species are very similar in appearance and are easily confused.

Generally, the different species of the genus *Panulirus* have the same reproductive behavior and life cycle (Pitcher 1993). The male spiny lobster deposits a spermatophore or sperm packet on the female's abdomen (WPRFMC 1983). In *Panulirus* sp., the fertilization of the eggs occurs externally (Uchida et al. 1980). The female lobster scratches and breaks the mass, releasing the spermatozoa (WPRFMC 1983). Simultaneously, ova are released from the female's oviduct and are then fertilized and attach to the setae of the female's pleopod (Pitcher 1993; WPRFMC 1983). At this point, the female lobster is ovigerous, or "berried" (WPRFMC 1983). The fertilized eggs hatch into phyllosoma larvae after 30 to 40 days (MacDonald 1986; Uchida and Uchiyama 1986). Spiny lobsters are very fecund (WPRFMC 1983). The release of the phyllosoma larvae appears to be timed to coincide with the full moon and in some species at dawn (Pitcher 1993). In *Scyllarides* sp. fertilization is internal (Uchida and Uchiyama 1986).

Very little is known about the planktonic phase of the phyllosoma larvae of *Panulirus marginatus* (Uchida et al. 1980). After hatching, the "leaf-like" larvae (or phyllosoma) enter a planktonic phase (WPRFMC 1983). The duration of this planktonic phase varies depending on the species and geographic region (WPRFMC 1983). The planktonic larval stage may last from 6 months to 1 year from the time of the hatching of the eggs (MacDonald 1986; WPRFMC 1983).

Johnston (1968) suggested that fine-scale oceanographic features, such as eddies and currents, serve to retain lobster larva within island areas. In the NWHI, for example, lobster larvae settlement appears to be linked to the north and southward shifts of the North Pacific Central Water type (MacDonald 1986). The relatively long pelagic larval phase for palinurids results in very wide dispersal of spiny lobster larvae; palinurid larvae can be transported up to 2,000 miles by prevailing ocean currents (MacDonald 1986).

Reef Slope, Bank, and Seamount Species

Bottomfish

The families of bottomfish and seamount fish that are often targeted by fishermen include snappers (*Lutjanidae*), groupers (*Serranidae*), jacks (*Carangidae*), and emperors (*Lethrinidae*). See Section 1.6 for a complete list of Western Pacific Region's M.U.S. Distinct depth associations are reported for certain species of emperors, snappers, and groupers; with some groupers restricted to feeding in deep water (Parrish 1987). The emperor family (*Lethrinidae*) are bottom-feeding carnivorous fish found usually in shallow coastal waters on or near reefs, with some species observed at greater depths (e.g., *L. rubrioperculatus*). Lethrinids are not reported to be territorial, but may be solitary or form schools. The snapper family (*Lutjanidae*) is largely confined to continental shelves and slopes, as well as corresponding depths around islands. Adults are usually associated with the bottom. The genus *Lutjanus* is the largest of this family, consisting primarily of inhabitants of shallow reefs. Species of the genus *Pristipomoides* occur at intermediate depths, often schooling around rocky outcrops and promontories (Ralston et al. 1986), while *Eteline* snappers are deep-water species. Groupers (*Serranidae*) are relatively larger and mostly occur in shallow areas, although some occupy deep-slope habitats. Groupers in general are more sedentary and territorial than snappers or emperors, and are more dependent on hard substrata. In general, groupers may be less dependent on hard-bottom substrates at depth (Parrish 1987). For each family, schooling behavior is reported more frequently for juveniles than for adults. Spawning aggregations may, however, occur even for the solitary species at certain times of the year, especially among groupers.

A commonly reported trend is that juveniles occur in shallow water and adults are found in deeper water (Parrish 1989). Juveniles also tend to feed in different habitats than adults, possibly reflecting a way to reduce predation pressures. Not much is known on the location and characteristics of nursery grounds for juvenile deep-slope snappers and groupers. In Hawaii, juvenile opakapaka (*P. filamentosus*) have been found on flat, featureless shallow banks, as opposed to high-relief areas where the adults occur. Similarly, juveniles of the deep-slope grouper, Hāpu`upu`u (*Epinephelus quernus*), are found in shallow water (Moffitt 1993). Ralston and Williams (1988), however, found that for deep-slope species, size is poorly correlated with depth.

The distribution of adult bottomfish is correlated with suitable physical habitat. Because of the volcanic nature of the islands within the region, most bottomfish habitat consists of steep-slope areas on the margins of the islands and banks. The habitat of the major bottomfish species tends to overlap to some degree, as indicated by the depth range where they are caught. Within the overall depth range, however, individual species are more common at specific depth intervals.

Depth alone does not assure satisfactory habitat. Both the quantity and quality of habitat at depth are important. Bottomfish are typically distributed in a nonrandom patchy pattern, reflecting bottom habitat and oceanographic conditions. Much of the habitat within the depths of occurrence of bottomfish is a mosaic of sandy low-relief areas and rocky high-relief areas. An important component of the habitat for many bottomfish species appears to be the association of high-relief areas with water movement. In the Hawaiian Islands and at Johnston Atoll, bottomfish density is correlated with areas of high relief and current flow (Haight 1989; Haight et al. 1993b; Ralston et al. 1986).

Although the water depths utilized by bottomfish may overlap somewhat, the available resources may be partitioned by species-specific behavioral differences. In a study of the feeding habitats of the commercial bottomfish in the Hawaiian Archipelago, Haight et al.

(1993b) found that ecological competition between bottomfish species appears to be minimized through species-specific habitat utilization. Species may partition the resource through both the depth and time of feeding activity, as well as through different prey preferences.

Precious Corals

Currently, there are minimal harvests of precious corals in the Western Pacific Region. In the 1970s to early 1990s, however, precious corals were targeted and an FMP was implemented in 1983 (see Section 1.4). The commonly harvested precious corals include pink coral (*Corallium secundum, Corallium regale, Corallium laauense*), gold coral (*Narella* spp., *Gerardia* spp., *Calyptrophora* spp.), bamboo coral (*Lepidisis olapa, Acanella* spp.), and black coral (*Antipathes dichotoma*, *Antipathes grandis*, *Antipathes ulex*).

In general, the Western Pacific Region's precious corals share several ecological characteristics: they lack symbiotic algae in tissues (they are ahermatypic), and most are found in deep water below the euphotic zone; they are filter feeders; and many are fan shaped to maximize contact surfaces with particles or microplankton in the water column. Because precious corals are filter feeders, most species thrive in areas swept by strong-to-moderate currents (Grigg 1993). Although precious corals are known to grow on a variety of hard substrate, they are most abundant on substrates of shell sandstone, limestone, or basaltic rock with a limestone veneer.

All precious corals are slow growing and are characterized by low rates of mortality and recruitment. Natural populations are relatively stable, and a wide range of age classes is generally present. This life history pattern (longevity and many year classes) has two important consequences with respect to exploitation. First, the response of the population to exploitation is drawn out over many years. Second, because of the great longevity of individuals and the associated slow rates of turnover in the populations, a long period of reduced fishing effort is required to restore the ability of the stock to produce at the MSY if a stock has been over exploited for several years.

Because of the great depths at which they live, precious corals may be insulated from some short term changes in the physical environment; however, not much is known regarding the long term effects of changes in environmental conditions, such as water temperature or current velocity, on the reproduction, growth, or other life history characteristics of the precious corals (Grigg 1993).

3.2.3 Pelagic Environment

Pelagic species are closely associated with their physical and chemical environments. Suitable physical environment for these species depends on gradients in temperature, oxygen, or salinity, all of which are influenced by oceanic conditions on various scales. In the pelagic environment, physical conditions such as isotherm and isohaline boundaries often determine whether the surrounding water mass is suitable for pelagic fish, and many of the species are associated with specific isothermic regions. Additionally, areas of high trophic turnover as found in fronts and eddies are important habitat for foraging, migration, and reproduction for many species (Bakun 1996).

The pelagic ecosystem is very large compared with any other marine ecosystem. Biological productivity in the pelagic zone is highly dynamic, characterized by advection of organisms at lower trophic levels and by extensive movements of animals at higher trophic levels, both of which are strongly influenced by ocean climate variability and mesoscale hydrographic features.

Phytoplankton contribute to more than 95 percent of primary production in the marine environment (Valiela 1995). Phytoplankton, which by definition require exposure to sunlight for photosynthesis, primarily live in the upper 100 meters of the euphotic zone and include organisms such as diatoms, dinoflagellates, coccolithophores, silicoflagellates, and cyanobacteria. Although some phytoplankton have structures (e.g., flagella) that allow them some movement, generally phytoplankton distribution is controlled by current movements and water turbulence.

Diatoms can be either single celled or form chains with other diatoms. They are mostly found in areas with high nutrient levels such as coastal temperate and polar regions. Diatoms are the largest contributor to primary production in the ocean (Valiela 1995). Dinoflagellates are unicellular (one-celled) organisms that are often observed in high abundance in subtropical and tropical regions. Coccolithophores, which are also unicellular, are mostly observed in tropical pelagic regions (Levington 1995). Cyanobacteria, or blue-green algae, are often found in warm nutrient-poor waters of tropical ocean regions.

Oceanic pelagic fish such as skipjack and yellowfin tuna and blue marlin prefer warm surface layers, where the water is well mixed by surface winds and is relatively uniform in temperature and salinity. Other fish such as albacore, bigeye tuna, striped marlin, and swordfish prefer cooler, more temperate waters, often meaning higher latitudes or greater depths. Preferred water temperature often varies with the size and maturity of pelagic fish, and adults usually have a wider temperature tolerance than subadults. Thus, during spawning, adults of many pelagic species usually move to warmer waters, the preferred habitat of their larval and juvenile stages. Large-scale oceanographic events (such as El Niño) change the characteristics of water temperature and productivity across the Pacific, and these events have a significant effect on the habitat range and movements of pelagic species. Tuna are commonly most concentrated near islands and seamounts that create divergences and convergences, which concentrate forage species, and also near upwelling zones along ocean current boundaries and along gradients in temperature, oxygen, and salinity. Swordfish and numerous other pelagic species tend to concentrate along food-rich temperature fronts between cold upwelled water and warmer oceanic water masses (NMFS 2001).

Frontal zones are also likely migratory pathways across the Pacific for loggerhead turtles (Polovina et al. 2000). Loggerhead turtles are opportunistic omnivores that feed on floating prey such as the pelagic cnidarian *Vellela vellela* ("by the wind sailor"), and the pelagic gastropod *Janthina* spp., both of which are likely to be concentrated by the weak downwelling associated with frontal zones (Polovina et al. 2000). Data from on-board observers in the Hawaii-based longline fishery indicate that incidental catch of loggerheads occurs along the 17° C front (STF) during the first quarter of the year, and along the 20° C front (STF) in the second quarter of the year. The interaction rate, however, is substantially greater along the 17° C front (Polovina et al. 2000).

Pelagic Species of Economic Importance

The most commonly harvested pelagic species in the Western Pacific Region are: tuna (*Thunnus obesus, Thunnus albacares, Thunnus alalunga, Katsuwonus pelamis*), billfish (*Tetrapturus auda, Makaira mazara, Xiphias gladius*), dolphinfish (*Coryphaena hippurus, C. equiselas*), and wahoo (*Acanthocybium solandri*). Pelagic fish live in tropical and temperate waters throughout the world's oceans. They are capable of long migrations that reflect complex relationships to oceanic environmental conditions. These relationships are different for larval, juvenile, and adult stages of life. The larvae and juveniles of most species are more abundant in tropical waters, whereas the adults are more widely distributed. Geographic distribution varies with seasonal changes in ocean temperature. In both the Northern and Southern Hemispheres, there is seasonal movement of tuna and related species toward the higher latitudes in the warmer seasons and a return toward the equator in the colder seasons. In the western Pacific, some species of adult pelagic fish range from as far north as Japan to as far south as New Zealand. Albacore, striped marlin, and swordfish can be found in cooler waters at latitudes as far north as 50° N, and as far south as 50° S. As a result, fishing for these species is conducted year-round in tropical waters, and seasonally in temperate waters (NMFS 2001).

Migration patterns of pelagic fish stocks in the Pacific Ocean are not easily categorized, despite extensive tag-and-release projects for many of the species. This is particularly evident for the more tropical tuna species (e.g., yellowfin, skipjack, bigeye) that appear to roam extensively within a broad expanse of the Pacific centered on the equator. Although tagging and genetic studies have shown that some interchange does occur, it appears that short life spans and rapid growth rates restrict large-scale interchange and genetic mixing of eastern, central, and far-western Pacific Ocean stocks of yellowfin and skipjack tuna. Morphometric studies of yellowfin tuna also support the hypothesis that populations from the eastern and western Pacific derive from relatively distinct substocks in the Pacific. The stock structure of bigeye in the Pacific is poorly understood, but a single Pacific-wide population is assumed. The movement of the cooler water tuna (e.g., bluefin, albacore) is more predictable and defined, with tagging studies documenting regular, well-defined seasonal movement patterns relating to specific feeding and spawning grounds. The oceanic migrations of billfish are poorly understood, but the results of limited tagging work conclude that most billfish species are capable of transoceanic movement, and some seasonal regularity has been noted (NMFS 2001).

In the ocean, light and temperature diminish rapidly with increasing depth, especially in the region of the thermocline. Many pelagic fish make vertical migrations through the water column. They tend to inhabit surface waters at night and deeper waters during the day, but several species make extensive vertical migrations between surface and deeper waters throughout the day. Certain species, such as swordfish and bigeye tuna, are more vulnerable to fishing when they are concentrated near the surface at night. Bigeye tuna may visit the surface during the night, but generally, longline catches of this fish are highest when hooks are set in deeper, cooler waters just above the thermocline (275–550 m or 150–300 fm). Surface concentrations of juvenile albacore are largely concentrated where the warm mixed layer of the ocean is shallow (above 90 m or 50 fm), but adults are caught mostly in deeper water (90–275 m or 50–150 fm). Swordfish are usually caught near the ocean surface but are known to venture into deeper waters. Swordfish demonstrate an affinity for thermal oceanic frontal systems that may act to aggregate their prey and enhance migration by providing an energetic gain through moving the fish along with favorable currents (Olson et al. 1994).

3.3 Essential Fish Habitat and Habitat Areas of Particular Concern

For each FMP and list of MUS (see Section 2.1), the Council has declared essential fish habitat (EFH) and habitat areas of particular concern (HAPC; 64 FR 19068). The Council and NMFS must ensure that any activities being conducting in such areas do not adversely affect, to the extent possible, EFH of HAPC for any MUS. Table 3-1 represents the EFH and HAPC for all Western Pacific MUS.

As the table shows, Western Pacific EFH and HAPC fall into two categories: either the water column above the ocean bottom or the ocean bottom itself. Water column EFH and HAPC have been designated for Pelagic, Bottomfish, Precious Corals, Crustacean, and Coral Reef Ecosystem MUS. Areas of ocean bottom have been designated EFH and HAPC for Precious Corals, Crustaceans, Bottomfish, and Coral Reef Ecosystem MUS. The use of explosives, poisons, trawl nets, and other destructive gears that may adversely affect any EFH or HAPC in the Western Pacific Region is prohibited. No fishery under Council jurisdiction has been found to adversely affect the EFH or HAPC of any Western Pacific Region M.U.S.

Table 3-1: EFH and HAPC for Western Pacific Region MUS.

FMP	EFH (Juveniles and Adults)	EFH (Eggs and Larvae)	HAPC
Bottomfish and Seamount Groundfish	**Bottomfish:** Water column and bottom habitat down to 400 meters **Seamount Groundfish (adults only):** Water column and bottom from 80 to 600 m, bounded by 29°–35° N and 171°E–179° W	**Bottomfish:** Water column down to 400 m **Seamount Groundfish (including juveniles):** epipelagic zone (0–200 m) bounded by 29°–35° N and 171° E–179° W	**Bottomfish:** All escarpments and slopes between 40 and 280 meters, and three known areas of juvenile *ōpakapaka* habitat **Seamount Groundfish:** Not identified
Coral Reef Ecoystem	Water column and benthic substrate to a depth of 100 meters	Water column and benthic substrate to a depth of 100 meters	All MPAs identified in FMP, all PRIA, many specific areas of coral reef habitat
Crustaceans	Bottom habitat from shoreline to a depth of 100 meters	Water column down to 150 meters	All banks within the NWHI with summits less than 30 meters
Precious Corals	Keāhole Point, Makapuu, Kaena Point, Westpac, Brooks Bank, and 180 Fathom Bank deep-water precious coral (gold and red) beds and Milolii, Auau Channel, and S. Kauai black coral beds	NA	Makapuu, Westpac, and Brooks Bank deep-water precious coral beds and the Auau Channel black coral bed
Pelagics	Water column down to 1,000 meters	Water column down to 200 meters	Water column above seamounts and banks down to 1,000 meters

3.4 Protected Species

To varying degrees, protected species in the Western Pacific Region face various natural and anthropogenic threats to their continued existence. These threats include ecosystem regime shifts (i.e., rapid reorganizations of ecosystems), habitat degradation, poaching, fisheries interactions, vessel strikes, disease, and behavioral alterations from various disturbances associated with human activities.

3.4.1 Sea Turtles

All Pacific sea turtles are designated under the U.S. Endangered Species Act (ESA) as either threatened or endangered. The breeding populations of Mexico's olive ridley sea turtles (*Lepidochelys olivacea*) are currently listed as endangered, while all other ridley populations are listed as threatened. Leatherback sea turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) are also classified as endangered. Loggerhead (*Caretta caretta*) and green sea turtles (*Chelonia mydas*) are listed as threatened (the green sea turtle is listed as threatened throughout its Pacific range, except for the endangered population nesting on the Pacific coast of Mexico). These five species of sea turtles are highly migratory or have a highly migratory phase in their life history (NMFS 2001). Generally, impacts to sea turtles in the Western Pacific Region include anthropogenic ecosystem variability (e.g., regime shifts), predation, habitat degradation (e.g., nesting and foraging sites), illegal poaching, tourism activities' disrupting behavior, fishery interactions (e.g., hookings or gear entanglements), and marine debris entanglements.

A Biological Opinion (Opinion) was issued in February 2004 by NMFS following a consultation under section 7 of the ESA on the ongoing operation of the Western Pacific Region's pelagic fisheries as managed under the Pelagics FMP (NMFS 2004a). That Opinion concluded these pelagic fisheries are not likely to jeopardize the continued existence of any sea turtles under NMFS's jurisdiction. A second Opinion, issued in October 2005, focused on the deep-set (tuna targeting) sector of the Hawaii-based longline fishery and reached the same conclusion (NMFS 2005a). These issues are similarly discussed in a 2001 FEIS (NMFS 2001) and 2004 Supplemental EIS prepared as part of the ongoing implementation of the Pelagics FMP. Please refer to those EISs and Opinions for additional details on the life history, status, threats, and impacts to Pacific sea turtles. Nonpelagic fisheries managed by the Council are not believed to adversely impact sea turtles due to the gear types used and species targeted. In the Hawaii longline shallow-set fishery that mainly targets swordfish, recent fishing gear requirements including circle hooks and makeral-type bait have greatly reduce sea turtle interactions.

Leatherback Sea Turtles

Leatherback turtles (*Dermochelys coriacea*) are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Dutton et al. 1999). Increases in the number of nesting females have been noted at some sites in the Atlantic (Dutton et al. 1999), but these are far outweighed by local extinctions, especially of island populations, and the demise of once-large populations throughout the Pacific, such as in Malaysia (Chan & Liew 1996) and Mexico (Sarti et al. 1996; Spotila et al. 1996). In other leatherback nesting areas, such as Papua New Guinea, Indonesia, and the Solomon Islands, there have been no systematic, consistent nesting surveys, so it is difficult to assess the status and trends of leatherback turtles at these beaches. In all areas where leatherback nesting has been documented, current nesting populations are reported by scientists, government officials, and local observers to be well below abundance levels of several decades ago. The collapse of these nesting populations was most likely precipitated by a tremendous overharvest of eggs coupled with incidental mortality from fishing (Sarti et al. 1996).

Leatherback turtles are the largest of the marine turtles, with a shell length often exceeding 150 centimeters and front flippers that are proportionately larger than in other sea turtles. These flippers span 270 centimeters in an adult (NMFS and FWS 1998c). The leatherback is morphologically and physiologically distinct from other sea turtles, and it is thought that its streamlined body, with a smooth dermis-sheathed carapace and dorso-longitudinal ridges, may improve laminar flow.

Leatherback turtles lead a completely pelagic existence, foraging widely in temperate waters except during the nesting season when gravid females return to tropical beaches to lay eggs. Males are rarely observed near nesting areas, and it has been proposed that mating most likely takes place outside of tropical waters, before females move to their nesting beaches (Eckert and Eckert 1988). Leatherbacks are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998). In a single year, a leatherback may swim more than 10,000 kilometers (Eckert 1998).

Satellite telemetry studies indicate that adult leatherback turtles follow bathymetric contours over their long pelagic migrations and typically feed on cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps), and their commensals, parasites, and prey (NMFS and FWS 1998c). Because of the low nutrient value of jellyfish and tunicates, it has been estimated that an adult leatherback would need to eat about 50 large jellyfish (equivalent to approximately 200 liters) per day to maintain its nutritional needs (Duron 1978). Compared with greens and loggerheads, which consume approximately 3 to 5 percent of their body weight per day, leatherback turtles may consume 20 to 30 percent of their body weight per day (Davenport and Balazs 1991).

Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically 2 to 4 years (Spotila et al. 2000). The mean renesting interval of females on Playa Grande, Costa Rica, is believed to be 3.7 years, while in Mexico, 3 years was the typical reported interval (NMFS 2004a). In Mexico, the nesting season generally extends from November to February, although some females arrive as early as August (Sarti et al. 1996). Most of the nesting on Las Baulas takes place from the beginning of October to the end of February (Reina et al. 2002). In the western Pacific, nesting peaks on Jamursba-Medi Beach (Papua, Indonesia) from May to August; on War-Mon Beach (Papua) from November to January (Starbird and Suarez 1994); in peninsular Malaysia during June and July (Chan and Liew 1996); and in Queensland, Australia, in December and January (Limpus and Reimer 1994).

Migratory routes of leatherback turtles originating from eastern and western Pacific nesting beaches are not entirely known. However, satellite tracking of postnesting females and genetic analyses of leatherback turtles caught in U.S. Pacific fisheries or stranded on the west coast of the U.S. presents some strong insights into at least a portion of their routes and the importance of particular foraging areas. Current data from genetic research suggest that Pacific leatherback stock structure (natal origins) may vary by region. Because of the fact that leatherback turtles are highly migratory and that stocks mix in high-seas foraging areas, and based on genetic analyses of samples collected by both Hawaii-based and west-coast-based longline observers, leatherback turtles inhabiting the northern and central Pacific Ocean comprise individuals originating from nesting assemblages located south of the equator in the western Pacific (e.g., Indonesia, Solomon Islands) and in the eastern Pacific along the Americas (e.g., Mexico, Costa Rica; Dutton et al. 1999).

Recent information on leatherbacks tagged off the west coast of the United States has also revealed an important migratory corridor from central California to south of the Hawaiian Islands, leading to western Pacific nesting beaches. Leatherback turtles originating from western Pacific beaches have also been found along the U.S. mainland. There, leatherback turtles have been sighted and reported stranded as far north as Alaska (60° N) and as far south as San Diego, California (NMFS and FWS 1998c). Of the stranded leatherback turtles that have been sampled to date from the U.S. mainland, all have been of western Pacific nesting stock origin (NMFS 2004a).

Loggerhead Sea Turtles

The loggerhead sea turtle (*Caretta caretta*) is characterized by a reddish brown, bony carapace, with a comparatively large head, up to 25 centimeters wide in some adults. Adults typically weigh between 80 and 150 kilograms, with average curved carapace length (CCL) measurements for adult females worldwide between 95 to100 centimeters CCL (Dodd 1988) and adult males in Australia averaging around 97 centimeters CCL (Limpus 1985; Eckert 1993). Juveniles found off California and Mexico measured between 20 and 80 centimeters (average 60 cm) in length (Bartlett 1989, in Eckert 1993). Skeletochronological age estimates and growth rates were derived from small loggerheads caught in the Pacific high-seas driftnet fishery. Loggerheads less than 20 centimeters were estimated to be 3 years old or less, while those greater than 36 centimeters were estimated to be 6 years old or more. Age-specific growth rates for the first 10 years were estimated to be 4.2 cm/year (Zug et al. 1995).

For their first years of life, loggerheads forage in open-ocean pelagic habitats. Both juvenile and subadult loggerheads feed on pelagic crustaceans, mollusks, fish, and algae. The large aggregations of juveniles off Baja California have been observed foraging on dense concentrations of the pelagic red crab *Pleuronocodes planipes* (Nichols et al. 2000). Data collected from stomach samples of turtles captured in North Pacific driftnets indicate a diet of gastropods (*Janthina* spp.), heteropods (*Carinaria* spp.), gooseneck barnacles (*Lepas* spp.), pelagic purple snails (*Janthina* spp.), medusae (*Vellela* spp.), and pyrosomas (tunicate zooids). Other common components include fish eggs, amphipods, and plastics (Parker et al. 2002).

Loggerheads in the North Pacific are opportunistic feeders that target items floating at or near the surface, and if high densities of prey are present, they will actively forage at depth (Parker et al. 2002). As they age, loggerheads begin to move into shallower waters, where, as adults, they forage over a variety of benthic hard- and soft-bottom habitats (reviewed in Dodd, 1988). Subadults and adults are found in nearshore benthic habitats around southern Japan, as well as in the East China Sea and the South China Sea (e.g., Philippines, Taiwan, and Vietnam).

The loggerhead sea turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. In general, during the last 50 years, North Pacific loggerhead nesting populations have declined 50–90 percent (Kamezaki et al. 2003). From nesting data collected by the Sea Turtle Association of Japan since 1990, the latest estimates of the number of nesting females in studied rookeries are as follows: 1998 –2,479 nests, 1999 –2,255 nests, and 2000 –2,589 nests.[29]

In the South Pacific, Limpus (1982) reported an estimated 3,000 loggerheads nesting annually in Queensland, Australia, during the late 1970s. However, long-term trend data from Queensland indicate a 50 percent decline in nesting by 1988 to 1989 due to incidental mortality of turtles in the coastal trawl fishery. This decline is corroborated by studies of breeding females at adjacent feeding grounds (Limpus and Reimer 1994). Currently, approximately 300 females nest annually in Queensland, mainly on offshore islands (Capricorn-Bunker Islands, Sandy Cape, and Swains Head; Dobbs 2001). In southern Great Barrier Reef waters, nesting loggerheads have declined approximately 8 percent per year since the mid-1980s (Heron Island), while the foraging ground population has declined 3 percent and comprised less than 40 adults by 1992. Researchers attribute the declines to recruitment failure due to fox predation of eggs in the 1960s and mortality of pelagic juveniles from incidental capture in longline fisheries since the 1970s (Chaloupka and Limpus 2001).

Green Sea Turtles

Green sea turtles (*Chelonia mydas*) are distinguished from other sea turtles by their smooth carapace with four pairs of lateral "scutes," a single pair of prefrontal scales, and a lower jaw edge that is coarsely serrated. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed 1 meter in carapace length and 100 kilograms in body mass. Females nesting in Hawaii averaged 92 centimeters in straight carapace length (SCL), while at Olimarao Atoll in Yap, females averaged 104 centimeters in curved carapace length and approximately 140 kilograms in body mass. In the rookeries of Michoacán, Mexico, females averaged 82 centimeters in CCL, while males averaged 77 centimeters in CCL (NMFS and FWS 1998a). Based on growth rates observed in wild green turtles, skeletochronological studies, and capture–recapture

[29] In the 2001, 2002, and 2003 nesting seasons, a total of 3,122, 4,035 and 4,519 loggerhead nests, respectively, were recorded on Japanese beaches (Matsuzawa, 2005).

studies, all in Hawaii, it is estimated that an average of at least 25 years would be needed to achieve sexual maturity (Eckert 1993).

Although most adult green sea turtles appear to have a nearly exclusively herbivorous diet, consisting primarily of seagrass and algae (Wetherall 1993), those along the east Pacific coast seem to have a more carnivorous diet. Analysis of stomach contents of green turtles found off Peru revealed a large percentage of mollusks and polychaetes, while fish and fish eggs, jellyfish, and amphipods made up a lesser percentage (Bjorndal 1997). Seminoff et al. (2000) found that 5.8 percent of gastric samples and 29.3 percent of the fecal samples of east Pacific green turtles foraging in the northern Sea of Cortéz, Mexico, contained the remains of the fleshy sea pen (*Ptilosarcus undulatus*).

Green sea turtles are a circumglobal and highly migratory species, nesting and feeding in tropical/subtropical regions. Their range can be defined by a general preference for water temperature above 20° C. Green sea turtles are known to live in pelagic habitats as posthatchlings/juveniles, feeding at or near the ocean surface. The nonbreeding component of this species can lead a pelagic existence many miles from shore. The breeding component of this species lives primarily in bays and estuaries, and is rarely found in the open ocean. Most migration from rookeries to feeding grounds is via coastal waters, with females migrating to breed only once every 2 years or more (Bjorndal 1997).

Tag returns of eastern Pacific green turtles (often reported as black turtles) establish that these turtles travel long distances between foraging and nesting grounds. In fact, 75 percent of tag recoveries from 1982 to 1990 were from turtles that had traveled more than 1,000 kilometers from Michoacán, Mexico. Even though these turtles were found in coastal waters, the species is not confined to these areas, as indicated by 1990 sightings records from a NOAA research ship. Observers documented green turtles 1,000 to 2,000 statute miles from shore (Eckert 1993). The east Pacific green is also the second-most sighted turtle in the east Pacific during tuna cruises; they frequent a north–south band from 15° N to 5° S along 90° W and an area between the Galapagos Islands and the Central American Coast (NMFS and FWS 1998a).

In a review of sea turtle sighting records from northern Baja California to Alaska, Stinson (1984, in NMFS and FWS 1998a) determined that the green turtle was the most commonly observed sea turtle on the U.S. Pacific coast, with 62 percent reported in a band from southern California and southward. The northernmost (reported) year-round resident population of green turtles occurs in San Diego Bay, where about 30 to 60 mature and immature turtles concentrate in the warm water effluent discharged by a power plant. These turtles appear to have originated from east Pacific nesting beaches, on the basis of morphology and preliminary genetic analysis (NMFS and FWS 1998a). California stranding reports from 1990 to 1999 indicate that the green turtle is the second most commonly found stranded sea turtle (48 total, averaging 4.8 annually, NMFS 2004a).

Stinson (1984) found that green turtles will appear most frequently in U.S. coastal waters when temperatures exceed 18° C. An east Pacific green turtle was tracked along the

California coast by a satellite transmitter that was equipped to report thermal preferences of the turtle. This turtle showed a distinct preference for waters that were above 20° (S. Eckert, unpublished data). Subadult green turtles routinely dive to 20 meters for 9 to 23 minutes, with a maximum recorded dive of 66 minutes (Lutcavage et al. 1997a).

The nonbreeding range of green turtles is generally tropical, and can extend approximately 500 to 800 miles from shore in certain regions (Eckert 1993). The underwater resting sites include coral recesses, undersides of ledges, and sand bottom areas that are relatively free of strong currents and disturbance from natural predators and humans. In the MHI, these foraging and resting areas for adults usually occur at depths greater than 10 meters, but probably not normally exceeding 40 meters. Available information indicates that the resting areas are in proximity to the feeding pastures. In the Pacific, the only major (greater than 2,000 nesting females) populations of green turtles occur in Australia and Malaysia. Smaller colonies occur in the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993) and on six small sand islands at French Frigate Shoals, a long atoll situated in the middle of the Hawaiian Archipelago (Balazs et al. 1995).

Green turtles were listed as threatened under the ESA on July 28, 1978, except for breeding populations found in Florida and the Pacific coast of Mexico, which were listed as endangered. Using a precautionary estimate, the number of nesting female green turtles has declined by 48 to 67 percent over the last three generations (approximately 150 years; Troeng and Rankin 2005). Causes for this decline include harvest of eggs, subadults, and adults; incidental capture by fisheries; loss of habitat; and disease. The degree of population change is not consistent among all index nesting beaches or among all regions. Some nesting populations are stable or increasing (Balazs and Chaloupka 2004; Chaloupka and Limpus 2001; Troeng and Rankin 2005). However, other populations or nesting stocks have markedly declined. Because many of the threats that have led to these declines have not yet ceased, it is evident that green turtles face a measurable risk of extinction (Troeng and Rankin 2005).

Green turtles in Hawaii are considered genetically distinct and geographically isolated; although a nesting population at Islas Revillagigedos in Mexico appears to share the mtDNA haplotype that commonly occurs in Hawaii. In Hawaii, green turtles nest on six small sand islands at French Frigate Shoals, a crescent-shaped atoll situated in the middle of the Hawaiian Archipelago (Northwestern Hawaiian Islands; Balazs et al. 1992). Ninety to 95 percent of the nesting and breeding activity occurs at the French Frigate Shoals, and at least 50 percent of that nesting takes place on East Island, a 12-acre island. Long-term monitoring of the population shows that there is strong island fidelity within the regional rookery. Low-level nesting also occurs at Laysan Island, Lisianski Island, and on Pearl and Hermes Reef (NMFS 1998).

Since the establishment of the ESA in 1973, and following years of exploitation, the nesting population of Hawaiian green turtles has shown a gradual but definite increase (Balazs 1996; Balazs and Chaloupka 2004). In three decades, the number of nesting females at East Island increased from 67 nesting females in 1973 to 467 nesting females in 2002. Nester abundance increased rapidly at this rookery during the early 1980s, leveled off during the early 1990s, and again increased rapidly during the late 1990s to the present. This trend is very similar to the underlying trend in the recovery of the much larger green turtle population that nests at Tortuguero Costa Rica (Bjorndal et al. 1999). The stepwise increase of the long-term nester trend since the mid-1980s is suggestive, but not conclusive, of a density-dependent adjustment process affecting sea turtle abundance at the foraging grounds (Balazs and Chaloupka 2004; Bjorndal et al. 2000). Balazs and Chaloupka (2004) concluded that the Hawaiian green sea turtle stock is well on the way to recovery following 25 years of protection. This increase is attributed to increased female survivorship since the harvesting of turtles was prohibited in addition to the cessation of habitat damage at the nesting beaches since the early 1950s (Balazs and Chaloupka 2004).

Hawksbill Sea Turtles

Hawksbill sea turtles (*Eretmochelys imbricate*) are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS and FWS 1998b). Hawksbills have a relatively unique diet of sponges (Meylan 1985, 1988). While data are somewhat limited on their diet in the Pacific, it is well documented that in the Caribbean hawksbill turtles are selective spongivores, preferring particular sponge species over others (Dam and Diez 1997b). Foraging dive durations are often a function of turtle size, with larger turtles diving deeper and longer. At a study site also in the northern Caribbean, foraging dives were made only during the day and dive durations ranged from 19 to 26 minutes at depths of 8–10 meters. At night, resting dives ranged from 35 to 47 minutes in duration (Dam and Diez 1997a).

As a hawksbill turtle grows from a juvenile to an adult, data suggest that the turtle switches foraging behaviors from pelagic surface feeding to benthic reef feeding (Limpus 1992). Within the Great Barrier Reef of Australia, hawksbills move from a pelagic existence to a “neritic” life on the reef at a minimum CCL of 35 centimeters. The maturing turtle establishes foraging territory and will remain in this territory until it is displaced (Limpus 1992). As with other sea turtles, hawksbills will make long reproductive migrations between foraging and nesting areas but otherwise they remain within coastal reef habitats (Meylan 1999). In Australia, juvenile turtles outnumber adults 100:1. These populations are also sex biased, with females outnumbering males 2.57:1 (Limpus 1992).

Along the far western and southeastern Pacific, hawksbill turtles nest on the islands and mainland of southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands (McKeown 1977), and Australia (Limpus 1982).

The hawksbill turtle is listed as endangered throughout its range. In the Pacific, this species is rapidly approaching extinction primarily due to the harvesting of the species for its meat, eggs and shell, as well as the destruction of nesting habitat by human occupation and disruption (NMFS and FWS 1998b). Along the eastern Pacific Rim, hawksbill turtles were common to abundant in the 1930s (Cliffton et al. 1982). By the 1990s, the hawksbill turtle was rare to absent in most localities where it was once abundant (Cliffton et al. 1982).

Olive Ridley Sea Turtles

Olive ridley turtles (*Lepidochelys olivacea*) are olive or grayish green above, with a greenish white underpart, and adults are moderately sexually dimorphic (NMFS and 1998e). Olive ridleys lead a highly pelagic existence (Plotkin 1994). These sea turtles appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. In a 3-year study of communities associated with floating objects in the eastern tropical Pacific, Arenas et al. (1992) found that 75 percent of sea turtles encountered were olive ridleys and were present in 15 percent of the observations, thus implying that flotsam may provide the turtles with food, shelter, and/or orientation cues in an otherwise featureless landscape. It is possible that young turtles move offshore and occupy areas of surface-current convergences to find food and shelter among aggregated floating objects until they are large enough to recruit to the nearshore benthic feeding grounds of the adults, similar to the juvenile loggerheads mentioned previously.

While it is true that olive ridleys generally have a tropical range, individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000). The postnesting migration routes of olive ridleys, tracked via satellite from Costa Rica, traversed thousands of kilometers of deep oceanic waters ranging from Mexico to Peru and more than 3,000 kilometers out into the central Pacific (Plotkin 1994). Stranding records from 1990 to 1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (NMFS 2004a).

The olive ridley turtle is omnivorous, and identified prey include a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and sea grass (Marquez 1990). It is also not unusual for olive ridley turtles in reasonably good health to be found entangled in scraps of net or other floating synthetic debris. Small crabs, barnacles, and other marine life often reside on debris and are likely to attract the turtles. Olive ridley turtles also forage at great depths, as a turtle was sighted foraging for crabs at a depth of 300 meters (Landis 1965, in Eckert et al. 1986). The average dive lengths for adult females and males are reported to be 54.3 and 28.5 minutes, respectively (Plotkin 1994, in Lutcavage and Lutz 1997b).

Declines in olive ridley populations have been documented in Playa Nancite, Costa Rica; however, other nesting populations along the Pacific coast of Mexico and Costa Rica appear to be stable or increasing, after an initial large decline due to harvesting of adults. Historically, an estimated 10-million olive ridleys inhabited the waters in the eastern Pacific off Mexico (Cliffton et al. 1982, in NMFS and FWS 1998e). However, human-induced mortality led to declines in this population. Beginning in the 1960s, and lasting over the next 15 years, several million adult olive ridleys were harvested by Mexico for commercial trade with Europe and Japan (NMFS and FWS 1998e). Although olive ridley meat is palatable, it is not widely sought; eggs, however, are considered a delicacy, and egg harvest is considered one of the major causes for its decline. Fisheries for olive ridley turtles were also established in Ecuador during the 1960s and 1970s to supply Europe with leather (Green and Ortiz-Crespo 1982). In the Indian Ocean, Gahirmatha Beach in India may have once support the largest nesting population of olive ridleys; however, this population continues to be threatened by nearshore trawl fisheries. Direct harvest of adults and eggs, incidental capture in commercial fisheries, and loss of nesting habits are the main threats to the olive ridley's recovery.

3.4.2 Marine Mammals Listed under ESA

Cetaceans listed as endangered under the ESA that have been observed in the Western Pacific Region include the humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), blue whale (*Balaenoptera musculus*), fin whale (*B. physalus*), and sei whale (*B. borealis*). In addition, one endangered pinniped, the Hawaiian monk seal (*Monachus schauinslandi*), occurs in the region. Generally, impacts to marine mammals in the Western Pacific Region include natural caused ecosystem variability (e.g., regime shifts), shark predation, habitat degradation (e.g., birthing and calving areas), wildlife viewing activities that disrupt behavior, fishery interactions (e.g., gear entanglements), marine debris entanglements, and vessel collisions. Fisheries managed under the Council's FMPs have been determined by NMFS to not jeopardize the continued existence of any ESA listed marine mammal.

Humpback Whale

Humpback whales (*Megaptera novaeangliae*) can attain lengths of 16 meters. Humpback whales usually winter in nearshore waters of 100 fathoms or less. Mature females are believed to conceive on the breeding grounds one winter and give birth the following winter. Genetic and photo identification studies indicate that within the U.S. EEZ in the North Pacific, there are at least three relatively separate populations of humpback whales that migrate between their respective summer/fall feeding areas to winter/spring calving and mating areas (Hill and DeMaster 1999). The Central North Pacific stock of humpback whales winters in the waters of the Main Hawaiian Islands (Hill et al. 1997). It is not unusual to observe humpback whales during the months of October to May in the nearshore waters off of the Main Hawaii Islands. Another northern hemisphere stock of humpbacks uses the northwestern part of the Philippine Sea in winter. Some animals of this stock move south to the Northern Mariana Islands, including Saipan and Guam. Sightings have been reported in Guam in January and February (Reeves et al. 1999). At least six well-defined breeding stocks of humpback whales occur in the Southern Hemisphere. Humpbacks arrive in American Samoa from the south between June and December (Reeves et al.1999). This area is probably another calving area and mating ground for the New Zealand group of Antarctic humpbacks.

There is no precise estimate of the worldwide humpback whale population. The humpback whale population in the North Pacific Ocean basin is estimated to contain 6,000 to 8,000 individuals (Calambokidis et al. 1997). The Central North Pacific stock appears to have increased in abundance between the early 1980s and early 1990s; however, the status of this stock relative to its optimum sustainable population size is unknown (Hill and DeMaster 1999).

Sperm Whale

The sperm whale (*Physeter macrocephalus*) is the most easily recognizable whale log-like head comprising about 40 percent of its total body length.The current average body length for male sperm whales is about 15 meters, with females reaching up to 12 meters. Sperm whales are characterized by their brown/gray coloration, relatively short dorsal fin, whrinkled appearance of tail stock, and unique blow pattern. Sperm whales are the only whales that blow forward and to the left.

Sperm whales are found in tropical to polar waters throughout the world (Rice 1989). They are among the most abundant large cetaceans in the region. Sperm whales have been sighted around several of the Northwestern Hawaiian Islands (Rice 1960) and off the main islands of Hawaii (Lee 1993). In the early to mid-nineteenth century, Hawaii was the center of the whaling operations targeting sperm whales. The sounds of sperm whales have been recorded throughout the year off Oahu (Thompson and Freidl 1982). Sightings of sperm whales were made during May–July in the 1980s around Guam, and in recent years strandings have been reported on Guam (Reeves et al. 1999). Historical observations of sperm whales around Samoa occurred in all months except February and March (Reeves et al. 1999).

Blue Whale

The blue whale (*Balaenoptera musculus*) is the largest living animal. Blue whales can reach lengths of 30 meters and weights of 160 tons (320,000 lbs), with females usually being larger than males of the same age. They occur in all oceans, usually along continental shelves, but can also be found in the shallow inshore waters and on the high seas. There have been at least two sightings of blue whales reported by Hawaii-based longline vessel crew to the north of Hawaii, and acoustic recordings made off Oahu and Midway Islands have reported blue whales somewhere within the EEZ around Hawaii (Thompson and Friedl, 1982). The stock structure of blue whales in the North Pacific is uncertain (Forney et al. 2000). The status of this species in Hawaii waters relative to the optimum sustainable population is unknown, and there are insufficient data to evaluate trends in abundance (Forney et al. 2000).

Fin Whale

Fin whales (*Balaenoptera physalus*) are found throughout all oceans and seas of the world from tropical to polar latitudes (Forney et al. 2000). Although it is generally believed that fin whales make poleward feeding migrations in summer and move toward the equator in winter, few actual observations of fin whales in tropical and subtropical waters have been documented, particularly in the Pacific Ocean away from continental coasts (Reeves et al. 1999). There has been at least on sighting of fin whales—a mixed group of adults and calves—almost due south of Oahu between 18 and 19 degrees latitude. This sighting was documented by an observer aboard a Hawaii-based longline vessel.

There is insufficient information to accurately determine the population structure of fin whales in the North Pacific, but there is evidence of multiple stocks. The status of fin whales in Hawaii waters relative to the optimum sustainable population is unknown, and there are insufficient data to evaluate trends in abundance (Forney et al. 2000).

Sei Whale

Sei whales (*Balaenoptera borealis*) have a worldwide distribution but are found mainly in cold temperate to subpolar latitudes rather than in the tropics or near the poles (Horwood 1987). They are distributed far out to sea and do not appear to be associated with coastal features. Two sei whales were tagged in the vicinity of the Northern Mariana Islands (Reeves et al.1999). Sei whales are rare in Hawaiian waters. The International Whaling Commission only considers one stock of sei whales in the North Pacific, but some evidence exists for multiple populations (Forney et al. 2000). In the southern Pacific most observations have been south of 30° S (Reeves et al. 1999).

There are no data on trends in sei whale abundance in the North Pacific (Forney et al. 2000). It is especially difficult to estimate their numbers because they are easily confused with Bryde's whales, which have an overlapping, but more subtropical, distribution (Reeves et al. 1999).

Hawaiian Monk Seal

The Hawaiian monk seal (*Monachus schauinslandi*) is a tropical seal endemic to the Hawaiian Islands. Today, the entire population of Hawaiian monk seals is about 1,300 to 1,400 and occurs mainly in the NWHI. The six major reproductive sites are French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, and Kure Atoll. Small populations at Necker Island and Nihoa Island are maintained by immigration, and an increasing number of seals are distributed throughout the Main Hawaiian Islands.

The subpopulation of monk seals on French Frigate Shoals has shown the most change in population size, increasing dramatically in the 1960s–1970s and declining in the late 1980s–1990s. In the 1960s–1970s, the other five subpopulations experienced declines. However, during the last decade the number of monk seals increased at Kure Atoll, Midway Atoll, Pearl Reef, and Hermes Reef while the subpopulations at Laysan Island and Lisianski Island remained relatively stable. The recent subpopulation decline at French Frigate Shoals is thought to be caused by male aggression, shark attack, entanglement in marine debris, loss of habitat, and decreased prey availability. The Hawaiian monk seal is assumed to be well below its optimum sustainable population, and, since 1985 the overall population has declined approximately 3 percent per year (Forney et al. 2000).

Other Marine Mammals

All marine mammals are protected under the MMPA. Table 3-2 lists known non-ESA listed marine mammals that occur in the Western Pacific Region.

Table 3-2: Non-ESA Listed Marine Mammals of the Western Pacific Region.

Common Name	Scientific Name	Common Name	Scientific Name
Blainsville beaked whale	(*Mesoplodon densirostris*)	Pygmy sperm whale	*Kogia breviceps*
Bottlenose dolphin	(*Tursiops truncates*)	Risso's dolphin	*Grampus griseus*
Bryde's whale	(*Balaenoptera edeni*)	Rough-toothed dolphin	*Steno bredanensis*
Cuvier's beaked whale	*Ziphius cavirostris*	Short-finned pilot whale	*Globicephala macrorhynchus*
Dwarf sperm whale	*Kogia simus*	Spinner dolphin	*Stenella longirostris*
False killer whale	*Pseudorca crassidens*	Spotted dolphin	*Stenella attenuata*
Killer whale	*Orcinus orca*	Striped dolphin	*Stenella coeruleoalba*
Melon-headed whale	*Peponocephala electra*	Pacific white-sided dolphin	*Lagenorhynchus obliquidens*
Pygmy killer whale	*Feresa attenuata*	Minke whale	*Balaenoptera acutorostrata*
Fraser's dolphin	*Lagenodelphis hosei*	Dall's porpoise	*Phocoenoides dalli*
Longman's beaked whale	*Indopacetus pacificus*		

The MMPA (50 CFR § 229) requires all commercial fisheries to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals in each fishery:

- Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing;
- Category II designates fisheries with occasional serious injuries and mortalities;
- Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

With the exception of the Hawaii-based longline fishery (Category I), all Western Pacific Region fisheries are classified as Category III fisheries under the MMPA (71 FR 247, January 4, 2006). Please see the ESA and additional NEPA analyses listed in Section 3.4.1 for more information on marine mammals in the Western Pacific Region.

3.4.3 Seabirds

Seabirds are widely distributed throughout the Western Pacific Region, and generally are high trophic level predators. Generally, impacts to seabirds include natural caused ecosystem variability (e.g., regime shifts), habitat degradation (e.g., nesting areas), invasive species (e.g., rats and cats), fishery interactions (e.g., hookings and gear entanglements), marine debris entanglements, and collisions with airplanes. The only documented Western Pacific Region fishery interactions with seabirds have been with the Hawaii-based longline fleet and NWHI bottomfish fishery, which are known to inadvertently hook and entangle, boobies, and black-footed and Laysan albatrosses. On rare occasions, wedge-tailed and sooty shearwaters are also incidentally caught by these Hawaii longline vessels (NMFS 2005b) Please see the additional NEPA analyses listed in Section 3.4.1 as well as the 2005 Final EIS under the Pelagics FMP (NMFS 2005b)for more information on the seabirds in the Western Pacific Region. In addition, two Biological Opinions issue by the U.S. Fish and Wildlife Service[30] provide detailed information on short-tailed, Laysan, and black-footed albatrosses (USFWS 2002 and 2004). The Opinions concluded that the Hawaii-based longline fishery is not likely to jeopardize the continued existence of the ESA-listed short-tailed albatross.

Short-Tailed Albatross

The short-tailed albatross (*Phoebastria immutabilis*) is the largest seabird in the North Pacific, with a wingspan of more than 3 meters (9 feet) in length. It is characterized by a bright-pink bill with a light-blue tip and defining black line extending around the base. The plumage of a young fledgling (i.e., a chick that has successfully flown from the colony for the first time) is brown, and at this stage, except for the bird's pink bill and feet, the seabird can easily be mistaken for a black-footed albatross. As the juvenile short-

[30] The U.S. Fish and Wildlife Service is the primary agency with authority and responsibility to managed endangered seabirds.

tailed albatross matures, the face and underbody become white and the seabird begins to resemble a Laysan albatross. In flight, however, the adult short-tailed albatross is distinguished from the Laysan albatross by a white back and by white patches on the wings, as opposed to the Laysan albatross which has a brown back and dorsal coloration on its wings. As the short-tailed albatross matures further, the white plumage on the crown and nape changes to a golden yellow.

Historically, the short-tailed albatross ranged along the coasts of the entire North Pacific Ocean from China, including the Japan Sea and the Okhotsk Sea (Sherburne 1993), to the west coast of North America. Prior to the harvesting of the short-tailed albatross at their breeding colonies by Japanese feather hunters, this albatross was considered common year-round off the western coast of North America (Robertson 1980). Between 1885 and 1903, an estimated five million short-tailed albatrosses were harvested from the Japanese breeding colonies for the feather, fertilizer, and egg trade, and by 1949, the species was thought to be extinct (Austin 1949). In 1950, ten short-tailed albatrosses were observed nesting on Torishima (Tickell 1973).

The short-tailed albatross is known to breed only in the western North Pacific Ocean, south of the main islands of Japan. Although at one time there may have been more than ten breeding locations, today there are only two known active breeding colonies: Minami Tori Shima Island and Minami-Kojima Island (Hasegawa 1979). On December 14, 2000, one short-tailed albatross was discovered incubating an egg on Yomejima Island of the Ogasawara Islands (southernmost island among the Mukojima Islands). A few short-tailed albatrosses have also been observed attempting to breed, although unsuccessful, at Midway Atoll in the NWHI.

In 2000, the breeding population of the short-tailed albatross was estimated at approximately 600 breeding age birds, with an additional 600 immature birds, yielding a total population estimate of 1,200 individuals (65 FR 46643; July 31, 2000). At that time, short-tailed albatrosses were estimated to have an overall annual survival rate of 96 percent and a population growth rate of 7.8 percent (65 FR 46643, July 31, 2000). More recently NMFS estimated the global population at approximately 1,900 individuals (P. Sievert, personal communication as cited in NMFS 2005b). The Torishima population was estimated to have increased by 9 percent between the 2003 to 2004 and 2004 to 2005 seasons (Harrison 2005).

The short-tailed albatross was first listed under the Endangered Foreign Wildlife Act in June 1970. On July 31, 2000, the United States Fish and Wildlife Service extended the endangered status of the short-tailed albatross to include the species' range in the U.S. The primary threats to the species are destruction of breeding habitat by volcanic eruption or mud- and landslides, reduced genetic variability, limited breeding distribution, plastics ingestion, contaminants, airplane strikes, and incidental capture in longline fisheries.

Newell’s Shearwater

The Newell’s shearwater (*Puffinus auricularis newelli*) is listed as threatened under the ESA. Generally, the at-sea distribution of the Newell’s shearwater is restricted to the waters surrounding the Hawaiian Archipelago, with preference given to the area east and south of the main Hawaiian Islands. The Newell’s shearwater has been listed as threatened because of its small population, approximately 14,600 breeding pairs, its isolated breeding colonies, and the numerous hazards affecting them at their breeding colonies (Ainley et al. 1997). The Newell’s shearwater nests in the mountainous areas between 500 and 2,300feet on Kauai.[31] Major threats include urban development and introduced predators like rats, cats, dogs, and mongooses (Ainley et al. 1997).

Shearwaters are most active in the day and skim the ocean surface while foraging. During the breeding season, shearwaters tend to forage within 50 to 62 miles (80 to 100 km) of their nesting burrows (Harrison 1990). Shearwaters also tend to be gregarious at sea, and the Newell’s shearwater is known to occasionally follow ships (Harrison 1990. Shearwaters feed by surface seizing and pursuit plunging (Warham 1990). Often shearwaters will dip their heads under the water to sight their prey before submerging (Warham 1990).

Shearwaters are extremely difficult to identify at sea, as the species is characterized by mostly dark plumage, long and thin wings, a slender bill with a pair of flat and wide nasal tubes at the base, and dark legs and feet. Like the albatross, the nasal tubes at the base of the bill enhance the bird’s sense of smell, assisting them to locate food while foraging (Ainley et al. 1997).

Other Seabirds

Other seabirds found in the region include the black-footed albatross (*Phoebastria nigripes*), Laysan albatross (*Phoebastria immutabilis*), masked booby (*Sula dactylatra*), brown booby (*Sula leucogaster*), red-footed booby (*Sula sula*), wedge-tailed shearwater (*Puffinus pacificus*), Christmas shearwater (*Puffinus nativitatis*), petrels (*Pseudobulweria* spp., *Pterodroma* spp.), tropicbirds (*Phaethon* spp.), frigatebirds (*Fregata* spp.), and noddies (*Anous* spp.)

[31] http://www.fws.gov/pacificislands/wesa/ao.html

3.5 The Western Pacific Region

Under the MSA, the WPRFMC has authority over the fisheries in the Pacific Ocean seaward of American Samoa, CNMI, Guam, Hawaii, and the PRIA (Figure 3-10). The Western Pacific Region, which is the largest fisheries management area in the United States, includes nearly 1.5 million square nautical miles of EEZ waters. This section provides information on each island area including summaries of local marine features, resources, fisheries, and economies. For more information pleasesee the additional NEPA analyses listed in Section 3.4.1.

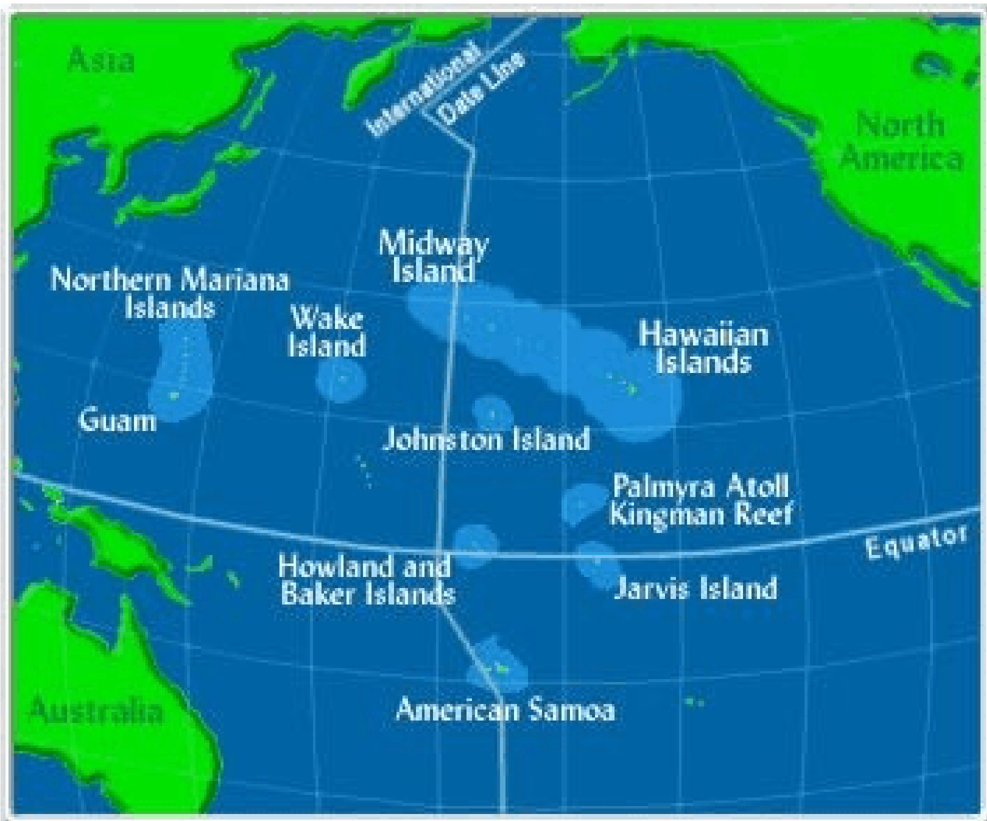

Figure 3-10: The Western Pacific Region.
Note: The U.S. EEZ is highlighted in light blue**.**

3.5.1 American Samoa

American Samoa has been a U.S. territory since 1899. Pago Pago has one the best naturally-formed deep water harbors in the Pacific. Over eighty nine percent of the people in American Samoa are considered native Samoan. This population is descended from the aboriginal people, who, prior to discovery by Europeans, occupied and exercised sovereignty in the area now known as Samoa. Western Samoa is now

Independent Samoa. Eastern Samoa is known as American Samoa. New Zealand occupied Western Samoa in 1914, and in 1962 Western Samoa gained independence. In 1997, Western Samoa changed its name to Samoa. The demarcation between Samoa and American Samoa is mostly political as cultural and commercial exchanges between families living and commuting between American Samoa and Samoa is common.

Approximately 95 percent of the landmass in American Samoa is held under the traditional land tenure system and under the direct authority of the Samoan chiefs known as “matai”. Under this system, traditional land cannot be purchased or sold, and the current reigning chief from within the family unit has final say over the disposition of a family's holdings. This system ensures the passage of assets to future generations and serves as the catalyst in the preservation of the Samoan culture.

The five volcanic islands, which are the major inhabited islands of American Samoa, are Tutuila, Aunuu, Ofu, Olosega, and Tau. Tutuila, the largest island (55 square miles), is the center of government and business. Aunuu, a satellite of Tutuila, lies one-quarter mile off the coast. The three islands of Ofu, Olosega, and Tau are collectively referred to as the Manua islands (with a total land area of less than 20 square miles) and lie 70 miles east of Tutuila. Swains Island, with a population of approximately 30, lies 200 miles north of Tutuila, and the uninhabited Rose Atoll is a national sanctuary. Tutuila, Manua, and Rose Atoll are between the 14° to 15° S latitude, and Swains Island lies at 11° S latitude. Swains Island is, geographically, a member of the Tokelau archipelago. The region was believed to be relatively geologically inactive with few seamounts or guyots in comparison to other Polynesian states. However, new anecdotal evidence indicates that the region is volcanically active, with new seamount being formed. The majority of islands rise from deep (4,000 m) oceanic depths.

The total land mass of American Samoa is about 70 square miles, and is surrounded by U.S. EEZ waters of approximately 156,246 square miles. The largest island, Tutuila, is nearly bisected by Pago Pago Harbor, the deepest and one of the most sheltered embayments in the South Pacific. Aunuu is a small island one-quarter mile off the eastern shore of Tutuila. The Manua islands include Ofu, Olosega, and Tau located 70 miles east of Tutuila. Rose Atoll is a wildlife refuge 60 miles east of Manua.

American Samoa experiences southeast trade winds that result in frequent rains and a warm tropical climate. The year-round air temperatures range from 70° to 90° F. Humidity averages 80 percent during most of the year. The average rainfall at Pago Pago International Airport is 130 inches per year, while Pago Pago Harbor, only 4.5 miles away, receives an average of 200 inches of rainfall per year (Territorial Planning Commission and Department of Commerce 2000).

Marine Environment

Coral Reefs

The coral reef area (includes seagrass beds and sandy and rocky rubble areas) in American Samoa is estimated at 55 square kilometers (within 10-fm curve) and 464 square kilometers (within 100-fm curve), respectively (Rohmann et al. 2005). Within the 10-fathom curve, the estimated coral reef area of Tutuila is 35.8 square kilometers, Ofu-Olesega is 3.8 square kilometers, Tau is 3.7 square kilometers, Rose Atoll is 8.0 square kilometers, and Swains Island is 3.5 square kilometers (Rohmann et al. 2005). The structure and development of most of these reefs, except the submerged banks, has been well described (Green 1997; Maragos et al. 1994).

The conditions of coral reef communities American Samoa have also been well described by numerous quantitative and qualitative surveys, including the following: Birkeland et al. 1987, 1994, 1996; Green 1996a; Green and Craig 1996; Hunter et al. 1993; Maragos 1994; Maragos et al. 1994; Mundy 1996. In general, the reefs adjacent to human population centers (e.g., Tutuila Island) appear to be in worse condition than those on less populated or unpopulated islands (e.g., the Manua Group and the two remote atolls; Green 1996a).

The reefs of American Samoa have been badly damaged by a combination of natural and anthropogenic disturbances in the past two decades. These include a severe outbreak of the crown-of-thorns starfish in the 1970s, four major cyclones in the last 18 years, and mass coral bleaching events in 1994, 2002, and 2003 (Maragos et al. 1994; Birkeland et al. 1996; Green 1996a; Craig et al. 2005). In some locations (especially Pago Pago Harbor), these reefs also appear to have been degraded by a combination of anthropogenic processes, including coastal construction, sedimentation, eutrophication, and chemical and solid waste pollution (Craig et al. 2005; Green 1996a; Maragos et al. 1994).

Long-term monitoring shows that these disturbances have resulted in major changes to the coral and fish communities near the island over the past 20–80 years (Birkeland et al. 1996). The rate of recovery of the coral reef communities on Tutuila appears to be quite variable. The reefs in Fagatele Bay National Marine Sanctuary (FBNMS) and at most other locations are recovering well from these disturbances (Birkeland et al. 1987, 1994, 1996; Green 1996a). In contrast, the reefs in Pago Pago Harbor and at several other locations around the island are not (Birkeland et al. 1987, 1994, 1996; Mundy 1996). Differences in water quality among sites may be partly responsible for these differences among the reefs. For example, the reefs in good condition, including those at FBNMS, Leone, Fatumafuti, and Vatia, appear to have good water quality. By comparison, the reefs that are in poor condition appear to have poor water quality, including high sediment loads and the presence of chemical pollutants (Green 1996a; Maragos et al. 1994; Mundy 1996). Poor quality reefs include most of the reefs in Pago Pago Harbor and some reefs on the northwest shore (Green 1996a; Maragos et al. 1994; Mundy 1996). Threats to the health of Tutuila's coral reefs include coral bleeching, coastal alterations from human development, fishing pressure, loss of wetlands, soil erosion and sedimentation, solid and hazardous waste disposal, and pollution (Craig et al. 2005).

In general, the reefs on the other less populated islands appear to be in good condition The small island of Aunuu Island has suffered the same natural disturbances as Tutuila, including coral bleaching and tropical storms. However, they are relatively protected from anthropogenic effects, and have been observed to recover quickly from the area's frequent storms (Green 1996a; Mundy 1996).

The reefs of the Manua Islands (Ofu, Olosega, and Tau) were severely damaged by Hurricane Tusi in 1987. The starfish invasion in the 1970s and the recent coral bleaching event also affected these reefs, but the extent of the damage is unclear (Green 1996a). Several studies over the past 10 years have shown that the reefs of the Manua Group tend to be in better condition than those around Tutuila (Green 1996a; Itano & Buckley 1988; Maragos et al. 1994; Mundy 1996,). In fact, Green (1996a) and Mundy (1996) reported that some of the reefs in Manua were among the best surveyed in the archipelago, including reefs on Ofu (Asaga), Olosega (Sili and Olosega Village), and Tau (Lepula and Afuli). The shallow lagoon in the National Park is also in particularly good condition (Green 1996a; Hunter et al. 1993). In general, anthropogenic effects are less pronounced in the Manua Islands because of the lower population on these islands. However, the future of some of these reefs is threatened by road construction immediately adjacent to the shoreline on all three islands (Green 1996a; Green and Mundy 1995). Intermittent, moderate- to-large infestations of the crown-of-thorns starfish may also threaten the condition of some of these reefs in future, especially on Ofu and Olosega (Mundy 1996; Zann 1995).

Benthic Habitat

Because of the steepness of the Tutuila and the other islands that make up American Samoa, most of the available benthic habitat is composed of fringing coral reefs, a limited reef slope, and a few offshore banks (Craig et al. 2005). The islands are fringed by narrow reef flats (50 to 500 m) that drop to a depth of 3 to 6 meters and descend gradually to 40 meters. From this depth, the ocean bottom drops rapidly, reaching depths of 1,000 meters within 1 to 3 kilometers from shore. The following four banks around Tutuila have been identified: Taputapu, Mataula, Leone West Banks, and Steps Point (Severance and Franco 1989).

Pelagic Habitat

The islands of the Samoa Archipelago are an area of modest productivity relative to areas to the north and west. The region is traversed by two main currents: the southern branch of the westward-flowing South Equatorial Current during June–October and the eastward-flowing South Equatorial Counter Current during November to April. Surface temperatures vary between 27° to 29° C and are highest in the January to April period. The upper limit of the thermocline in ocean areas is relatively shallow (27° C isotherm at a 100-meter depth), but the thermocline itself is diffuse (lower boundary at a 300-meter depth).

Surface Currents

As discussed in Section 3.1.6, ocean circulation is mainly driven by winds and changes in temperature and salinity that affect seawater density. Divergent currents bring nutrient-rich waters to the surface, which promotes phytoplankton growth, whereas convergent currents may accumulate forage items important for species distribution. The Westwind Drift (40° to 50° S) and the equatorial current system create an anticlockwise current flow or gyre in the South Pacific. From the equator to 20° S, four main currents or countercurrents are recognized (Bigelow 1997).

The northern branch of the South Equatorial Current (SECN) flows westward between 10° N and 7° S at a mean speed of 30 cm/sec and is 200 meters thick. The southern branch of the South Equatorial Current (SECS) flows westward between 11° and 14° S at a mean speed of 5 cm/sec and is 200 meters thick (Bigelow 1997).

Between these two westward-flowing currents is the eastward-flowing South Equatorial Countercurrent (SECC) at 7° S to 11° S. The SECC has a mean speed of 20 cm/sec and is 50,100 meters thick. South of 15° S, the South Tropical Countercurrent (STCC) flows eastward (Bigelow 1997).

Current systems in the South Pacific are not simple latitudinal features, as vertical profiles of the equatorial western Pacific show a complex and dynamic stratification of currents (Delcroix et al. 1992). Current velocity fields affecting the American Samoa EEZ are weak, with maximum velocity of about 25 cm/sec (52 cm/sec = 1 knot). In general, current velocities appear southwesterly in the north (5° to 10° S) and southerly between 10° and 15° S. The northern branch of the SECN is the strongest current in the South Pacific. The SECN flows westward and usually attains its maximum velocities within 5° of the equator during March and April (Picaut and Tournier 1991). Current The SECN mainly affects American Samoa EEZ from January to June.

The southern branch of the SECS flows westward, but is weaker than the SECN. In the central Pacific, it may fragment into a series of vortexes (Picaut and Tournier 1991). The SECS is evident to the north of 20° S each month and is strongest from May to October. The SECC shares a northern boundary, with the westward-flowing SECN and a southern boundary with the westward-flowing SECS. From observational oceanographic studies in the western Pacific, the SECC flows eastward, and in June or July its area of maximum velocity shifts abruptly from 10° S to 7° S; it may fragment into branches that interrupt the flow of the SECN. In the central Pacific, the SECC is evident to the south of 10° S during November to April, during which time the velocity of the SECS is reduced. From May to October, the SECS strengthen and the SECC is not evident in the climatology.

Water Temperatures

Although a 100-meter deep pool of uniformly warm (greater than 29° C) water extends over the equatorial western Pacific within 10° N to 10° S (Delcroix et al. 1992), virtually all of the EEZ waters around American Samoa lie farther to the south than the western Pacific warm pool in the more saline and cooler waters of the subtropical south Pacific. Bimonthly sea-surface temperature fields were estimated from a climatology based on an optimal interpolation (OI) analysis of in situ ship and buoy data collected from 1950 to 1979 (Reynolds and Smith 1994). In American Samoa, the SST is warmest during January and February and coolest during July and August. Part of the northern portion of the American Samoa EEZ is isothermal (29° C) during January to June. Sea-surface temperatures show a north–south gradient, and seasonal variation increases with latitude.

A sea-surface temperatures time series was estimated from 1982 to 1996 for an area north and south of 15° S. Monthly sea-surface temperatures was estimated from blended in situ (ship and buoy) sea-surface temperature data and satellite retrievals (Reynolds and Smith 1994). Throughout the time series, the southern area had a greater annual range in sea-surface temperatures (2° to 5° C) than the northern area (0.5° to 1.50° C). The three major El Niño, or warm events, that occurred over the time series (1982 to 1983, 1986 to 1987, and 1991 to 1995) resulted in 10° C cooler winter sea-surface temperatures (240° C) in the southern area than in normal years. The one major La Niña, or cold event, that occurred in 1988 to 1989 resulted in cooler summer sea-surface temperatures in the northern area than in normal years, but had little affect on the southern area (Reynolds and Smith 1994).

While sea-surface temperature is a convenient indicator of water temperature, the subsurface thermal structure has a greater influence on the horizontal and vertical distribution of some economically important species, including tuna. Two measurements used by oceanographers to characterize the subsurface thermal structure are the depth of the mixed layer and the depth of the lower boundary of the thermocline. The mixed layer is a relatively homogeneous layer of nearsurface water where the temperature remains constant with depth, while the thermocline is a region in the water column where temperature declines rapidly over a relatively small depth range. In tropical waters, the depth of the 27° C isotherm is commonly used as the lower boundary of the mixed layer (Cayre et al. 1989); however, the lower boundary of the thermocline is more difficult to define. For the purposes of this document, the depth of the 15° C isotherm is considered as the lower thermocline depth as suggested by Toole et al. (1988).

Subsurface temperature data, compiled from expendable bathythermographs (XBTs), were used by Bigelow (1997) to develop a time series of profile of temperature, with depth for the neighboring Cook Islands between 1982 and 1996. A total of 2,665 profiles were taken from a large area of the Cook Islands EEZ (5° to 25° S, 170° to 150 ° W). During this period, 15 profiles were made per month. The isotherm depths show very different time series patterns for the two areas. In the northern area, at a range of latitude similar to American Samoa's EEZ, isotherms were 50 to 100 meters shallower after the strong ENSO event of 1982 to 1983. In contrast, isotherm depths showed little temporal variability in the southern area. The average depth of the 27° C isotherm in the northern area was 100 meters. The lower boundary of the thermocline was deeper in the southern area (330 m) compared with the northern area (275 m; Bigelow 1997).

The latitudinal distribution of oxygen with depth was derived from a climatology study based on historical research ship data (Levitus 1982). There is a latitudinal gradient in dissolved oxygen as northern latitudes have less oxygen at a given depth than southern latitudes. In waters south of 15° S, oxygen concentrations are generally high (greater than 3.5 ml O2/liter above 300 m) and should not limit the vertical distribution of tuna. In contrast, catch ability of yellowfin and bigeye is increased between 5° and 10° S because dissolved oxygen concentrations are low (greater than 3.0 ml O2/liter below 250 m), which effectively restricts their vertical habitat (Bigelow 1997).

A monthly productivity climatology model derived from the Coastal Zone Color Scanner (CZCS), and based on data from 1978 to 1986, gives an indication of relative productivity. Within the Pacific, primary production is high in the equatorial western Pacific and the tropical eastern Pacific. In contrast, oceanic waters near American Samoa are low in productivity (approximately 0.05 mg/m^3) compared with the Society Islands in French Polynesia (greater than 0.1 mg/m^3). There is little intraannual variation in productivity within the American Samoa fishing zone, but waters to the northeast of 10° S have high productivity during winter months (May to August; Bigelow 1997).

A long-term shift in the physical environment of the equatorial Pacific Ocean began in 1977 (Miller et al. 1994). Conditions included more clouds, more rainfall, warmer sea-surface temperatures, and weaker trade winds, similar to a weak decadal El Niño state. These conditions were most pronounced in the central equatorial Pacific, thus American Samoa was close to the center of this shift, which persisted until 1999 (J. Polovina, PIFSC, personal communication as cited in WPRFMC 2003).

Protected Species

Sea Turtles

The information regarding sea turtles in American Samoa has come from opportunistic tagging of turtles and from dead (stranded) turtles. Hawksbill and green turtles are the most common species found in local waters. There is one record of a leatherback turtle that was incidentally captured about five kilometers south of Swains Island and three records of olive ridleys (two dead and one live sighting; Utzurrum 2002). Hawksbill and green turtle populations have declined precipitously in American Samoa (Grant et al. 1997). Despite federal and territorial laws prohibiting the killing of sea turtles and an extensive education program, some sea turtles and eggs were harvested illegally in American Samoa (Grant et al. 1997). In addition to direct take of turtles and eggs, degradation of nesting habitat by coastal construction, environmental contaminants, and increased human presence are viewed as the major problems to the recovery of green and hawksbill turtle populations. Beach mining and beach erosion are also detrimental because the islands of American Samoa have very few beaches suitable for turtle nesting habitat. American Samoa's human population is one of the fastest growing of the Pacific Islands (Pacific Sea Turtle Recovery Team, 1998a, 1998b), and the people of the Samoan Archipelago have traditionally harvested sea turtles for food and the shell. On the basis of recent surveys, the total number of nesting female sea turtles (hawksbill and green turtle species combined) is estimated to be approximately 120 (Utzurrum 2002). A voluntary observer program on American Samoa based longline vessels did not see any interactions with sea turtles on 76 observed longline sets during 2002. The newly instituted observer program implemented as part of the American Samoa longline limited entry program will provide more information on interactions between sea turtles and the American Samoa longline fishery.

Green Sea Turtle

As discussed in Section 3.4, the life cycle of the green sea turtle involves a series of long-distance migrations back and forth between their feeding and nesting areas (Craig 2002). In American Samoa, their only nesting area is at Rose Atoll. When they finish laying their eggs there, the green turtles leave Rose Atoll and migrate to their feeding grounds elsewhere in the South Pacific. After several years, the turtles will return to Rose Atoll to nest again. Every turtle returns to the same nesting and feeding areas throughout its life, but that does not necessarily mean that all turtles nesting at Rose Atoll will migrate to exactly the same feeding area.

Two green turtles with tagged flippers and three that were telemetered by satellite after nesting at Rose Atoll were recovered in Fiji (Balazs et al. 1994). In addition, a green turtle with tagged flippers from Rose Atoll was found dead in Vanuatu less than one year later (G. H. Balaz 1994, cited in Grant et al. 1997).

Hawksbill Sea Turtle

Hawksbill turtles are most commonly found at Tutuila and the Manua Islands. They are known to nest at Rose Atoll and Swains Island (Utzurrum 2002).

Leatherback Sea Turtle

In 1993, the crew of an American Samoa government vessel engaged in experimental longline fishing pulled up a small freshly dead leatherback turtle about 5.6 kilometers south of Swains Island. This is the first leatherback turtle seen by the vessel's captain in 32 years of fishing in the waters of American Samoa. The nearest known leatherback nesting area to the Samoan Archipelago is the Solomon Islands (Grant 1994).

Olive Ridley Sea Turtle

Olive ridley turtles are uncommon in American Samoa, although there have been at least three sightings. Necropsy of one recovered dead olive ridley found that it was injured by a shark, and may have recently laid eggs, indicating that there may be a nesting beach in American Samoa (Utzurrum 2002).

Loggerhead Sea Turtle

In 2006, there were two interactions observed between loggerhead turtles and American Samoa-based longline fishing gear.

Marine Mammals and Seabirds

Southern Pacific Humpback whales have been observed around Fagatele Bay National Marine Sanctuary between June and September. Moreover, sperm whales are occasionally seen in the Sanctuary and around Tutuila as well. Several species of dolphins also frequent the sanctuary waters. In addition, there is anecdotal observation of both false killer whales and short-finned pilot whales occasionally steal bait and fish from American Samoa-based longline gear. There are no pinnepeds (i.e., seals and sea lions) known to occur in American Samoa.

Seabirds

Table 3-3 presents the seabirds found in American Samoa. Twelve species of migratory seabirds reside on Rose Atoll, one of which is the bristle-thighed curlew, listed as “vulnerable” under the ESA.

Table 3-3: Seabirds Known to Be Present Around American Samoa.

Common Name	Scientific Name
Resident Seabirds (i.e., breeding):	
Puffinus pacificus	Wedge-tailed shearwaters
Puffinus lherminieri	Audubon’s shearwater
Puffinus nativitatis	Christmas shearwater
Pseudobulweria rostrata	Tahiti petrel
Pterodroma heraldica	Herald petrel
Pterodroma brevipes	Collared petrel
Sula sula	Red-footed booby
Sula leucogaster	Brown booby
Sula dactylatra	Masked booby
Phaethon lepturus	White-tailed tropicbird
Phaethon rubricauda	Red-tailed tropicbird
Fregata minor	Great frigatebird
Fregata ariel	Lesser frigatebird
Sterna fuscata	Sooty tern
Anous stolidus	Brown noddy
Anous minutus	Black noddy
Procelsterna cerulea	Blue-gray noddy
Gygis alba	Common fairy-tern (white tern)

Visitors/Vagrants	
Puffinus tenuirostris	Short-tailed shearwater
Pterodroma inexpectata	Mottled petrel
Pterodroma alba	Phoenix petrel
Fregetta grallaria	White-bellied storm petrel
Nesofregetta fuliginosa	Polynesian storm petrel (pratt—resident)
Larus atricilla	Laughing gull
Sterna sumatrana	Black-naped tern

Fisheries

Under the authority of the MSA, the Council developed (and the Secretary of Commerce approved) criteria to determine overfishing (fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region. Currently, no fishery in American Samoa has been determined to be experiencing overfishing or to be overfished.[32]

[32] Status of U.S. Fisheries, 2005. http://www.nmfs.noaa.gov/docs/Report_text_FINAL3.pdf

Dermersal Fisheries

Coral Reef

Coral reef fishes and invertebrates are harvested in American Samoa by various gear types including hook and line, spear gun, and gillnets. Approximately 25,000 pounds of coral reef species were reported landed by domestic commercial fisheries in 2003 (NMFS 2004b). Resources such as giant clams, parrotfish, surgeonfish, and jacks are believed to be low in abundance (Craig et al. 2005). MSY has not been estimated for the American Samoa coral reef fishery.

Crustaceans

Lobsters are more expensive than fishes in American Samoa markets, and are often present in important meals such as weddings, funerals, Christmas, and New Years.Formerly, lobsters were provided at the level of the village/family, whereas nowadays, they are mainly bought at the market, caught by professional/regular fishermen. Spiny lobster (*Panulirus penicillatus*) is the main species speared by night near the outer slope by free divers while diving for finfish. Total annual commercial landings expanded from market surveys are estimated to average 1,271 pounds of spiny lobsters (without taking subsistence and recreational catches into account; Coutures 2003). MSY has not been estimated for the American Samoa crustacean fisheries.

Bottomfish

Long before the arrival of Europeans in the islands of Samoa, the indigenous people of those islands developed specialized techniques for catching bottomfish from canoes. Some bottomfish, such as ulua, held a particular social significance and were reserved for the matai (chiefs; Severance and Franco 1989).

By the 1950s, many of the small boats in American Samoa were equipped with outboard engines, steel hooks were used instead of ones made of pearl shell, and monofilament fishing lines had replaced hand woven sennit lines. However, bottomfish fishing remained largely a subsistence practice. It was not until the early 1970s that the bottomfish fishery developed into a commercial venture (Ralston 1979). Surveys conducted around Tutuila Island from 1967 to 1970 by the American Samoa Office of Marine Resources indicated that the potential existed for developing a small-scale commercial bottomfish fishery. Four major fishing grounds were identified around the island of Tutuila: Taputapu, Matatula, Leone West Banks, and Steps Point (Severance and Franco 1989). In 1972, a government-subsidized boat-building program was initiated to provide local fishermen with gasoline and diesel powered 24–foot wooden dories capable of fishing for bottomfish in offshore waters. Twenty-three boats were eventually built and used by fishermen. By 1980, however, mechanical problems and other difficulties had reduced the dory fleet to a single vessel (Itano 1996).

In the early 1980s, the 28-foot alia catamaran, designed by the Food and Agriculture Organization of the United Nations, was introduced into American Samoa, and local boat builders began constructing these inexpensive but seaworthy fishing vessels. A recovery in the size of the fishing fleet, together with a government-subsidized development project aimed at exporting deep-water snapper to Hawaii, caused another notable increase in bottomfish landings (Itano 1996). Between 1982 and 1988, the bottomfish fishery made up as much as half of the total catch of the local commercial fishery. However, since 1988, the nature of American Samoa's fisheries has changed dramatically, with a shift in importance from bottomfish fishing to trolling and longlining for pelagic species (WPRFMC 1999). Landings trends in the bottomfish fishery have also been periodically adversely impacted by hurricanes. The 1987 hurricane, in particular, damaged or destroyed a large segment of American Samoa's small-boat fishing fleet.

Today, the bottomfish fishery of American Samoa consists of approximately 19 part-time vessels that typically jig overnight using skipjack tuna as bait (WPRFMC 2004a, 2004b). The fishing technology employed by the fleet continues to be relatively unsophisticated. Most vessels are aluminum alia catamarans less than 30 foot length and many of the boats are outfitted with wooden hand reels that are used for both trolling and bottomfish fishing. In 1999, less than 10 percent of the boats carry a depth recorder, electronic fish finder or global positioning system (Severance et al. 1999). Because few boats carry ice, they typically fish within 20 miles of shore. In recent years, however, a growing number of fishermen in American Samoa have been acquiring larger (greater than 35 feet) vessels with capacity for chilling or freezing fish and a much greater fishing range.

In recent years, commercial landings of bottomfish accounted for almost all of the total bottomfish catch. The amount of bottomfish caught for recreational or subsistence purposes was very small. In 2002, there were no recreational or charter landings recorded. The commercial catch declined significantly in 1987, recovered slightly in 1988, but then decreased dramatically again during the early 1990s (Figure 3-11). The overall decline was due to the effects of hurricanes that struck the territory in 1987, 1990, and 1991; the departure of several highliners from the fishery and a shift by the fleet from bottomfish fishing to trolling for pelagic species (WPRFMC 1999). In addition, fishermen began to experience competition in local markets from fresh bottomfish imported from Samoa and Tonga. In 1991, bottomfish imports exceeded local landings of bottomfish. The significantly greater 1994 total landings, when compared to previous years, occurred primarily because of improved catch recording, an increase in effort by highline vessels and a high fish demand for government and cultural events. However, the 1998 harvest was only 25 percent of the 17-year average and was the smallest catch since 1992. This decline was primarily due to a shift by highliners in the local fleet from bottomfish fishing to fishing for pelagic species with longline gear. Since 1998, some alias have returned to bottomfish fishing when longline catches and prices for pelagic species declined. In 2003, 19 vessels took 291 trips and landed 26,200 pounds of bottomfish in American Samoa. Of this, 25,509 pounds were sold for total ex-vessel revenue of $25,012 (WPRFMC 2004a, 2004b).

In 2005 a total of 16 local boats landed an estimated 21,157 pounds of both commercial and recreational bottomfish in the territory, where 30 percent of the total landing was sold commercially. Revenues from the commercial fishery in 2005 are estimated at $16,744 with all catch being sold locally. The majority of the catch is emperors and snappers. MSY for deep-water bottomfish around American Samoa is estimated at 74,970 lbs (WPRFMC 2005). Figure 3-11 provides historical data on commercial bottomfish harvests in American Samoa.

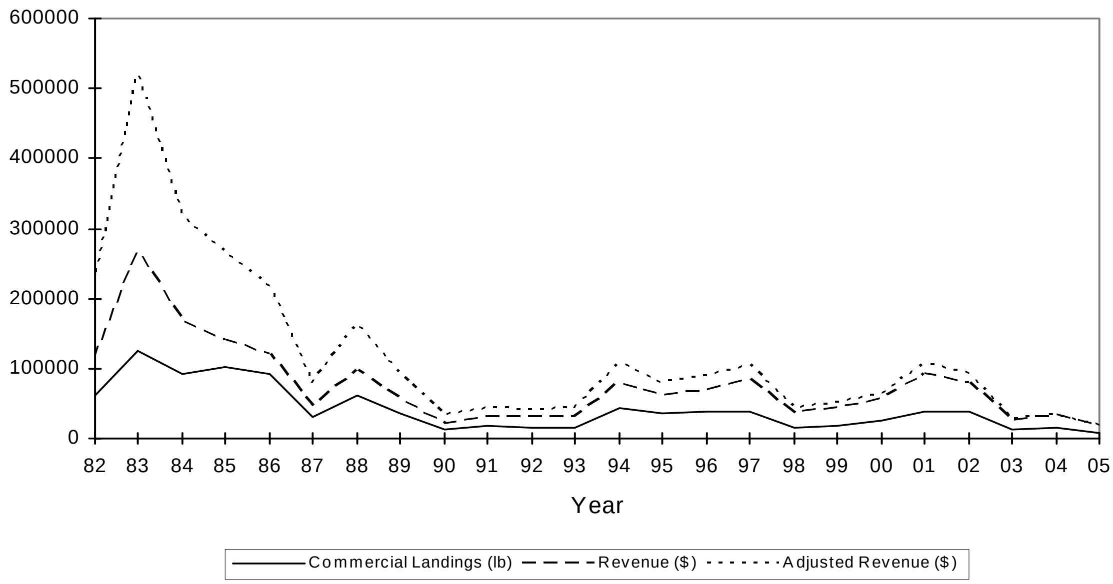

Figure 3-11: Bottomfish Landings and Value in American Samoa 1982 to 2005.
Source: WPRFMC 2006, In Prep.

Precious Corals

There are no known historical or current precious coral fisheries in American Samoa. MSY for precious corals around American Samoa has not been estimated.

Pelagic Fisheries

The harvest of pelagic fish has been a part of the way of life in the Samoan Archipelago since the islands were first settled some 3,500 years ago (Severance and Franco 1989). Subsistence fishing continues to the present, but the importance of pelagic fisheries as a source of income and employment is increasing. Commercial ventures are diverse, ranging from small-scale vessels having very limited range to large-scale vessels catching tuna in the EEZ and distant waters and delivering their catches to canneries based in American Samoa. Total pelagic landings by American Samoa based longline, troll, and handline vessels were approximately 11 million pounds in 2003 (Figure 3-12), with longline landings making up nearly 99 percent of this total (WPRFMC 2004a). During 2003, nearly 90 percent of these longline landings were albacore, with yellowfin, bigeye, and skipjack tuna making up the majority of the remainder (WPRFMC 2004a, 2004b). In 2004, there was a decrease in tuna landings of 19.2 percent and an increase of 12.4 percent in the total landings for other pelagic species (Figure 3-12; WPRFMC 2005).

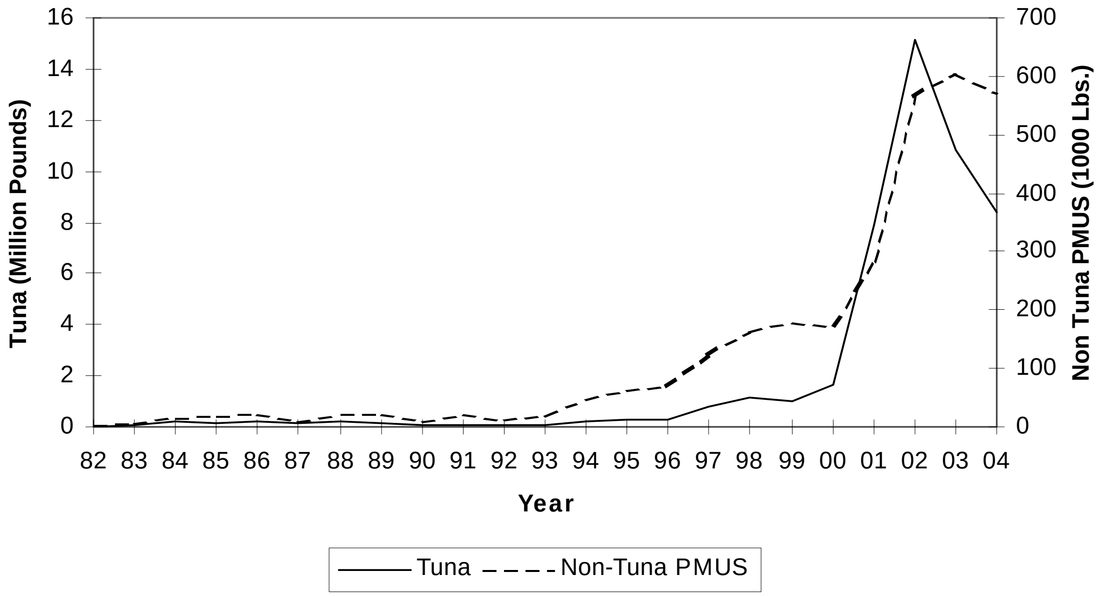

Figure 3-12: Tuna and Nontuna PMUS Landings in American Samoa 1982 to 2004. Source: WPRFMC 2005.

Small-Scale Longline

Most participants in the small-scale domestic longline fishery are indigenous American Samoans with vessels under 50 feet in length, most of which are alia boats under 40 feet in length. The stimulus for American Samoa's commercial fishermen to shift from troll or handline gear to longline gear in the mid-1990s (see Figure 3-12) was the fishing success of 28-foot alia catamarans that engaged in longline fishing in the EEZ around Independent Samoa. Following this example, the fishermen in American Samoa deploy a short monofilament longline, with an average of 350 hooks per set, from a hand-powered reel (WPRFMC 2000). The number of alias fishing in American Samoa has decreased significantly in recent years, from 27 in 2002 to 9 in 2004 (WPRFMC 2005).

Large-Scale Longline

American Samoa's domestic longline fishery expanded rapidly in 2001. Much of the recent (and anticipated future) growth was due to the entry of monohull vessels larger than 50 feet in length. The number of permitted longline vessels in this sector increased from three in 2000 to 30 by March 21, 2002 (DMWR, unpublished data). Of these, five permits (33 percent of the vessel size class) for vessels between 50.1 feet and 70 feet and five permits (33 percent of the vessel size class) for vessels larger than 70 feet were believed to be held by indigenous American Samoans as of March 21, 2002 (T.

Beeching, DMWR, personal communication to P. Bartram, WPFMC Consultant, March 2002). Economic barriers have prevented more substantial indigenous participation in the large-scale sector of the longline fishery. The lack of capital appears to be the primary constraint to substantial indigenous participation in this sector (DMWR 2002).

While the smallest (less than or equal to 40 feet) vessels average 350 hooks per set, a vessel more than 50 feet can set 5 to 6 times more hooks and has a greater fishing range and capacity for storing fish (8 to 40 mt as compared with 0.5 to 2 mt on a small-scale vessel). Larger vessels are also outfitted with hydraulically powered reels to set and haul mainline, and modern electronic equipment for navigation, communications, and fish finding. Most vessels are presently being operated to freeze albacore onboard rather than to land chilled fish. After the Hawaii longline swordfish fishery closure in 2000, a handful of Hawaii-based vessels relocated to American Samoa, but there are some vessels that move between Hawaii and American Samoa depending on market conditions. Large vessels have participated in the American Samoa longline fishery from diverse ports and fisheries, including the U.S. West Coast (six), Gulf of Mexico (three), and foreign countries (four under U.S. ownership; O'Malley and Pooley 2002). In 2004, 29 large vessels fished in the American Samoa EEZ (WPRFMC 2005). In 2005, the American Samoa limited entry longline program was established, requiring a limited entry permit to fish in the EEZ around American Samoa (70 FR 29646).

Distant-Water Purse Seine Fishery

The U.S. purse seine fleet operating in the central and western Pacific uses large nets to capture skipjack, yellowfin, and bigeye tuna near the ocean surface, in free-swimming schools and around fish aggregation devices (FADs) deployed by the fleet. These vessels often land their catches at canneries based in American Samoa. These large vessels (200–250 feet length) could not be economically operated for longline fishing, but some former participants in the U.S. purse seine fishery have acquired more suitable vessels and have participated in the American Samoa based longline fishery (NMFS 2001).

Distant-Water Jig Albacore Fishery

Domestic albacore jig vessels also supply tuna to the canneries in American Samoa. Since 1985, about 50 to 60 U.S. vessels have participated in the high-seas jig fishery for albacore. This fishery occurs seasonally (December to April) in international waters at 35° to 40° S latitude. The vessels range in length from 50 to 120 feet, with the average length about 75 feet. The vessels operate with crews of 3 to 5 and are capable of freezing 45 to 90 tons of fish (WPRFMC 2000).

Troll and Handline Fishery

From October 1985 to the present, catch-and-effort data in American Samoa fisheries have been collected through a creel survey that includes subsistence and recreational fishing, as well as commercial fishing. However, differentiating commercial troll fishing activity from noncommercial activity can be difficult.

Recreational fishing strictly for sport or pleasure is uncommon in American Samoa. Most fishermen normally harvest pelagic species for subsistence or commercial sale. However, tournament fishing for pelagic species began in American Samoa in the 1980s. Between 1974 and 1998, 64 fishing tournaments were held in American Samoa (Tulafono 2001). Most of the boats that participated were alia catamarans and small skiffs. Catches from tournaments are often sold, as most of the entrants are local small-scale commercial fishermen. In 1996, 3 days of tournament fishing contributed about 1 percent of the total domestic landings. Typically, 7 to 14 local boats carrying 55 to 70 fishermen participated in each tournament, which were held two to five times per year (Craig et al. 1993).

The majority of tournament participants have operated 28-foot alia, the same vessels that engage in the small-scale longline fishery. With more emphasis on commercial longline fishing since 1996, interest in the tournaments has waned (Tulafono 2001), and in 2001 the pelagic fishing effort shifted markedly from trolling to longlining (see Figure 3-13). However, with the recent decrease in alia longline activity, there are more alia available to go trolling, but the price of the gas is likely impeding trolling activity.

Catch-and-release recreational fishing is virtually unknown in American Samoa. Landing fish to meet cultural obligations is so important that releasing fish would generally be considered a failure to meet these obligations (Tulafono 2001).

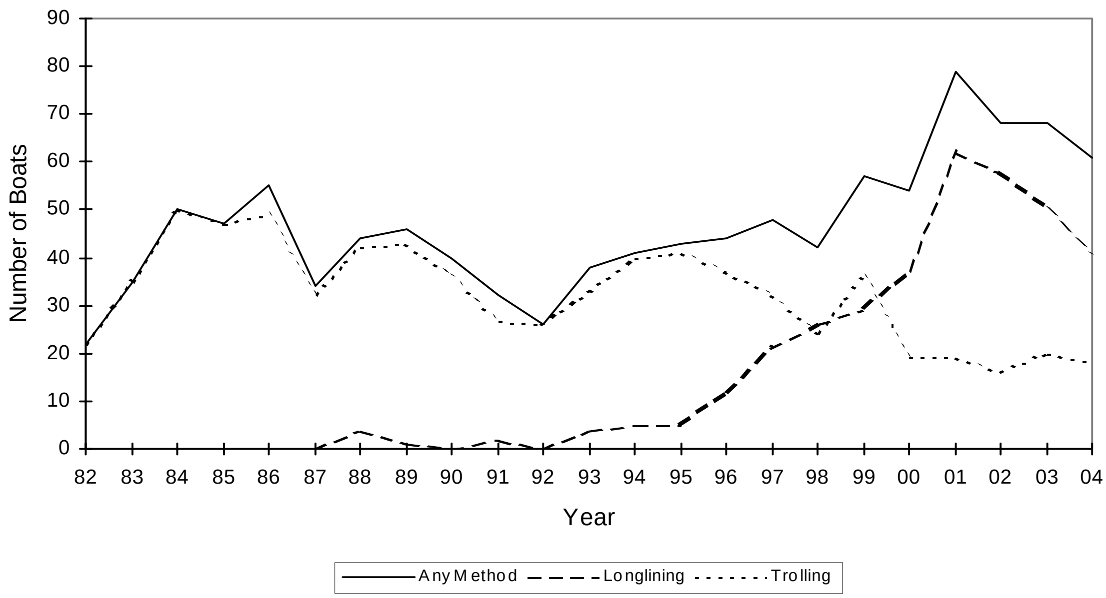

Figure 3-13: Trolling and Longlining in American Samoa.
Source: WPRFMC 2005.

American Samoa has been unable to develop a significant tourist industry that could support charter fishing (Territorial Planning Commission and Department of Commerce 2000). American Samoa is not known for producing large game fish. Few, if any, charter boats are in operation (Tulafono 2001), so no data are collected specifically for the charter fishing sector.

Communities

American Samoan dependence on fishing undoubtedly goes back as far as the peopled history of the islands of the Samoan Archipelago, about 3,500 years ago (Severance and Franco 1989). Many aspects of the culture have changed in contemporary times, but American Samoans have retained a traditional social system that continues to strongly influence and depend on the culture of fishing. Centered around an extended family (*aiga*) and allegiance to a hierarchy of chiefs (*matai*), this system is rooted in the economics and politics of communally held village land. It has effectively resisted Euro-American colonial influence and has contributed to a contemporary cultural resiliency unique in the Pacific Islands region (Severance et al. 1999).

From the time of the Deeds of Cession to the present, despite increasing Western influences on American Samoa, native American Samoans have expressed a very strong preference for and commitment to the preservation of their traditional matai, aiga, and communal land system, which provides for social continuity, structure, and order. The traditional system is ancient and complex, containing nuances that are not well understood by outsiders (Territorial Planning Commission and Department of Commerce 2000).

Traditional American Samoan values still exert a strong influence on when and why people fish, how they distribute their catch, and the meaning of fish within the society. When distributed, fish and other resources move through a complex and culturally embedded exchange system that supports the food needs of aiga, as well as the status of both matai and village ministers (Severance et al. 1999).

Under the MSA, the islands of American Samoa are recognized as a fishing community. However, American Samoa's history, culture, geography, and relationship with the United States are vastly different from those of a typical community in the continental United States and are closely related to the heritage, traditions, and culture of neighboring independent Samoa. The seven islands that make up American Samoa were ceded in 1900 and 1904 to the United States and governed by the U.S. Navy until 1951, when administration was passed to the U.S. Department of the Interior, which continues to provide technical assistance, represent territorial views to the federal government, and oversee federal expenditures and operations. American Samoa elected its first governor in 1978 and is represented by a nonvoting member of Congress.

Tutuila, American Samoa's largest island is the center of government and business and is home to 90 percent of the estimated 63,000 total population of the territory. American Samoan natives born in the territory are classified as U.S. nationals and are categorized as native Americans by the U.S. government (Territorial Planning Commission and Department of Commerce 2000). Population density is about 320 people/km^2, and the annual population growth rate is nearly 3 percent, with projected population doubling in only 24 years. The net migration rate from American Samoa was estimated as 3.75 migrants/1,000 population in the year 2000 (Central Intelligence World Fact Book 2005).

The only U.S. territory south of the equator, American Samoa is considered unincorporated because the U.S. Constitution does not apply in full, even though it is under U.S. sovereignty (Territorial Planning Commission and Department of Commerce 2000). American Samoa's vision for its future is not fundamentally different from that of any other people in the United States, but American Samoa has additional objectives that are related to its covenant with the United States, its own constitution, and its distinctive culture (Territorial Planning Commission and Department of Commerce 2000). A central premise of ceding eastern Samoa to the United States was to preserve the rights and property of the islands' inhabitants. American Samoa's constitution makes its government policy to protect persons of American Samoan ancestry from the alienation of their lands and the destruction of the Samoan way of life and language. It provides for protective legislation and encourages business enterprise among persons of American Samoan ancestry (Territorial Planning Commission and Department of Commerce 2000).

American Samoa has a small developing economy, dependent mainly on two primary income sources: the American Samoa government, which receives income and capital subsidies from the federal government, and the two fish canneries on Tutuila (Bank of Hawaii 2002) These two primary income sources have given rise to a third: a service sector that derives from and complements the first two. In 1993, the latest year for which the American Samoan government compiled detailed labor force and employment data, the government employed 4,355 persons (32.2 % of total employment), two canneries 3,977 persons (29.4 %), and the remainder of the service economy 5,211 persons (38.4 %). As of 2000, there were 17,644 people 16 years and older in the labor force, of which 16,718, or 95 percent, were employed. [33]

A large proportion of the territory's work force is from Western Samoa, which is now officially called Samoa (Bank of Hawaii 2000). While it would be true to say that Western Samoans working in the territory are legal alien workers, in fact they are the same people—by culture, history, and family ties.

Statistics on household income indicate that the majority of American Samoans live in poverty, according to U.S. income standards. American Samoa has the lowest gross domestic product and highest donor aid per capita among the U.S.-flag Pacific Islands (Adams et al. 1999). However, by some regional measures, American Samoa is not a poor economy. Its estimated per capita income of $9,332 (male)[34] is almost twice the average for all Pacific Island economies, although it is less than half of the per capita income in Guam, where proximity to Asia has led to development of a large tourism sector. Sixty-one percent of the population in 1999 was at or below poverty level.[35]

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[33] http://www.census.gov/Press-Release/www/2002/amsamstatelevel.pdf
[34] Ibid
[35] Ibid

The excellent harbor at Pago Pago and certain special provisions of U.S. law form the basis of American Samoa's largest private industry, fish processing, which is now more than 30 years old (Bank of Hawaii 1997). The territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. American Samoan products with less than 50 percent market value from foreign sources enter the United States duty free (Headnote 3(a) of the U.S. Tariff Schedule). The parent companies of American Samoa's fish processing plants enjoy special tax benefits, and wages in the territory are set not by federal law but by recommendation of a special U.S. Department of Labor committee that reviews economic conditions every 2 years and establishes minimum wages by industry.

The American Samoan government has estimated that the tuna processing industry directly and indirectly generates about 15 percent of current money wages, 10 to 12 percent of aggregate household income and 7 percent of government receipts in the territory (Bank of Hawaii 2000). Both tuna canneries in American Samoa are tied to multinational corporations that supply virtually everything but unskilled labor, shipping services, and infrastructure facilities (Schug and Galeai 1987). Even a substantial portion of the raw tuna processed by StarKist Samoa is landed by vessels owned by the parent company. The result is that few backward linkages have developed, and the fish-processing facilities exist essentially as industrial enclaves. Furthermore, most of the unskilled labor of the canneries is imported. Up to 90 percent of cannery jobs are filled by foreign nationals from Western Samoa and Tonga. The result is that much of the payroll of the canneries "leaks" out of the territory in the form of overseas remittances.

Harsh working conditions, low wages, and long fishing trips have discouraged American Samoans from working on foreign longline vessels delivering tuna to the canneries. American Samoans prefer employment on the U.S. purse seine vessels, but the capital-intensive nature of purse seine operations limits the number of job opportunities for locals in that sector as well. However, the presence of the industrial tuna fishing fleet has had a positive economic effect on the local economy as a whole. Ancillary businesses involved in reprovisioning the fishing fleet generate a significant number of jobs and amount of income for local residents. Fleet expenditures for fuel, provisions, and repairs in 1994 were estimated to be between $45 million and $92 million (Hamnett and Pintz 1996).

The tuna processing industry has had a mixed effect on the commercial fishing activities undertaken by American Samoans. The canneries often buy fish from the small-scale domestic longline fleet based in American Samoa, although the quantity of this fish is insignificant compared with cannery deliveries by the U.S. purse seine, U.S. albacore fleets, and foreign longline fleets. The ready market provided by the canneries is attractive to the small-boat fleet, and virtually all of the albacore caught by the domestic longline fishery is sold to the canneries.

Local fishermen have indicated an interest in participating in the far more lucrative overseas market for fresh fish. To date, however, inadequate shoreside ice and cold storage facilities in American Samoa, as well as infrequent and expensive air transportation links, have been restrictive factors.

Using information obtained from industry sources for a presentation to the American Samoa Legislature (Faleomavaega 2002), canning the 3,100 metric tons of albacore landed in American Samoa by the domestic longline fishery in 2001 is estimated to have generated 75 jobs, $420,000 in wages, $5 million in processing revenue, and $1.4 million in direct cannery spending in the local economy. Ancillary businesses associated with the tuna canning industry also contribute significantly to American Samoa's economy. The American Samoa government calculates that the canneries represent, directly and indirectly, from 10 percent to 12 percent of aggregate household income, 7 percent of government receipts and 20 percent of power sales (Bank of Hawaii 2000).

American Samoa's position in the industry is being eroded by forces in the world economy and in the tuna canning industry itself. Whereas wage levels in American Samoa are well below those of the United States, they are considerably higher than in other canned tuna production centers around the world. To remain competitive, U.S. tuna producers are purchasing more raw materials, especially precooked loins, from foreign manufacturers. Tax benefits to U.S. canneries operating in American Samoa have also been tempered in recent years by the removal of a provision in the U.S. tax code that previously permitted the tax-free repatriation of corporate income in U.S. territories. Trends in world trade, specifically reductions in tariffs, are reducing the competitive advantage of American Samoa's duty-free access to the U.S. canned tuna market (Territorial Planning Commission and Department of Commerce 2000).

Despite the long history of the tuna canning industry in American Samoa, processing and marketing of pelagic fish by local enterprises have not yet developed beyond a few short-term pilot projects. However, the government's comprehensive economic development strategy (Territorial Planning Commission and Department of Commerce 2000) places a high priority on establishing a private sector fish processing and export operation proposed to be located at the Tafuna Industrial Park.

3.5.2 Commonwealth of the Northern Mariana Islands

Located between 14° and 20° N, the Commonwealth of the Northern Mariana Islands (CNMI) encompasses 14 islands and many banks stretching over 400 nautical miles (760 km) in a north–south direction. The total land area of all 14 islands is approximately 477 square kilometers. Within the EEZ and approximately 120 nautical miles west of the island chain, is the West Mariana Ridge, a line of seamounts running parallel to the main islands. The islands north of Saipan are called the northern islands, which have been designated as wildlife conservation areas. Seamounts near the northern islands include Bank A, Pathfinder Reef, Bank D, Bank C, and Arakane Reef. Comprised of raised limestone and classified as geologically "older", the southern islands include Rota, Aguijan, Tinian, Saipan, and Farallon de Medinilla. The "younger" and still volcanically active northern islands include Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, Maug, and Farallon de Pajaros. More than 99.5 percent of the population occurs on the southern islands of Saipan, Tinian, and Rota, with 89 percent living on Saipan (U.S. Census 2000). Aguijan is the only uninhabited southern island.

The CNMI archipelago spans both tropical and subtropical latitudes. And thus, CNMI's climate can be considered tropical (i.e., Saipan) and subtropical (i.e., Maug); and CNMI's average air temperatures are consistently around 80° F, with little variation. Prevailing winds in CNMI are northeasterly trade winds, averaging near 10 knots; however, southeasterly winds are observed in summer months, and west and northwesterly winds are observed during winter months. Average annual rainfall in the southern islands and the northern islands is around 82 inches and 75 inches, respectively. Because of the Mariana Islands' position in the western Pacific, typhoons occur almost every year in the vicinity (Eldredge 1983).

Marine Environment

Coral Reefs

The total coral reef area in CNMI is 124 square kilometers (within the 10-fm curve) and 476 square kilometers (within the 100-fm curve; Rohmann et al. 2005). The older southern islands have fringing and/or barrier reefs, while the volcanically active northern islands have relatively little coral reef (Eldredge 1983).

The southern islands support a variety of marine habitat types. Saipan's potential coral reef area within the 10-fathom contour is 58 square kilometers and includes fringing reefs, inshore and offshore patch reefs, and a well-developed barrier reef/lagoon system along most of the leeward coast (Eldredge 1983; Gourly 1997; Rohmann et al. 2005). Saipan Lagoon also comprises some large areas of well-developed seagrass beds, as well as a small area of mangroves (Gourley 1997).

The corals reefs within the 10-fathom curve of Rota (12 km^2), Tinian, and Agrijan (18 km^2) are less well developed than those on Saipan, and are generally restricted to small fringing reef systems (Eldredge 1983; Gourley 1997; Rohmann et al. 2005). A study of the reefs adjacent to beaches on Tinian reported that coral reefs are present around much of the island, and, in general, reefs on the eastern (leeward) coastline are better developed and have greater species diversity than those on the western coast (PSDA 1997). Rota also has some well-developed reefs, especially in Sasanhaya Bay on the south side, and some offshore reefs on the north and west sides of the island (PSDA 1997).

Farallon de Medinilla is an uninhabited island with 2 square kilometers of potential coral reef area within the 10-fathom curve (Rohmann et al. 2005). The island has been used as a military bombardment range for the last 30 plus years (Eldredge 1983; PSDA 1997; Starmer et al. 2005). There is no fringing reef or shallow coastal zone at Farallon de Medinilla because deep water surrounds much of the island and the submarine slope appears to be very steep (PSDA 1997). The combination of this vertical profile and wave action on the windward side of the island probably explains the limited coral reef biota in shallow water on that side (PSDA 1997). As such, marine resources are mostly concentrated on the leeward side of the island, where the substrate drops gradually seaward (PSDA 1997). Farallon de Medinilla is near a large shallow bank 1 mile north of the island (about 18 meters).

The northern islands are relatively young (1–1.5 million years) and include active volcanoes on the islands of Pagan (erupted in 1981), Anatahan (erupted in 2003), Guguan, Asuncion, Agrihan and Uracas (Asakura et al. 1994a). In general, reef development is poor or nonexistent on the Northern Islands (Eldredge 1983), with Pagan having the greatest area of potential coral reef area at 11 square kilometers with the 10-fathom curve (Rohmann et al. 2005). Most of the reefs that do exist tend to be narrow, rocky reefs on steep slopes, with coral communities growing on volcanic substrata because there is little true coral reef development (Birkeland 1997b; Donaldson 1995; Eldredge 1983). However, there are a few small "embryonic" or "apron" reefs on these islands, which may have some reef formation but do not reach sea level (Birkeland 1997b). These include areas at depths of greater than 25 meters at western Anatahan, southern Sarigan, and parts of Pagan (Donaldson 1995; Donaldson et al. 1994). Eldredge et al. (1977a) also reported a well-developed fringing reef on the west side of Maug.

These differences in the development of reefs throughout the Marianas appear to be related to the age and geology of the islands, because coral growth is just as vigorous in both the north and south (Birkeland 1997b). For example, geological faulting of large areas in the older Southern Marianas (e.g., west coast of Saipan) has created large, oblique, shallow-water surfaces, which have supported extensive reef growth and the development of reef flats and lagoons over time (Birkeland 1997b). In contrast, the islands in the north are younger with quite vertical profiles, which do not provide the basis for extensive reef development (Birkeland 1997b).

Low-to-moderate numbers of pernicious starfish (i.e., *Acanthaster planci*) are believed to have been responsible for substantial coral mortality on some reefs around Saipan over the past two decades. This includes areas in Saipan Lagoon (Duenas and Swavely 1985; Richmond and Matson 1986), the Obyan-Naftan area (Randall et al. 1988), and Laulau Bay (PBEC 1984). However, the starfish do not appear to be abundant at present, and local divers report that starfish are only seen occasionally at the primary dive sites (e.g., Obyan and Laulau Bay; J. Comfort, personal communication as cited in Green 1997).

Starfish outbreaks have also been recorded on the other islands, including occasional small-scale outbreaks on Rota since the 1980s (CRM 1996). There have also been reports of starfish causing damage to reefs on the northern islands of CNMI, including Maug and Alamagan (Eldredge 1983).

CNMI's coral reefs have experienced some damage from the frequent typhoons in the area, and coral bleaching has occurred in 1994, 2001, and 2003. In addition, coral reefs in some locations appear to have been affected by human activities, including fishing, sedimentation, and nutrient loading (Starmer et al. 2005).

Available information suggests that the current condition of the coral reefs in the southern islands of CNMI is quite variable (Starmer et al. 2005). Most appear to be in good condition, except in some heavily populated areas where the reefs have been degraded by human activities. A major management focus is the reefs in the Saipan Lagoon, because this area encompasses nearly all of the commonwealth's population, tourism industry, commercial activity, subsistence fishing, and water-oriented recreation (Duenas and Swavely 1985).

In general, it appears that the reefs in the northern islands are also in good condition because of their isolation from human population centers (Birkeland 1997b). The exceptions are localized areas that may have been affected by volcanic or military activities (e.g. Pagan and Farallon de Medinilla).

Deep Reef Slope, Banks, and Seamount Habitat

A total of 579 square kilometers of banks and reefs has been estimated in the EEZ surrounding the CNMI (Hunter 1995). Of this area, 534 square kilometers are outside 3 nautical miles. The submerged seamounts 120 nautical miles west of the emergent islands have been estimated to have a total of 50 to 60 square kilometers of viable habitat to support bottomfish populations (WPRFMC 2005).

Pelagic Habitat

Generally, the major surface current affecting CNMI is the North Equatorial Current (see Figure 3-4), which flows westward through the islands; however, the Subtropical Counter Current affects the northern islands and generally flows in a easterly direction (Elgredge 1983). Depending on the season, sea surface temperatures near the Northern Mariana Islands vary between 80.9° and 84.9° F. The mixed layer extends to between depths between 300 and 400 feet (Eldredge 1983).

Protected Species

Sea Turtles

Both green and hawksbill turtles are known to occur in waters around the CNMI and leatherback and olive ridley sea turtles are believed to occasionally transit the area (Starmer et al. 2005).

Green Sea Turtle

Based on nearshore surveys conducted jointly between the CNMI Division of Fish and Wildlife (DFW) and the NMFS around the southern islands (Saipan [1999] and Rota and Tinian [2001]), an estimated 1,000–2,000 green sea turtles forage in these areas (Kolinksi et al. 2004). The green sea turtle is a traditional food of the native population, and although harvesting them is illegal, divers have been known to take them at sea and others have taken nesting females (Pacific Sea Turtle Recovery Team 1998a). Turtle eggs were also harvested in the CNMI. Nesting beaches and seagrass beds on Tinian and Rota are in good condition, but beaches and seagrass beds on Saipan have been impacted by hotels, golf courses, and general tourist activities.

Hawksbill Sea Turtle

Although hawksbill turtles have occasionally been sighted in the past around the CNMI, they were not observed in a detailed assessment conducted in 1999, nor were they observed in ten aquatic surveys along the shores of Tinian in 1995. According to the 1998 Pacific Sea Turtle Recovery Team Recovery Plan for the hawksbill turtle (Pacific Sea Turtle Recovery Team 1998b) there are no reports of hawksbill nesting in the CNMI. This does not rule out the possibility of a few hawksbill nests as nesting surveys on small pocket beaches in remote areas of CNMI have never been done. A single hawksbill sighting occurred in 1996 during the detonation of an unexploded ordinance off of Rota. The turtle was recovered near the explosion sight and subsequently died, apparently from internal injuries incurred from the blast (Trianni 1998a).

Marine Mammals and Seabirds

Cetaceans

Humpback whales (*Megaptera novaeangliae*) and sperm whales (*Physeter macrocephalus*) are known to appear between Saipan and Farallon de Medinilla. Sightings of Risso's dolphin (*Grampus griseus*), Cuvier's beaked whale (*Xiphias cavirostris*), pygmy sperm whale (*Kogia breviceps*), pilot whale (*Globicephala melaena*), striped dolphin (*Stenella coeruleoalba*), and the pan-tropic whitebelly spinner dolphin (*Stenella longirostris longirostris*) have also occurred around CNMI.

Pinnipeds and Sirenians

No pinnipeds or sirenians species are known to occur in CNMI waters**.**

Seabirds

According to Pratt et al. (1987), the following seabirds have been sighted and are considered residents of the CNMI: wedge-tailed shearwater (*Puffinus pacificus*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon lepturus*), masked booby (*sula dactylatra*), and brown booby (*Sula leucogaster*).

The following seabirds have been sighted and are considered visitors to the CNMI: streaked shearwater (*Calonectris leucomelas*), short-tailed shearwater (*Puffinus tenuirostris*), Christmas shearwater (*Puffinus nativitatis*), Newell's shearwater (*Puffinus auricularis*), Audobon's shearwater (*Puffinus iherminieri*), Leach's storm-petral

(*Oceanodroma leucorhoa*), Matsudaira's storm-petral (*Oceanodroma matsudairae*), and the red-footed booby (*Sula sula*). Of these, only the Newell's shearwater is listed as endangered. There have been no sightings of the endangered short-tailed albatross (*Diomedea albatrus*) in the CNMI, although the CNMI is within the range of the only breeding colony at Tora Shima, Japan.

Fisheries

Under the authority of the MSA, the Council established (and the Secretary of Commerce approved) criteria to determine overfishing (fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region. Currently, no fishery in the CNMI has been determined by NMFS to be experiencing overfishing or to be overfished.[36] For more information on these fisheries see the additional NEPA analyses listed in Section 3.4.1.

Demersal Fisheries

Coral Reef

Commercial landings of coral reef fish were approximately 136,000 pounds in 2003 (NMFS 2004b) and include harvests of parrotfish, surgeonfish, goatfish, snappers, and emperors. Currently, a moratorium exists on invertebrate coral reef fisheries targeting sea cucumbers (*Actinopyga maruitiana*) and topshells (*Trochus niloticus*). Generally, coral reef fisheries in the CNMI are believed to be in good condition, but local depletion likely occurs in some areas of Saipan (Starmer et al. 2005). MSY has not been estimated for the CNMI coral reef fishery.

Crustacean Fishery

Lobsters around the CNMI do not appear to go into traps and have not been found in waters deeper than 13 meters (M. Trianni, DFW, personal communication). The CNMI fishery primarily targets spiny lobster in nearshore waters, with reported catches taken almost exclusively within the 0–3 nautical mile zone of the inhabited southern islands, generally on reef flats by scuba or free diving. Beyond 3 nautical miles, the topography in most locations drops off steeply. These lobster habitats are relatively small, and access is difficult. Near the northern islands on reefs surrounding Farallon de Medinilla, bottomfish fishermen anchored during the night occasionally dive for lobsters (Trianni 1998b). Anchoring and diving at Farallon de Medinilla occur exclusively within 3 nautical miles, and most likely on the lee side within 100 yards of land. This activity is primarily for personal consumption. The directed commercial fishery is relatively small, with 493 pounds of commercial landings estimated for 2003 (NMFS 2004b). However, unreported commercial and noncommercial catches could raise this figure.

A second fishery for crustacean species occurred in the 1990s, mostly on grounds around Saipan and Tinian. The fishery trapped deep-water shrimp, with fishing occurring on flat areas near steep banks at depths greater than 350 meters (Ostazeski 1997). Two fishing

[36] Status of U.S. Fisheries, 2005. http://www.nmfs.noaa.gov/docs/Report_text_FINAL3.pdf

companies began fishing for deep-water shrimp in May of 1994. While three species of pandalid shrimp are known to occur at varying depths in the waters around CNMI (*Heterocarpus ensifer* [366 to 550 m], *Heterocarpus laevigatus* [550 to 915 m], and *Heterocarpus longirostris* [greater than 915 m]), the most commercially valuable and subsequently targeted shrimp is the largest species (*Heterocarpus laevigatus* [Moffitt and Polovina 1987]). Between May of 1994 and February of 1996, 12,160 kilograms of deep-water shrimp were landed. Of these, more than 97 percent were *Heterocarpus laevigatus,* with the remainder being *Heterocarpus ensifer*. Bycatch included a few deepwater eels (*Synaphobranchus* spp.) and dogfish sharks. A large number of two species of Geryonid crabs were also caught. The crabs are a marketable incidental catch and could contribute to the success of any deep-water shrimp fishery. Strong currents, rough bottom topography, and fishing depth all contribute to the potential for gear loss, which has been experienced by this fishery in the past.

Throughout the Pacific, deep-water shrimp fisheries have been sporadic in nature (Hastie and Saunders 1992). The reasons for this are manifold. Gear loss has been a common problem and made many past ventures unprofitable. A second difficulty is the short shelf life and a history of inconsistent quality, leading to fluctuating market demand for the product. Lastly, these fisheries generally experience local depletion on known fishing grounds, which leads to much lower catch rates. While other banks might have abundant stocks, unfamiliarity with them could lead to even greater gear loss.

Shrimp trapping was conducted at 22 islands and banks during the NMFS Resource Assessment Investigations of the Mariana Archipelago (RAIOMA) cruises. Depth and area distribution were observed for the three major species of pandalid shrimp. Average size, size at maturity, reproductive cycles, and sex ratios were analyzed and determined. Growth and mortality were also calculated. From analysis of catch-per-unit effort, determination of suitable habitat and the above parameters, total biomass and sustainable yield were calculated.

The DFW conducted a data collection project specifically for the deep-water shrimp fishery between May of 1994 and June of 1995. Catch-and -effort data were gathered for both types of traps, as well as bycatch data. Depth ranges for the fishery as well as depth of greatest abundance were recorded. Sex ratios and reproductive cycles were determined from 1,533 *H. laevigatus* examined (Ostazeski 1997). Research has also been conducted to create a depletion model that would estimate catch ability and help determine the commercial viability of this fishery. Moffitt and Polovina (1987) estimated 676.6 tons of *Heterocarpus laevigatus* biomass and an MSY of 162 tons per year for the combined EEZ waters around Guam and CNMI.

Bottomfish

The CNMI bottomfish fishery can be categorized into two segments: deep (greater than 500 feet) and shallow (less than 500 feet) water fishing. The deepwater fishery is primarily commercial, targeting snappers, the *Eteline* and *Pristipomoides* complexes, and the eight-banded grouper. The shallow-water fishery, which primarily targets the redgilled emperor, is mostly commercial but also includes recreational and subsistence fishermen. Some trips last for more than one day, but the majority of bottomfishing trips by small vessels are one day.

The CNMI bottomfish fishery occurs primarily around the islands and banks from Rota Island to Zealandia Bank north of Sariguan. Historically, the CNMI has had a relatively small fishing fleet consisting primarily of small-scale local boats engaged in commercial, subsistence, and recreational fishing. DFW has reported that 150 skiffs are used for subsistence fishing and that eight vessels ranging from 29 to 70 feet have been used commercially. However, the 2004 DFW "trip tickets" recorded a total of 43 vessels, both large and small, fishing commercially. The skiffs are generally less than 24 feet in length, which restricts them to fishing one-day trips during the daylight hours within a 30-mile radius of Saipan (WPRFMC 2003). Because of their distance from port, CNMI small-boat fishermen are reluctant to fish western seamounts. Handlines, home fabricated hand reels, and electric reels are commonly used for small-scale fishing operations.

Prior to 1994, large vessel ventures were short-lived. These vessels have landed as much as 70 percent of the total reported commercial bottomfish landings (M. Trianni, DFW, personal communication). The number of large-vessel commercial bottomfishing ventures active in the northern islands increased to eight during 2000, but only four are presently believed to be active (WPRFMC 2005). Of these four, two sell their catches primarily on the island of Saipan (mostly to the large hotels on Saipan and Tinian).

The larger commercial vessels are able to make multi-day trips to the Northern Islands, focusing their effort from Esmeralda Bank to Zealandia. Electric reels and hydraulics are the common gear used for these larger operations. No known commercial vessels have ice-making or freezer capabilities. Two ventures, comprised of three vessels, a 65-foot vessel and two 50-foot vessels, fished the Northern Islands deep-water complex in 1997, landing large volumes of onaga and eight-banded grouper.

By the end of 1999, two of the three bottomfishing vessels left the fishery. Four vessels have entered the fishery since late 2000, with two vessels occasionally targeting sharks (M. Trianni, DFW, personal communication).

Landings of bottomfish decreased in 2002 (34.3 percent fewer pounds in 2002 than in 2001) from the fishery's 2001 peak landings, but increases in landings were observed in 2004 (see Figure 3-14). This fishery continues to show a high turnover with changes in the highliners participating in the fishery and an increased number of local fishermen focusing on reef fishes in preference to bottomfishes. Fishermen are also moving towards an increasing number of multi-purpose trips that focus primarily on reef fishes and catch pelagic species while in transit. In doing so, the shallow-water bottomfish complex continues to be exploited, but as part of the exploitation of reefs near the populated islands. Redgill emperor ("mafute") is the most frequently harvested and easily identified species in this complex, although a variety of snappers and groupers are also harvested (M. Trianni, DFW, personal communication).

Over the last 6 years, 64 percent of mafute fishermen and 62 percent of onaga fishermen making commercial sales participated for only a single year and no fishermen participated in all six years (regardless of how small the sales) (WPRFMC 2005). Fishermen utilizing larger vessels have greater access to the deep-water bottomfish resources, especially in the northern islands of the CNMI. However, this sector of the industry requires more investment, consistent long-term effort, and knowledge to recoup start-up costs than does the shallow-water bottomfish sector. This industry could continue to expand with support from a training program in bottomfishing that addresses the following: proper fish handling and maintenance of product quality, use of fathometers, nautical charts, modern electronic equipment such as GPS, fish finders, electric reels, anchoring techniques, marketing, and financial planning. Moreover, side-band sonar mapping of the banks used by commercial fishermen from Farallon de Medinilla to Rota should assist the growth of this sector (M. Trianni, DFW, personal communication). It is estimated that in 2005 70,034 lbs of commercial landings of bottomfish were made, with a total ex-vessel value of $189,478 (See Table 3-4; WPRFMC 2005)

Table 3-4. Bottomfish Landings in CNMI 1983 to 2003.

Year	Landings Total (Lbs)	CPUE (Lbs/Trip)	CPI	CPI Adjusted Revenue ($)	CPI Adjusted Price ($/Lb)	Number of Fishermen
1983	28,529	43	140.90	97,052	3.40	90
1984	42,664	70	153.20	131,265	3.08	101
1985	40,975	117	159.30	117,717	2.87	62
1986	29,911	104	163.50	93,538	3.13	55
1987	49,715	169	170.70	142,838	2.87	46
1988	47,313	181	179.60	130,336	2.75	28
1989	24,438	73	190.20	73,965	3.03	31
1990	12,927	81	199.33	42,354	3.28	33
1991	7,093	47	214.93	25,281	3.56	19
1992	10,598	59	232.90	30,877	2.91	36
1993	18,461	84	243.18	52,235	2.83	20
1994	25,469	74	250.00	76,905	3.02	32
1995	36,101	93	254.48	128,991	3.57	34
1996	66,387	119	261.98	230,216	3.47	71
1997	64,143	137	264.95	217,078	3.38	68
1998	59,022	148	264.18	206,111	3.49	50
1999	55,991	156	267.80	204,633	3.65	53
2000	45,258	56	273.23	128,120	2.83	72
2001	71,256	68	271.01	218,462	3.07	74
2002	46,765	101	271.55	135,146	2.89	53
2003	41,903	89	268.92	120,315	2.87	59
2004	54,474	104	271.28	142,362	2.61	43
2005	70,034	76	271.90	189,478	2.71	62
Average	41,279	98		127,908	2.60	52
Standard Deviation	19,101	39		61,905	0.61	22

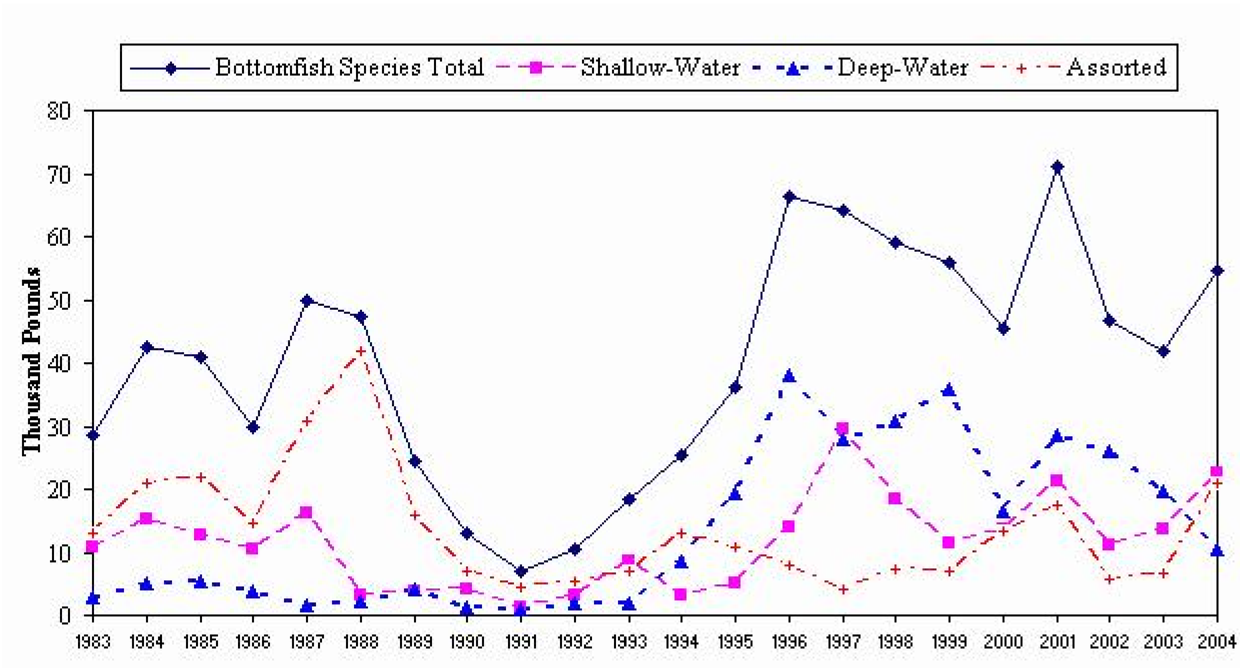

Figure 3-14: Bottomfish Landings in CNMI 1983 to 2003.
Source: WPRFMC 2005.

Commercial landings of shallow-water bottomfish appear to have peaked between 1996 and 2001 and were again headed upwards in 2004 and 2005. It is likely that there was a comparable peak in landings between 1984 and 1987, but this result is difficult to discern because of the large number of bottomfish that were categorized as "assorted bottomfish" during the earlier period. Commercial landings of emperor (mafute' of the family Lethrinidae) have fluctuated widely over the last 20 years, and particularly over the last eight years. In 2002, commercial landings of mafute' fell below the 20-year mean to their lowest level since 1995. In 2003 they increased slightly but remained below the 21-year mean. In 2004 commercial mafute' landings increased by 136 percent from 2003 and they increased again by 18 percent in 2005.

Commercial landings of jacks fished in shallow areas (itemized as "jacks," amberjack [*Seriola dumerili*], giant trevally [*Caranx ignobilis*], brassy trevally [*C. papuenis*], and black jack [*C. lugubris*] on the sales invoices) appear to have slowly increased over the last 10 years, with the highest landings reported in 2003. Commercial landings of jacks were up 0.57 percent in 2002 but were down 87 percent by 2004. However 2005 landings increased by 313 percent. The category "jacks" includes any carangids sold, both BMUS species and *Carangoides orthogrammus, Caranx melampygus*, *C. papuensis*, and *C. sexfasciatus*. Commercial landings of amberjack were slightly lower in 2005 than the previous year. Giant trevally and black jack were reported in 2002 for the first time and brassy trevally was reported in 2003 for the first time, both likely as a result of being added to the new sales invoice.

Jobfish (*Aprion virescens*) have been reported in eight of the last 20 years, and 2004 commercial landings were the highest ever reported surpassing the previous year by 100 percent. Commercial uku landings were down slightly in 2005 and landings of blueline snapper (*Lutjanus kasmira*) and humpback snapper (*Lutjanus gibbus*) were much higher than last year, but these species are often lumped within assorted reef fishes and so this increase may be overstated.

Table 3-5. Commercial landings (Lbs) of Bottomfishes.

year	btm_as	empr	jack_as	amber	giant_j	brass_j	blk_jack	uku	jack_s	taape	snapr
1983	12,998	9,555	1,031	0	0	0	0	0	1,031	0	175
1984	20,971	13,925	906	0	0	0	0	0	906	0	259
1985	21,904	11,676	962	135	0	0	0	81	1,098	0	81
1986	14,528	9,250	818	0	0	0	0	363	818	0	363
1987	30,929	15,568	607	0	0	0	0	0	607	0	0
1988	41,823	3,078	0	0	0	0	0	0	0	0	0
1989	15,891	3,963	0	0	0	0	0	0	0	0	0
1990	6,931	4,021	0	0	0	0	0	0	0	0	0
1991	4,296	1,212	175	0	0	0	0	0	175	0	0
1992	5,543	2,338	337	0	0	0	0	450	337	0	450
1993	7,055	8,083	454	0	0	0	0	0	454	0	0
1994	13,002	1,870	1,169	0	0	0	0	16	1,169	0	16
1995	10,779	4,276	596	0	0	0	0	171	596	0	171
1996	7,846	11,990	1,697	0	0	0	0	152	1,697	0	152
1997	3,998	25,445	3,482	0	0	0	0	526	3,482	0	526
1998	7,351	13,853	2,362	317	0	0	0	1,746	2,679	0	1,746
1999	7,004	8,419	2,019	343	0	0	0	683	2,363	0	683
2000	13,451	11,223	2,142	28	0	0	0	190	2,169	0	190
2001	17,485	16,987	3,761	21	0	0	0	425	3,782	0	425
2002	5,718	5,364	4,584	184	48	52	0	389	4,868	352	771
2003	6,526	7,999	3,685	322	26	725	138	597	4,896	75	672
2004	20,831	18,889	477	488	91	27	931	1,194	2,015	102	1,499
2005	**26,128**	**22,240**	**1,969**	**411**	**84**	**0**	**1,405**	**1,102**	**3,868**	**758**	**1,860**
Average	14,043	10,053	1,445	98	11	35	108	352	1,696	56	437
Stnd. Dev.	9,567	6,650	1,348	160	27	151	343	463	1,559	171	559

Legend for Table 3-5: Btm_as: Assorted bottomfish; empr: Emperor (mafute'); jack_a: As jacks; amber: Amberjack; giant_j: Giant trevally; blk_jack: Black jack; uku: Jobfish; jack_s: All shallow water jacks; taape: Blueline snapper; and shallow-water snappers

Review of Bycatch

Almost all fishes caught in the CNMI are considered food fishes, including many that show a high incidence of ciguatera (e.g. lyretail grouper [*Variola louti*] and red snapper [*Lutjanus bohar*]). Bycatch estimates for CNMI bottomfish fisheries are derived from interviews of fishermen during boat-based creel surveys. The interviews are divided into vessels engaged in non-charter (including commercial, noncommercial, and subsistence fishermen) and charter fishing.

In 2003, the non-charter sector reported zero incidences of bycatch. For the charter sector, only a single charter vessel was engaged in bottomfish fishing and reported a 19.57 percent bycatch rate (WPRFMC 2003b). Catch rates in this sector must remain high to ensure that the clientele are satisfied with the charter. For this reason, small fishes are often released alive so that they may be recaptured on subsequent charters. All bycatch reported in this sector was released alive.

Table 3-6: Bycatch in the CNMI Bottomfish Fishery.

Species Name	Interview with Bycatch	All Interview	Released Alive	Total Catch	Bycatch Percentage
Non-Charter	**2**	**220**			0.91%
Dogtooth Tuna			1	18	5.56%
Blueline Snapper			4	213	1.88%
Blackjack			1	29	3.45%
All Species with Bycatch			**6**	**260**	**2.31%**
Compared with All Caught				**5756**	**.10%**
Charter	**12**	**84**			14.29%
Redgill Emperor			6	240	2.50%
Triggerfish (misc.)			55	165	33.33%
Emperor (mafute/misc.)			7	129	5.43%
Red Snapper			5	9	55.56%
Blueline Snapper			3	64	4.69%
Lyretail Grouper			5	19	26.32%

Flagtail Grouper			4	116	3.45%
Maitai (blk-tipped Grper)			4	139	2.88%
Jobfish (uku)			1	5	20.00%
All Species with Bycatch			**90**	**886**	**10.16%**
Compared with All Caught				**1247**	**7.22%**

Source: WPFMC 2005 Bottomfish Annual Report.

There are no reported interactions with protected species (e.g. sea turtles, marine mammals, birds) in the CNMI bottomfish fishery.

CNMI Bottomfish MSY

A Resource Assessment Investigation of the Mariana Archipelago (RAIOMA) was conducted in 1982-1984 to assess the bottomfish and other resources of the Mariana Archipelago (Polovina et al. 1986). Sampled areas were divided into three regions: the Northern Islands, the Southern Islands and the Western Seamounts. These studies resulted in several publications describing the bottomfish complexes and included maximum sustainable yield (MSY) estimates for deep-slope bottomfish species in each area as presented in Table 3-7.

Table 3-7. Annual MSY estimates for CNMI deep-slope bottomfish (Polovina et al. 1985).

Area	MSY (pounds)
Northern Islands: Maug, Asuncion, Agrihan, Pagan, Alamagan, Guguan, Sarigan, Anatahan, 38-fathom, Esmeralda	64,577
Southern Islands: Farallon de Medinilla, Saipan, Tinian, Aguijan, Rota	110,641
Western Seamounts: Bank C, Bank D, Pathfinder, Arakane, Bank A	9,036
Total	184,254

Given an annual MSY of 184,254 pounds, and a recent (2001-2005) average annual commercial catch of approximately 20,000 pounds (with the majority coming from the Southern Islands which have an estimated annual MSY of approximately 111,000 pounds), CNMI deep-slope bottomfish do not appear to be subject to overfishing nor to be overfished. Unknown recreational catches would increase annual landings but it is believed unlikely that these would be enough to cross or even approach any of the MSY estimates.

Precious Corals

Little is known about the presence of precious corals in the waters around the CNMI. The amount of habitat where precious corals can grow is limited throughout the archipelago because of the steep topography. Black coral grows in relatively shallow waters of 30–100 meters, while pink, gold, and bamboo corals grow in deeper waters of 300–1,500 meters (Grigg 1993). Reports of a fishery from pre–World War II suggest that large quantities of high-quality *Corallium* spp. were taken in waters north of Pagan Island (Takahashi 1942, as cited in Grigg and Eldredge 1975). Since then, no known precious coral harvests have occurred within EEZ waters around CNMI.

During the 1970s, surveys for precious coral in the waters surrounding CNMI were performed (Grigg and Eldridge 1975). The study focused on the presence of pink and red corals (*Corallium spp.*) and black coral (*Antipathes* spp.). Although few precious coral resources were found in these surveys, precious corals likely exist (in sparse aggregations) in both the nearshore waters (0–3 nm) and the offshore waters (3–200 nm).

Pelagic Fisheries

The CNMI's pelagic fisheries occur primarily from the island of Farallon de Medinilla south to the island of Rota. Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet consists mostly of vessels less than 24 feet in length, which usually has a limited 20-mile travel radius from Saipan.

The primary target and most marketable species for the pelagic fleet is skipjack tuna (67 percent of 2004 commercial landings). Yellowfin tuna and mahimahi are also easily marketable species, but they are seasonal. During their migrations, these fish are usually found close to shore and provide easy targets for the local fishermen. In addition to the economic advantages of being near shore and their relative ease of capture, these species are widely accepted by all ethnic groups, which have kept market demand fairly high. Figure 3-15 presents historical data on pelagic landings near CNMI. It is estimated that in 2004, 68 fishery participants made 235,382 pounds of commercial landings of pelagic species, with a total ex-vessel value of $466,490 (WPRFMC 2005).

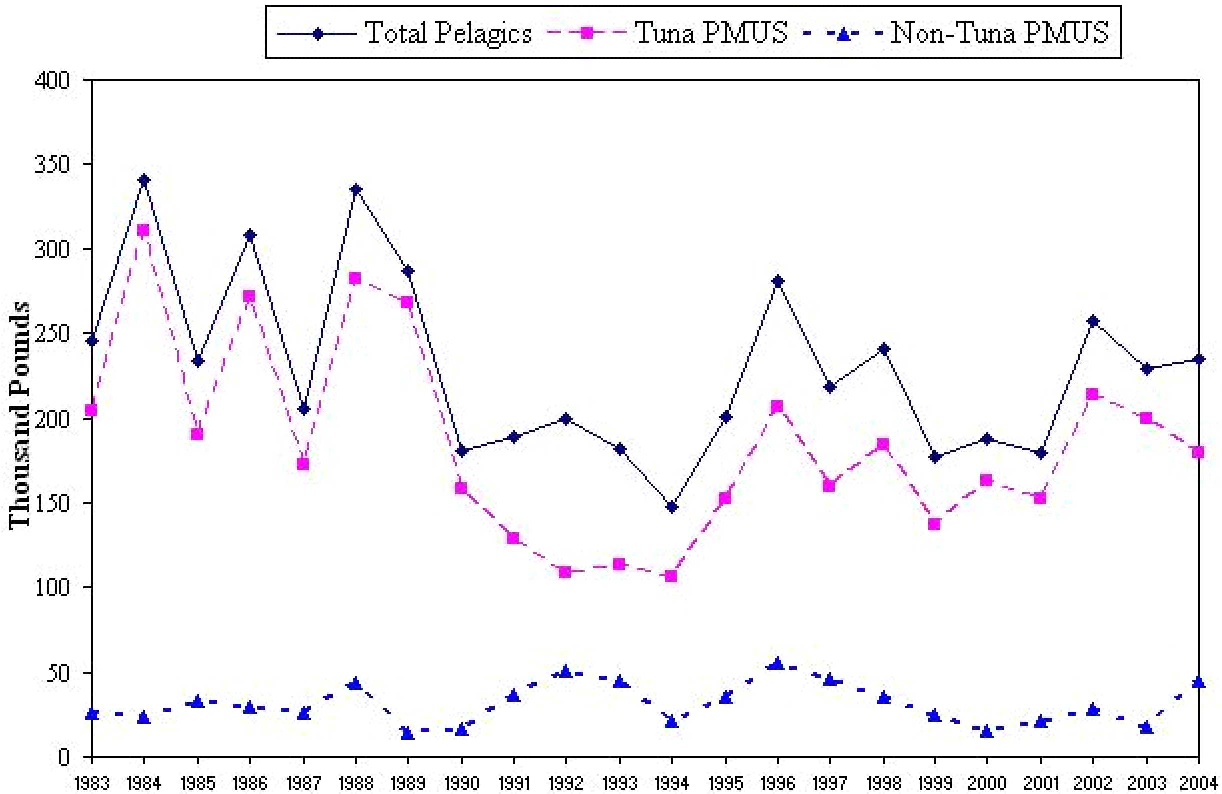

Figure 3-15: Pelagic Landings in CNMI 1983 to 2004.
Source: WPRFMC 2005 Pelagic Annual Report.

Communities

Fishery resources have played a central role in shaping the social, cultural, and economic fabric of the CNMI. The aboriginal peoples indigenous to these islands relied on seafood as their principal source of protein and developed exceptional fishing skills. Later immigrants to the islands from East and Southeast Asia also possessed a strong fishing tradition. Under the MSA, the CNMI is defined as a fishing community.

The CNMI consists of 14 islands, five of which are inhabited, with a total land area of 176.5 square miles spread over approximately 264,000 square miles of ocean. The Northern Mariana Islands became part of the Pacific Trust Territory administered by the United States under a mandate granted in 1947. The covenant that created the commonwealth and attached it to the United States was fully implemented in 1986, pursuant to a Presidential Proclamation that terminated the Trust Territory of the Pacific Islands as it applied to the Northern Mariana Islands.

Per capita income in the CNMI in 1999 was $9,151. The median household income for the CNMI as a whole was $22,898. For Saipan, the median household income was $19,698 in the first quarter of 1999, as compared with $21,457 in 1990. The commonwealth had an unemployment rate in 1999 of 5.5 percent. Forty-six percent of the CNMI population was at or below poverty in 1999 (U.S. Census 2000).

In 2000, CNMI had 20,378 men ages 16 and over in the labor force, of whom 96 percent, or 19,458, were employed. There were 24,093 women ages 16 and over in the labor force, of which 97 percent were employed (Census 2000). The economy of the CNMI has historically benefited substantially from financial assistance from the United States, but in recent years this assistance has declined as locally generated government revenues have grown. Between 1988 and 1996, tourism was the commonwealth's largest income source. During that period, tourist traffic to the CNMI tripled from 245,505 to 736,117 (Bank of Hawaii 1999c). Total tourist expenditures in the CNMI were estimated to be a record $587 million in 1996. In 1997 and 1998, however, the loss of air service between the CNMI and Korea, together with the impact of the Asian financial crisis on both Korean and Japanese travelers, caused tourist arrivals in the CNMI to drop by one third (Bank of Hawaii 1999c).

More recently, garment production has been an important industry, with shipments of $1 billion to the United States under duty and quota exemptions during 1999 (Bank of Hawaii 1999c). The garment industry is credited with preventing an economic depression in the commonwealth following the decline of its tourist industry, but the future of the CNMI's garment manufacturers is uncertain. When the commonwealth was created, it was granted an exemption from certain U.S. immigration, naturalization, and labor laws. These economic advantages are now a matter of national political debate centered on what some regard as unfair labor practices in the CNMI's garment industry. The two main advantages for manufacturing garments in the CNMI are low-cost foreign labor and duty-free sale in the United States. The controversy over labor practices in the CNMI may cause the commonwealth to lose these unique advantages, forcing garment makers to seek alternative low-cost production sites. The end of the quota on foreign textiles in 2005 may cause garment manufacturers to move to China, which has some competitive advantages (Bank of Hawaii 2004).

In the early 1980s, U.S. purse seine vessels established a transshipment operation at Tinian Harbor. The CNMI is exempt from the Jones Act, which requires the use of U.S.-flag and U.S.-built vessels to carry cargo between U.S. ports. The U.S. purse seiners took advantage of this exemption by offloading their catch at Tinian onto foreign vessels for shipment to tuna canneries in American Samoa. In 1991, a second type of tuna transshipment operation was established on Saipan (Hamnett and Pintz 1996). This operation transships fresh tuna caught in the Federated States of Micronesia from air freighters to wide-body jets bound for Japan. The volume of fish flown into and out of Saipan is substantial, but the contribution of this operation to the local economy is minimal (Hamnett and Pintz 1996).

With the exception of the purse seine support base on Tinian (now defunct), the CNMI has never had a large infrastructure dedicated to commercial fishing. The majority of boats in the local fishing fleet are small outboard engine-powered vessels. Between 1994 and 1998, the annual ex-vessel value of commercial landings of bottomfish and pelagic species has averaged about $473,900, for which bottomfish accounts for about 28 percent of the total revenues (WPRFMC 1999). Existing planning data for the CNMI are not suited to examining the direct and indirect contributions attributed to various inter-industry linkages in the economy. It is apparent, however, that fishing by the local small-boat fleet represents only a small fraction of the economic activity in the commonwealth.

3.5.3 Guam

At 560 square kilometers, Guam is the largest and most populated (approximately 160,000) island in Micronesia. Guam has a tropical climate with average air temperatures around 80° F and relative humidity around 90 percent near the coast. Prevailing winds are northeasterly trade winds that average around 10 knots. Guam's annual average rainfall amount is around 90 inches, with more than 75 percent of the rain occurring in the wet season between July and November (Eldredge 1983). Because of its position in the western Pacific Ocean, Guam experiences a high number of tropical cyclones during its wet season. For example, between 1948 and 1975, more than 70 cyclones came within 200 miles of Guam. Of those 70, 26 were categorized as typhoon strength (greater than 64 knot winds; Eldredge 1983). Over the past 10 years, Guam has been directly hit by four typhoons with sustained winds of more than 150 mph (Porter et al. 2005).

Marine Environment

Coral Reefs

Approximately 50 percent of Guam's 153-kilometer shoreline is surrounded by well-developed coral reefs (Myers 1997; Randall and Myers 1983). Most of the reefs are fringing reefs (up to 600-m wide), except for the broad barrier reef enclosing the shallow Cocos Lagoon at the southwest tip of the island (Eldredge 1983; Randall and Myers 1983). A raised barrier reef (Cabras Island), a greatly disturbed barrier reef (Luminao Reef), and a coral bank (Calalan Bank) enclose the deep lagoon of Apra Harbor (Randall and Myers 1983). Patch reefs are also associated with Anae Island on the southwest coast and at Pugua Patch Reef (or Double Reef) on the northwest coast (Randall and Myers 1983). All of the reef flats, lagoons, patch reefs, and outer reef slopes surrounding Guam are located within territorial waters (Hunter 1995; Myers 1997).

The potential coral reef area around Guam is estimated at 108 square kilometers (within a 10-fm curve) and 276 square kilometers (within a 100-fm curve), respectively (Rohmann et al. 2005). Most of the reefs are located in territorial waters (0 to 3 nm), while reefs located at the offshore banks are in federal waters.

The health of Guam's coral reefs varies considerably, with impacts ranging from anthropogenic and natural sources. Coral bleaching events have not been major threat to Guam's coral reefs as only two have been observed since 1970 (Porter et al. 2005).

Typhoons are frequent on Guam (up to five major typhoons per year: Birkeland 1997b; Eldredge 1983; U.S. Department of Agriculture 1995), which cause some damage to the reefs (Birkeland 1997b; Randall and Eldredge 1977). However, the reefs on Guam tend to experience less physical damage from these storms than is the case in other areas, because corals in exposed locations are "adapted" to these rough conditions and grow in low-profile growth forms

(Birkeland 1997b; Randall & Eldredge 1977). As such, severe typhoon damage to the reefs on Guam tends to be localized in areas that are usually protected from heavy wave action by the shape of the coastline (Birkeland 1997b).

Several outbreaks of the crown-of-thorns starfish have also occurred on Guam over the past few decades (Birkeland 1997b). One outbreak in the 1960s caused severe catastrophic mortality (90 %) of reef slope corals along 38 kilometers of Guam's northwest coast (Chesher 1969; Colgan 1981, 1982; Randall 1971, 1973). However, by 1981, the reefs had started to recover from the starfish invasion and coral cover was high again (65 %; Colgan 1987). Occasional earthquakes and El Niño events have also been known to cause substantial damage to the reefs on Guam (Birkeland 1997b). However, the biggest threat to Guam's reefs appears to be from anthropogenic effects, including overfishing and habitat degradation due to poor land use practices, urbanization, and development (Myers 1997). Sedimentation and overfishing are probably the most serious problems causing coral reef degradation on Guam (Birkeland 1997b; Myers 1997). For example, Birkeland (1997b) reported that the rates of coral replenishment have been substantially reduced on Guam over the past 20 years, possibly as a result of increased sedimentation and the overfishing of herbivores (Birkeland 1997b). As a result of the loss of living cover and the lack of replenishment of these reefs, coral cover on the island has declined substantially over time (Birkeland 1997b). This effect has been most pronounced on the reef slopes, and coral cover is still reasonably high in some places on the reef flat (Birkeland 1997b). Other anthropogenic impacts that may have affected coral reef health on Guam include industrial pollution, nonpoint source pollution, oil spills, sewage, and coastal construction (Myers 1997).

Current opinion is that coral reef health varies around the island of Guam. In general, many of the reefs on the southern part of the island are threatened by good reef access and high runoff of sediments onto the reefs from large rivers (Myers 1997; Porter et al. 2005). One example is the reef between Facpi Point and Umatac on the southwest side of the island, which has been repeatedly buried by sediment since the late 80s (R. Myers, R. Richmond, and S. Amesbury, personal communication, as cited in Green 1997). By contrast, the reefs on the northern part of the island (e.g., Ritidian Point and Pati Point) tend to be in better condition because there are fewer people, less development, less access to the reef, and no rivers (R. Myers, C. Birkeland, S. Amesbury, and R. Sakomoto, personal communication, as cited in Green 1997).

Virtually nothing is known of the coral reef resources on the banks in federal waters in Guam, as they are in remote locations and difficult to access (Myers 1997). The small amount of information that is available is based on anecdotal observations by scientists and fishermen, who have made one or more dives on the banks (e.g., C. Birkeland and E. Poppe Jr.; personal communication, as cited in Green 1997). In general, the coral reefs at Rota, Santa Rosa, and White Tuna Banks are thought to be in good condition, while fishery resources at Galvez Bank are believed to be in lower abundance because it is closer to Guam and more heavily fished (J. Cruz, WPRFMC Guam Coordinator, personal communication, July 2005).

Deep Reef Slope, Banks, and Seamount Habitat

Deep-water banks are located at several locations around the island, four of which are located in federal waters (Rota Bank to the north and Galvez, Santa Rosa, and White Tuna Bank to the south (Donaldson 1995; Hunter 1995; Myers 1997).

Pelagic Habitat

Generally, the major surface current affecting Guam is the North Equatorial Current (see Figure 3–4), which flows westward through the islands. Sea surface temperatures off Guam vary between 80.9° to 84.9° F, depending on the season. The mixed layer extends to depths between 300 and 400 feet (Eldredge 1983).

Protected Species

Sea Turtles

Both hawksbill and green sea turtles are known to nest on Guam, and there have been occasional sightings of leatherback turtles as well. Nesting surveys for green sea turtles have been done on Guam since 1973, with the most consistent data collected since 1990. There have been up to 60 nesting females observed annually, with a generally increasing trend over the past 12 years. Aerial surveys done in 1999–2000 also found an increase in green sea turtle sightings around Guam (Cummings 2002).

Marine Mammals and Seabirds

Cetaceans

Humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), Risso's dolphins (*Grampus griseus*), Cuvier's beaked whales (*Xiphias cavirostris*), pygmy sperm whales (*Kogia breviceps*), pilot whales (*Globicephala melaena*), striped dolphins (*Stenella coeruleoalba*), and the pantropic whitebelly spinner dolphin (*Stenella longirostris longirostris*) have been sighted around Guam.

Pinnipeds and Sirenians

No pinniped species are known to occur in Guam waters.

Seabirds

The following seabirds are believed to be residents of Guam: wedge-tailed shearwater (*Puffinus pacificus*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon lepturus*), masked booby (*sula dactylatra*), and brown booby (*Sula leucogaster*). Other species believed to be visitors to Guam include the following: streaked shearwater (*Calonectris leucomelas*), short-tailed shearwater (*Puffinus tenuirostris*), Christmas shearwater (*Puffinus nativitatis*), Newell's shearwater (*Puffinus auricularis*), Audobon's shearwater (*Puffinus iherminieri*), Leach's storm-petral (*Oceanodroma leucorhoa*), Matsudaira's storm-petral (*Oceanodroma matsudairae*), and the red-footed booby (*Sula sula*).

Fisheries

Under the authority of the MSA, the Council established (and the Secretary of Commerce approved) criteria to determine overfishing (fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region. Currently, no fishery in Guam has been determined by NMFS to be experiencing overfishing or to be overfished.[37] For more information on these fisheries please see the additional NEPA analyses listed in Section 3.4.1.

Demersal Fisheries

Bottomfish

There are two distinct bottomfish fisheries on Guam that can be separated by depth and species composition. The shallow-water complex (less than 500 feet) makes up a larger portion of the total bottomfish effort, and the harvest ususally comprises reef-dwelling snappers, groupers, and jacks of the genera *Lutjanus*, *Lethrinus*, *Aprion*, *Epinephelus*, *Variola*, *Cephalopholis,* and *Caranx*. The deep-water complex (greater than 500 feet) consists primarily of groupers and snappers of the genera *Pristipomoides*, *Etelis*, *Aphareus*, *Epinephelus*, and *Cephalopholis*.

Bottomfishing on Guam is a combination of recreational, subsistence, and small-scale commercial fishing. The majority of the participants in the bottomfish fishery operate vessels less than 25 feet long and primarily target the shallow-water bottomfish complex (WPRFMC 2003b). The shallow-water component is the larger of the two in terms of participation because of the lower expenditure and relative ease of fishing close to shore (Myers 1997). Participants in the shallow-water component seldom sell their catch because they fish mainly for recreational or subsistence purposes (WPRFMC 2003b). The commercially oriented highliner vessels tend to be longer than 25 feet, and their effort is usually concentrated on the deep-water bottomfish complex. Most fishermen troll for pelagic fish to supplement their bottomfishing effort, and most of those who sell their catch also hold jobs outside of the fishery (WPRFMC 2003b).

Participants in small-scale offshore fisheries live throughout the island of Guam and are not concentrated in specific locales. Surveys of fishery participants found that these individuals reside throughout the island (Rubinstein 2001). Because of Guam's small size, the dispersal of fishery participants and extensive community networks for sharing locally caught fish; it is likely that the social benefits of fishing are widely shared by most of the island's long term residents (WPRFMC 2003a).

Charter fishing has been a substantial component of the fishery since 1995, accounting for about 15–20 percent of all bottomfishing trips from 1995 through 2004 (WPRFMC 2005). Charter vessels typically make multiple two-to-four hour trips on a daily basis. The charter fleet includes both vessels that engage in both trolling and bottomfishing trips and larger bottomfishing-only vessels that can accommodate as many as 35 patrons per trip. These larger

[37] Status of U.S. Fisheries, 2005. http://www.nmfs.noaa.gov/docs/Report_text_FINAL3.pdf

vessels consistently fish in the same general area and release most of their catch, primarily small triggerfish, small groupers, and small goatfish. They occasionally keep larger fish and use a portion of the catch to serve as sashimi for their guests.

Smaller vessels (greater than 25 feet) mostly target the shallow-water bottomfish complex and fish for a mix of recreational, subsistence, and small-scale commercial purposes. Some vessels fishing the offshore banks, particularly the few relatively large vessels (greater than 25 feet) that fish primarily for commercial purposes, target the deep-water bottomfish complex. At least one such vessel has been engaged in a venture that exports deep-slope species, particularly onaga, to Japan. It is possible that some vessels fishing on the banks around Guam land their catches in the CNMI. In 1997, a highliner vessel made several bottomfishing trips to a seamount located 117 miles west of Guam (WPRFMC 2003a).

The Agana Boat Basin is centrally located on the western leeward coast and serves as the island's primary launch site for boats fishing areas off the central and northern leeward coasts and the northern banks. The Merizo boat ramp, Seaplane Ramp in Apra Harbor, Umatac boat ramp, and Agat Marina are boat launch sites that provide access to the southern coast, Apra Harbor, Cocos Lagoon, and the southern banks. The Agat Marina, in particular, located between the Agana Boat Basin and the Merizo boat ramp, provides trailered boats from the northern and central areas of the island a closer and more convenient launch site to the southern fishing grounds. At Ylig Bay, a paved parking area and maintenance of the brush along the highway have helped increase the number of boats accessing the east side of the island.

According to Myers (1997), less than 20 percent of the total shallow-water marine resources harvested in Guam are taken outside 3 miles, primarily because the offshore banks are less accessible. Most offshore banks are deep, remote, and subject to strong currents. Anecdotal evidence from local fishermen suggests that most of their catch on these banks are taken by sharks before the fish are brought on board. Generally, Guam's offshore banks are only accessible during calm weather in the summer months (May to August/September). Eleven Mile Bank is the closest; however, Galvez Bank is also accessible and, consequently, fished most often. In contrast, the other banks (White Tuna, Santa Rose, and Rota) are remote and can only be fished during exceptionally good weather conditions (Green 1997). Local fishermen report that up to ten commercial boats, with two to three people per boat, and some recreational boats, use the banks when the weather is good (Green 1997). The banks are fished using two methods: bottomfishing by hook and line and jigging at night for bigeye scad (*Selar crumenophthalmus*) (Myers 1997).

Guam's bottomfish fishery can be highly seasonal, with effort significantly increasing when sea conditions are calm, generally during the summer months. During these periods, bottomfishing activity increases substantially on the offshore banks (in federal waters), as well as on the east side of the island (in territorial waters), a more productive fishing area that is inaccessible to small boats during most of the year because of rough seas. Historical data on Guam bottomfish fishery statistics are provided in Table 3-9.

Table 3-9: Guam Bottomfish Fishery Statistics.

Year	Landings[1] Total (Lbs)	CPUE (Lbs/Hour)	CPI	Adjusted Revenue ($)	Adjusted Price ($/Lb)	Number of Boats
1980			134.0	48,454	5.14	
1981			161.4	65,681	6.20	
1982	37,639	7.1	169.7	44,514	6.41	154
1983	47,119	6.2	175.6	214,911	5.81	106
1984	58,095	7.4	190.9	130,429	5.60	144
1985	88,113	5.7	198.3	148,563	5.30	161
1986	36,774	5.2	203.7	60,412	4.99	118
1987	45,924	5.9	212.7	62,364	4.93	139
1988	62,273	5.0	223.8	75,052	4.71	198
1989	82,756	5.5	248.2	107,472	5.47	223
1990	78,349	4.5	283.5	100,301	5.30	226
1991	69,619	4.8	312.5	57,129	5.07	246
1992	82,682	5.8	344.2	49,660	4.66	236
1993	95,815	4.2	372.9	44,585	4.37	360
1994	103,046	5.5	436.0	135,823	4.47	298
1995	103,344	2.5	459.2	55,004	3.98	402
1996	138,621	4.1	482.0	22,812	3.09	408
1997	100,105	3.6	491.4	36,082	3.40	332
1998	100,736	2.7	488.9	55,031	3.73	354
1999	117,067	3.2	497.9	124,485	4.05	411
2000	138,398	3.7	508.1	85,841	3.92	312
2001	117,177	3.9	501.2	95,539	3.63	337
2002	68,289	3.0	504.5	62,597	3.42	351
2003	92,880	4.7	521.4	39,450	3.36	481
2004	72,844	4.0	563.2	73,466	2.93	347
2005	**61,601**	**4.8**	**563.2**	**69,186**	**3.18**	**233**
Average	83,303	4.7	355.7	79,417	4.50	274
Standard Deviation	28,806	1.3	149.1	43,083	1.00	106

1 Landings by boat-based bottomfishing activity only and includes both deep-water and shallow-water bottomfish.

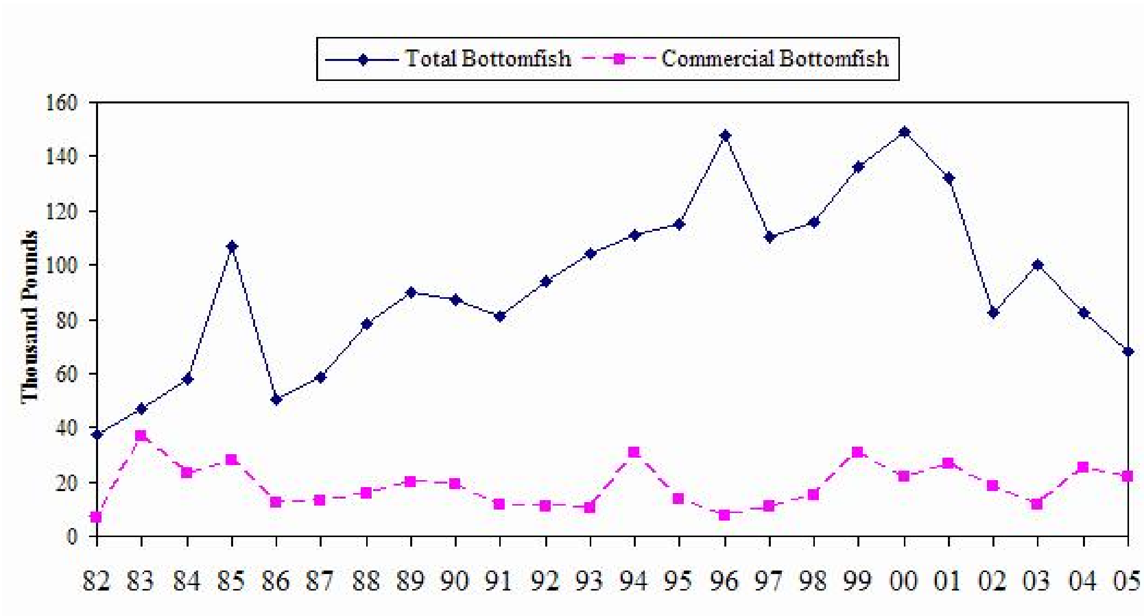

Figure 3-16: Guam Bottomfish Landings.
Source: WPRFMC 2006.

Table 3-10: Expanded Boat-Based Creel Survey Composition Of Bottomfish Management Unit Species (BMUS) for 2005.

Management Unit Species	Harvest (lbs)
BMUS	
Lehi (*A. rutilans)*	2,090
Uku (*A. virescens)*	4,791
Ehu (*E. carbunculus)*	3,488
Onaga (*E. coruscans)*	15,309
Yellowtail Kalekale (*P. auricilla)*	1,069
Opakapaka (*P. filamentosu)*	458
Yelloweye Opakapaka (*P. flavipinnis)*	265
Gindai (*P. zonatus)*	637
Ta'ape (*L. kasmira)*	479
Giant Trevally (*C. ignobilis)*	217
Black Jacks (*C. lugubris)*	482
Amberjack (*S. dumerili)*	288
Blacktip Grouper (*E. fasciatus)*	1,495
Lyretail Grouper (*V. louti)*	2,479
Redgill Emperor (*L. rubrioperculatus)*	2,214
BMUS Total	**35,761**
Non-BMUS Bottomfish	

Other Snappers	1,558
Other Jacks	7,718
Other Groupers	6,778
Other Emperors	8,804
Non-BMUS Bottomfish Total	**24,858**
Non-Specific Bottomfish**	
Misc Bottomfish	0
Shallow Bottomfish	975
Deep Bottomfish	6
Non-Specific Bottomfish Total	**981**
Bottomfish Total	**61,601**

Catch composition of the shallow-bottomfish complex (or coral reef species) is dominated by lethrinids. Other important components of the bottomfish catch include lutjanids, carangids, serranids, and sharks. Holocentrids, mullids, labrids, scombrids, and balistids are minor components. It should be noted that at least two of these species (*Aprion virescens* and *Caranx lugubris*) also go into deeper waters, and some of the catch of these species occurs in the deep-water fishery. It is reported that in 2005, 233 domestic vessels landed 61,601 pounds of bottomfish in Guam with a ex-vessel value of $69,186 (WPRFMC 2005). MSY for Guam's deep-water bottomfish fishery has been estimated at 56,863 lbs (Polovina and Ralston 1986). As seen in Table 11, 31,695 lbs of BMUS were reported caught in 2005, which includes both deep-water and shallow-water bottomfish. Current catches of deep-water BMUS are believed to be below their MSY. The MSY for shallow-water BMUS has not been estimated.

Table 3-11: Guam Bottomfish Fishery Bycatch (2005): Non-charter and Charter.

Species Name	Number Released			Total	Bycatch (%)
	Alive	Dead or Injured	Both		
Non-Charter					
Epinephelus howlandi	2		2	3	66.67
Epinephelus merra	1		1	20	5.00
Non-Charter Bycatch Total	3		3	23	13.04
Comparison with All Species Caught				1,434	0.21
Charter					
Serranidae	3		3	3	100.00
Epinephelus fasciatus	6		6	23	26.09
Mullidae	16		16	16	100.00
Mulloidichthys flavolineatus	8		8	8	100.00
Parupeneus multifasciatus	10		10	11	90.91
Balistidae	4		4	5	80.00
Melichthys vidua	10		10	10	100.00
Odonus niger	5		5	5	100.00
Rhinecanthus rectangulus	1		1	1	100.00

Charter Bycatch Total	63		63	82	76.83
Comparison with All Species Caught				235	26.81
All Bycatch Total	66		66	105	62.85
Comparison with All Species				1,669	3.95

Coral Reef

Guam's coral reef fisheries are culturally and economically important. The gear most often used to harvest coral reef resources include hook and line, cast nets, spears, and surround nets. The most common fish harvested include the following species: kyphosidae (rudderfish), acanthruidae (surgeonfish), lethrinidae (emperors), scaridae (parrotfish), and labridae (wrasses). Invertebrate harvests include octopus, spiny lobster, trochus shells, conch shells, and reef crabs. Total coral reef fish landings for 2002 and 2003 were estimated at 273,799 pounds and 306,626 pounds, respectively (See Table 3-8). No MSY estimates are available for Guam's coral reef ecosystem management unit species.

Table 3-8: Estimated harvest of top 10 families for inshore and offshore fisheries during 2002-2003.

Inshore*				Offshore**			
2002		2003		2002		2003	
Family	Catch (lbs)	Family	Catch (lbs)	Family	Catch (lbs)	Family	Catch (lbs)
Kyphosidae (Rudderfishes)	20,823	Acanthuridae (Surgeonfishes)	27,920	Lethrinidae (Emperors)	29,915	Lethrinidae (Emperors)	25,590
Siganidae (Rabbitfishes)	19,300	Carangidae (Jacks)	21,337	Acanthuridae (Surgeonfish)	20,523	Acanthuridae (Surgeonfish)	18,620
Acanthuridae (Surgeonfish)	17,129	Siganidae (Rabbitfishes)	12,408	Scaridae (Parrotfishes)	16,438	Scaridae (Parrotfishes)	18,141
Carangidae (Jacks)	14,938	Mullidae (Goatfishes)	11,818	Carangidae (Jacks)	12,192	Carangidae (Jacks)	21,117
Lethrinidae (Emperors)	9,856	Scaridae (Parrotfishes)	9,464	Serranidae (Groupers)	6,562	Serranidae (Groupers)	23,621

Mullidae (Goatfishes)	8,679	Lethrinidae (Emperors)	5,174	Lutjanidae (Snappers)	3,319	Lutjanidae (Snappers)	6,791
Lutjanidae (Snappers)	5,966	Diodontidae (Porcupinefish)	3,627	Sphyraenidae (Barracudas)	3,491	Sphyraenidae (Barracudas)	7,345
Serranidae (Groupers)	4,765	Scombridae (Mackerels)	2,875	Labridae (Wrasses)	3,060	Labridae (Wrasses)	5,229
Mugilidae (Mullets)	4,378	Serranidae (Groupers)	2,824	Mullidae (Goatfishes)	5,150	Scombridae (Mackerels)	7,548
Belonidae (Needlefishes)	4,329	Carcharhinidae (Requiem Sharks)	2,767	Siganidae (Rabbitfish)	3,055	Carcharhinidae (Requiem Sharks)	3,590

Sources: Gutierrez 2003; Flores 2003; DAWR unpublished data.
Note: Inshore data excludes seasonal runs of juvenile siganids and bigeye scads.

Crustaceans

Fishing for crustaceans around Guam occurs in inshore territorial waters, usually in a subsistence or recreational context. In 2004, however, two Crustacean FMP permits were registered to vessels to fish in the U.S. EEZ around Guam. The activities of these vessels, including catch levels, composition, or location of harvest (if any), are unknown at this time (A. Katekaru, PIRO, personal communication, July 2005). It is estimated that a total of 2,225 pounds of spiny lobsters with a total ex-vessel value of $7,279 were commercially harvested from waters around Guam in 2003 (NOAA 2004). No MSY value for the Guam lobster fishery has been estimated.

Precious Corals

There is no precious coral fishery currently operating around Guam, nor have there been any reported or observed landings of precious corals harvests from EEZ waters around Guam. No MSY values for precious corals around Guam have been estimated.

Pelagic Fisheries

Guam's pelagic fisheries consist of primarily small, recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish only within local waters, either within EEZ waters around Guam or on some occasions in the adjacent EEZ waters around the Northern Mariana Islands.

Domestic annual pelagic landings in Guam have varied widely, ranging between 322,000 and 937,000 pounds in the 23-year time series. The 2004 total pelagic landings were approximately 691,366 pounds, an increase of 36 percent compared with 2003. Of this total, it is estimated that 285,545 pounds were sold for total ex-vessel revenue of $433,911 (WPRFMC 2005).

Landings consisted primarily of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), bonita or skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor pelagic species caught include rainbow runner (*Elagatis bipinnulatus*), great barracuda (*Sphyraena barracuda*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel *(Grammatorcynus bilineatus*), oilfish (*Ruvettus pretiosus*), and three less common species of barracuda. Sailfish and sharks were also known to be caught during 2004, but these species were not encountered during offshore creel surveys.

There are wide year-to-year fluctuations in the estimated landings of the five major species. The 2004 mahimahi catch increased more than 134 percent from 2003, reaching its highest level since 1998. Wahoo catch totals increased 83 percent from 2003, which was its sixth highest total during the 23-year recording period. Pacific blue marlin landings decreased 28 percent from 2003, and were 24 percent below the 23-year average. Supertyphoon Pongsona's direct hit on Guam in December 2002, and subsequent negative impact on fishing during the first quarter of 2003, probably account for the low numbers of mahimahi caught during 2003. Participation and effort generally increased in 2004, with the number of trolling boats up by 8 percent (WPRFMC 2005).

The number of boats involved in Guam's pelagic or open-ocean fishery gradually increased from 193 in 1983 to 469 in 1998. This number decreased until 2001, but then began increasing, and has been increasing ever since. There were 401 boats active in Guam's domestic pelagic fishery in 2004. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of Guam's pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. These operations were responsible for 22 percent of all domestic pelagic fishing trips from Guam in 2004 (WPRFMC 2005). Figure 3-17 provides the estimated annual total domestic pelagics catch in Guam.

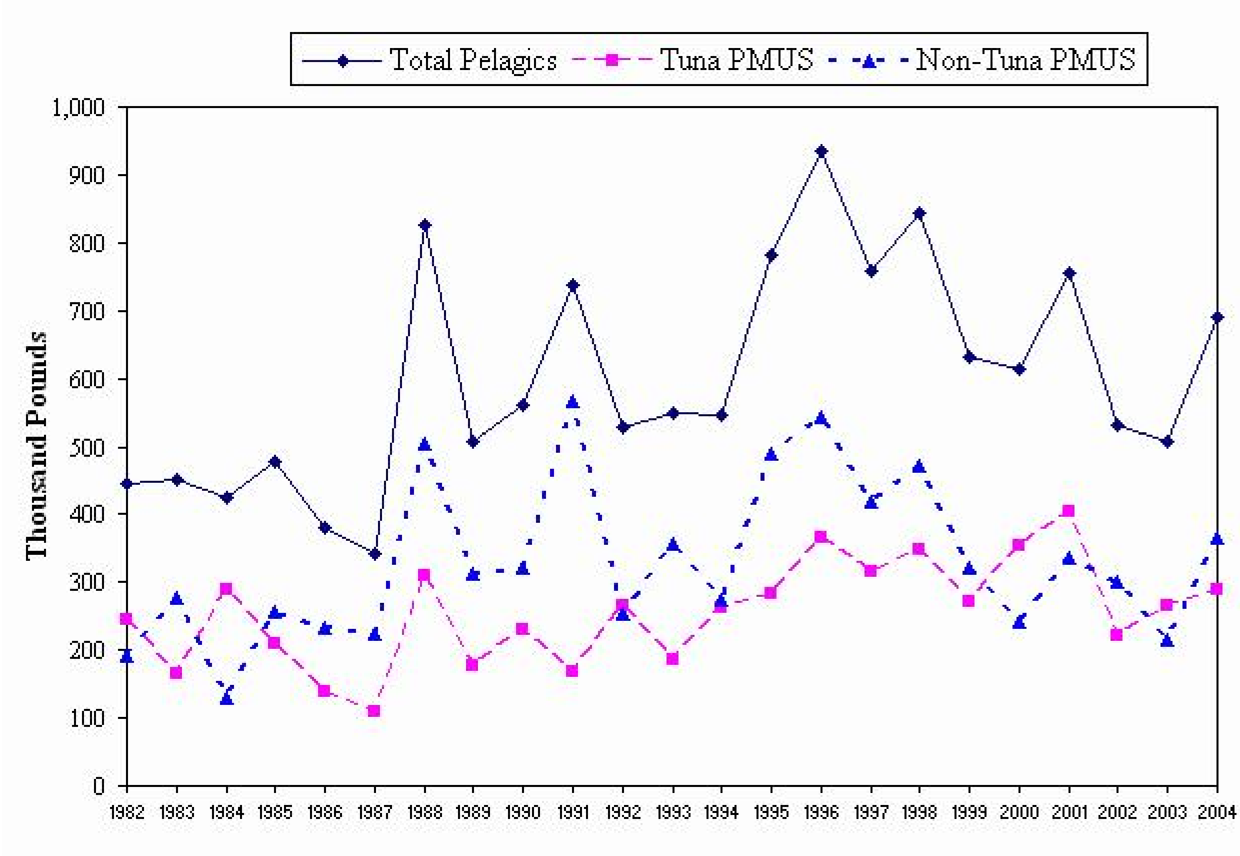

Figure 3-17: Estimated Annual Total Domestic Pelagics Catch in Guam 1982 to 2004.
Source: WPRFMC 2005 Pelagic Annual Report.

Communities

Under the MSA, Guam is designated as a fishing community. However, Guam's history, culture, geography, and relationship with the United States are vastly different from those of a typical fishing community in the continental United States.

Over the centuries of acculturation beginning with the Spanish conquest in the late seventeenth century, many elements of traditional Chamorro culture in Guam were lost. But certain traditional values, attitudes, and customs were retained to become a part of contemporary life. Amesbury et al. (1989, p. 48) noted that the practice of sharing one's fish catch with relatives and friends during Christian holidays is rooted in traditional Chamorro culture:

> A strongly enduring cultural dimension related to offshore fishing is the high value placed on sharing of the catch, and the importance of gifts of fish to relatives and friends.

On the basis of creel surveys of fishermen, only about one quarter to one third of the inshore catch is sold. The remainder enters noncommercial channels (Knudson 1987). Reef and bottomfish continue to be important for social obligations, such as fiestas and food exchange with friends and families. One study found a preference for inshore fish species in noncommercial exchanges of food (Amesbury and Hunter-Anderson 1989).

The social obligation to share one's fish catch extends to part-time and full-time commercial fishermen. Such gifts are often reef fish or shallow-water bottomfish (Amesbury and Hunter-Anderson 1989). Even when fish are purchased informally by friends, neighbors, or relatives of the fisherman, the personal marketing tends to restrain the price asked (WPRFMC 2003).

Domestic fishing on Guam supplements family subsistence, which is gained by a combination of small-scale gardening, ranching, and wage work (Amesbury and Hunter-Anderson 1989). The availability of economic activities such as part-time fishing is among the major reasons that Guam has not experienced more social problems during times of economic hardship and increasing unemployment. The subsistence component of the local economy has gained significance in recent years with the downturn in Guam's major industries and increasing unemployment.

Fishing in Guam continues to be important not only in terms of contributing to the subsistence needs of the Chamorro people but also in terms of preserving their history and identity. Fishing assists in perpetuating traditional knowledge of marine resources and maritime heritage of the Chamorro culture.

The island of Guam was ceded to the United States following the Spanish American War of 1898 and has been an unincorporated territory since 1949. Guam's population is approximately 155,000 people.[38] The main income sources on Guam include tourism, national defense, and trade and services. Per capita income in Guam was $12,722 in 2000, up from $10,152 in 1991.[39] Median household income was $38,769 in 2000, up from $31,118 in 1991. Twenty-three percent of the population in 2000 was at or below poverty level.[40]

The Guam Department of Labor estimated the number of employees on payroll to be 64,230 in 1998, a decrease of 3.8 percent from the 1997 figure. Of the 64,230 employees, 44,780 were in the private sector and 19,450 were in the public sector. The federal government employs 7.6 percent of the total work force, while the government of Guam employs 22.7 percent. Guam had an unemployment rate of 7 percent in 2000, with 39,143 men age 16 and over in the labor force and 29,751 women age 16 and over in the labor force.[41]

The major economic factor in Guam for most of the latter part of the twentieth century was the large-scale presence of the U.S. military (Bank of Hawaii 1999b). In the 1990s, however, the military's contribution to Guam's economy has waned and been largely replaced by Asian tourism. Guam's macroeconomic situation exhibited considerable growth between 1988 and 1993 as a result of rapid expansion of the tourist industry. In fact, Guam's economy has become so dependent on tourists from Asia, particularly Japan, that any significant economic, financial,

[38] http://www.census.gov/Press-Release/www/2002/guamstatelevel.pdf
[39] Ibid.
[40] Ibid.
[41] Ibid.

and foreign exchange development in the region have had an immediate impact on the territory (Bank of Hawaii 1999b). During the mid- to late 1990s, as Japan experienced a period of economic stagnation and cautious consumer spending, the impact was felt just as much in Guam as in Japan. Visitor arrivals in Guam dropped 17.7 percent in 1998. Despite recent efforts to expand the tourist market, Guam's economy remains dependent on Japanese tourists.

The government of Guam has been a major employer on Guam for many years. However, recent deficits have resulted from a steady rise in government spending at the same time that tax bases have not kept up with spending demands. Many senior government workers have been offered, and have accepted, early retirement to reduce the payroll burden.

In the 1990s, after three decades of troop reductions, the military presence on the island diminished to the lowest level in decades. But with the post–9/11 emphasis on homeland security, the war in Iraq, and repositioning of military assets from Asia and the mainland United States, military spending on Guam has rebounded significantly, and the effects have been felt throughout the economy, including in employment and housing prices (Los Angeles Times, July 25, 2004).

The importance of commercial fishing in Guam lies mainly in the territory's status as a major regional fish transshipment center and resupply base for domestic and foreign tuna fishing fleets. Among Guam's advantages as a home port are well-developed and highly efficient port facilities in Apra Harbor, an availability of relatively low-cost vessel fuel, a well-established marine supply/repair industry, and recreational amenities for crew shore leave (Hamnett and Pintz 1996). In addition, the territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. Initially, the majority of vessels calling in Apra Harbor to discharge frozen tuna for transshipment were Japanese purse seine boats and carrier vessels. Later, a fleet of U.S. purse seine vessels relocated to Guam, and since the late 1980s, Guam has become an important port for Japanese and Taiwanese longline fleets. The presence of the longline and purse seine vessels has created a demand for a range of provisioning, vessel maintenance, and gear repair services.

By the early 1990s, an air transshipment operation was also established on Guam. Fresh tuna is flown into Guam from the Federated States of Micronesia and elsewhere on air cargo planes and out of Guam to the Japanese market on wide-body passenger planes (Hamnett and Pintz, 1996). A second air transshipment operation that began in the mid-1990s is transporting to Europe fish that do not meet Japanese sashimi market standards.

Guam is an important resupply and transshipment center for the international tuna longline fleet in the Pacific. However, the future of home port and transshipment operations in Guam depends on the island's ability to compete with neighboring countries that are seeking to attract the highly mobile longline fleet to their own ports. Trends in the number of port calls made in Guam by various fishing fleets reflect the volatility of the industry. The number of vessels operating out of Guam decreased by almost half from 1996 to 1997, and further declined in 1998 (Hamnett and Anderson 2000).

The Guam Department of Commerce reported that fleet expenditures in Guam in 1998 were about $68 million. A 1994 study estimated that the home port and transshipment industry employed about 130 people (Hamnett and Pintz 1996). This industry constitutes a small percentage of the gross island product, which was about $2.99 billion in 1996, and is of minor economic importance in comparison to the tourist or defense industries (Hamnett and Anderson 2000). Nevertheless, home port and transshipment operations make an important contribution to the diversification of Guam's economy (Hamnett and Pintz 1996). As a result of fluctuations in the tourism industry and cuts in military expenditures in Guam, the importance of economic diversification has increased.

3.5.4 Hawaii

In the central North Pacific Ocean, roughly 2,500 miles southwest of North America, lies the Hawaiian Archipelago. This 137-island chain stretches nearly 1,500 miles from Kure Atoll in the NWHI to the island of Hawaii at the southern tip of the inhabited MHI. The total land area of the Hawaiian Islands is 6,423 square miles. The NWHI make up roughly 1,000 miles of the 1,500-mile archipelago, and are composed of volcanic islands, atolls, shoals, and submerged banks.

The NWHI are unique as they make up the northernmost coral reef ecosystem (Kure Atoll) on the planet. The water temperatures experienced there are assumed to be the lower limit for corals to thrive and reefs to grow (approximately 65° F). Grigg (1982) suggested that Kure Atoll lies at the "Darwin Point" for reef development, a geographical limit beyond which corals and coralline algae can no longer deposit enough calcium carbonate to keep up with the subsidence of the area's volcanic base. It is theorized that reefs at latitudes higher than the Darwin Point fail to remain at sea level and sink below the photic zone within which growth can occur (Grigg 1982).

The Hawaii Archipelago is subject to high wave energy produced from weather systems generated off the Aleutian Islands and other areas of the North Pacific. Such waves can have major effects on the nearshore environment. For example, high wave energies can break off pieces of coral, move underwater boulders, shift large volumes of sand, and erode islands (Grigg 1976).

Because of its position in the North Pacific, Hawaii (more specifically the NWHI) also acts as a sink for a multitude of marine debris originating from Pacific-rim countries. Perhaps the most damaging is derelict fishing gear such as nets and rope that are believed to be carried by ocean currents from North Pacific trawl fisheries. Other types of debris include materials made from rubber and plastics (e.g., lighters). Marine debris impacts the nearshore environment of the NWHI by choking and breaking coral reefs, entangling marine life, and carrying invasive species. Since 1996, NMFS has led a multiagency cleanup effort that has removed nearly 450 metric tons of derelict fishing nets and other debris from the NWHI (J. Asher, PIFSC, personal communication, July 2005). In recent years, the effort has removed more than 100 tons of marine debris per year. The total amount of marine debris accumulating each year in NWHI is difficult to quantify, but estimated to be 50 tons or more (S. Balwani, PIFSC, personal communication, July 2005).

Marine Environment

Coral Reefs

The total potential coral reef area in Hawaii (MHI and NWHI) is estimated to be 2,826 square kilometers within the 10-fathom curve, and 20,437 square kilometers within the 100-fathom curve, approximately 8 percent and 14 percent, respectively, of all U.S. coral reef ecosystems (Rohmann et al. 2005). The MHI represent the younger portion of the Hawaiian Archipelago, and have less well-developed fringing reefs that have not subsided as far below sea level as those in the NWHI (Smith 1993). The potential coral reef area surrounding the MHI is estimated at 1,231 square kilometers within the 10-fathom contour (Rohmann et al. 2005).

Grigg (1997) summarized the condition of the reefs on each island and concluded that 90 percent of Hawaii's reefs are healthy. However, there are increasing problems with excessive levels of fishing and environmental degradation associated with a growing human population, urbanization, and development (Friedlander 1996; Grigg 1997; J. Maragos, USFWS, personal communication, as cited in Green 1997). Focal points for coral reef degradation in Hawaii include reefs adjacent to urban areas, coastal recreational developments (e.g., hotels, golf courses), and ocean outfalls (Jokiel and Cox 1996, in Friedlander 1996; J. Maragos personal communication, as cited in Green 1997).

A combination of natural and anthropogenic factors, including wave energy, depth, sedimentation, turbidity, light, nutrient concentration, and other biological factors, control coral reef community structure in Hawaii (Grigg 1997). Most coastline areas in the state are exposed to the open ocean, and the reefs in these areas are frequently disturbed by wave-induced mortality (Grigg 1997). As such, the only significant buildup of reefs in the MHI is found in areas that are reasonably sheltered from open ocean swells and at depths that are not constrained by sea level (Grigg 1997). Such areas are typically restricted to embayments and areas sheltered from wave exposure by nearby islands (Grigg 1997). Examples include the Kona Coast of Hawaii, the south coast of west Maui, the north coast of Lanai and Kauai, Kaneohe Bay, Hanauma Bay, and Barber's Point on Oahu (Des Rochers 1992; J. Maragos, personal communication, as cited in Green 1997). In most places, the modern Holocene reefs consist of only a thin veneer on top of the older Pleistocene reefs, which suggests that no accretion of living corals is taking place (Grigg 1997). Slow coral growth, low rates of recruitment, and sedimentation have also been proposed as factors that have contributed to the slow rate of coral reef formation in Hawaii (Friedlander 1996).

In general, impacts related to anthropogenic factors, such as point and nonpoint pollution, tend to be of most significant in wave-sheltered environments or in areas with high residence time such as embayments and lagoons (Freidlander et al. 2005; Grigg 1997). In cases in which the ecology of reefs is under primary or dominant control by wave's forces, the potential effects of pollution may be less pronounced, except with respect to aesthetic values or water quality and human health (Grigg 1997). Friedlander (1996) and Grigg (1997) both noted that excessive fishing is a serious problem throughout the MHI. Grigg (1997) also found that each of the MHI is characterized by other specific and localized threats to coral reef health.

Oahu

Oahu, being the population center of Hawaii, ranks highest among the MHI in terms of coral reef resource problems and the need for better long-term management Most of the open coastline of Oahu is fringed by coral reefs with low natural coral cover due to wave action. The best reef development is found in embayments or shelter areas, such as Kaneohe Bay or Hanauma Bay. Reef communities are generally healthy except for local areas where shoreline use is high or in some embayments where water circulation is restricted . Point and nonpoint source pollution has degraded many of these environments, and overexploitation of coral reef fishes has reduced fish abundance. Notwithstanding these problems, Grigg reported that many improvements in coastal environments have occurred on Oahu in recent years. All shallow, nearshore sewage discharges have been replaced by deepwater outfalls, and better land management practices and the curtailment of dredging and filling activities have greatly reduced sedimentation problems to coral reef island wide (Grigg 1997).

Maui

Most coral reefs on Maui are also under primary control of wave forces. Healthy reefs can be found off Honokowai on the western end and the stretch of coastline between Olowalu and Papawai off the south coast of West Maui. Both of these areas were sheltered from the effects of Hurricane Iniki in 1992, and coral cover ranges from 50 to 80 percent (depth: 10 to 20 m). Other pristine reefs also exist at 30 to 40 meters in Auau Channel where they are totally sheltered from wave stress. Exposed areas, some with reefs containing more than 50 percent coral cover, were devastated by Hurricane Iniki, which resulted in mortality of up to 100 percent (E. Brown, UH, personal communication, as cited in Grigg 1997).

The two most significant environmental problems affecting coral reefs on Maui are excessive fishing and increases in various species of invasive algae, which may be related to nutrient loading, periodic natural upwelling, the low abundance of urchins, or high fishing pressure on herbivorous fishes (Grigg 1997).

Lanai

Virtually all of the reefs near Lanai are in a healthy condition, although those near the northern half experience episodic mortally as the result of sediment runoff (Grigg 1997; J. Maragos, personal communication as cited in Green 1997). None of Lanai's reefs seem to experience pollution, and most experience fishing pressure (Grigg 1997).

Molokai

The south coast of Molokai supports the longest fringing reef in Hawaii (approximately 35 miles long; J. Maragos, USFWS, personal communicationas cited in Green 1997). The condition of this reef varies from poor to excellent; with much of the reef degradation associated with sedimentation due to poor land use practices (J. Maragos, USFWS, personal communication, as cited in Green 1997). The reefs of Molokai have been subjected to widespread and high fishing levels as well as sedimentation although other anthropogenic effects on these reefs appear to be minimal (Grigg 1997). There was an outbreak of the starfish *Acanthaster planci* off the southeast coast in 1972, and an attempt was made to eradicate the outbreak (Branham et al. 1972, in Grigg 1997). However, it appears that the starfish returned to its normal abundance level naturally over a period of several years (Grigg 1997).

Kahoolawe

Kahoolawe was used as a military target for live firing and bombing for years, which resulted in high rates of sedimentation onto the reefs). The reefs are now in a state of recovery since the bombing ceased in 1994. Interestingly, little ordinance can be found on any reefs around Kahoolawe today, suggesting rapid overgrowth by coral and/or high accuracy of the military target practice (Grigg 1997).

Hawaii

The island of Hawaii (known locally as the Big Island) is still geologically active. The reefs on this island are dramatically different on the windward and leeward coasts Reefs on the windward side (except in Hilo Bay) are controlled by wave stress, and are characterized by early successional reef stages (i.e., scattered coral colonies or thin veneers on basalt foundations; Grigg 1997; J. Maragos, USFWS, personal communication as cited in Green 1997). In contrast, rich coral reef communities exist along the sheltered leeward side of the island (Grigg 1997; J. Maragos, personal communication as cited in Green 1997). However, Grigg noted that the reefs along the leeward shore are subject to severe storms with a periodicity of approximately 40 years, which may explain why fringing reefs are not well developed in this area. Human impacts have also had some effect on the reefs of this island. Reefs on the Hamakua Coast have been degraded by sugarcane waste waters in the past, while excessive fishing, aquarium fish collecting, and ground water intrusion have caused serious human impacts on the reefs on the leeward coast (Grigg 1997).

Kauai

Kauai is the oldest and wettest island in the MHI, and Grigg) suggested that sedimentation may be responsible for the lack of well-developed fringing reefs around most of the island. Grigg noted that the reefs that are most heavily impacted by sediments are those that are in shallow or enclosed areas that have restricted circulation. In contrast, the healthiest reefs were found on the exposed northeast and north coasts where the sediment is washed away by waves and currents (Grigg 1997; J. Maragos, USFWS, personal communication as cited in Green 1997). Grigg also noted that some of the best reefs on the island exist in deep water (15 to 25-m deep) in areas with the least exposure to sediment-laden streams (e.g., reefs of Poipu and Makahuena). However, these reefs have been impacted by hurricanes in recent years (Ewa in 1982 and Iniki in 1992; Grigg 1997). In addition to the recent reefs, fossil limestone reefs are present off the southern shore off Kauai (30 to 70-m deep), where abundant populations of the black coral Antipathes dichotoma can be found. In addition to sedimentation, human impacts that are perceived to be a problem on the reefs of Kauai include high fishing pressure and poor water quality (Grigg 1997).

Niihau

Little is known about the reefs on the small, privately owned island of Niihau. However, they are believed to be in good condition, especially along the western coast (J. Maragos, USFWS, personal communication as cited in Green 1997).

Penguin Bank

The reef habitat in federal waters in the MHI is restricted to Penguin Bank and Kaula Rock (Hunter 1995). Very little is known of the condition of the reefs in these locations, although they are presumed to be in good condition because of their remoteness to human population areas. On the basis of interpretations of navigational charts, Hunter (1995) suggested that Penguin Bank supports areas of coral or coralline algae at a depth of approximately 50 meters. In deeper waters (50 to 100 m), the reef on Penguin Bank is dominated by coralline algae, Halimeda, bryozoans, and pen shells; corals are present in low abundances (Agegian and Abbott 1985, in Hunter 1995).

NWHI

The NWHI comprise a multitude of reef areas (Hunter 1995; Maragos and Gulko 2002), including the following: numerous islands or reefs (French Frigate Shoals, Kure, Laysan, Lisianski, Maro Reef, Midway Atoll, Necker Island, Nihoa Island, Pearl and Hermes Atoll, and Gardner Pinnacles); two seamounts (Ladd and Nero); several banks (Brooks, Northhampton, Pioneer, Raita, Saint Rogatien, and Salmon); and eight shoals (Gambia Shoal and seven unnamed shoals, including three between Nihoa and Necker and one north of St. Rogatien). In general, these coral reefs are in excellent condition with unique biodiversity and high standing stock of many reef fishes, probably because of their isolation, protected status, and harsh seasonal weather conditions (Friedlander 1996). The pristine condition of this resource is likely to continue because they are distant from land-based sources of pollution and are protected from any large-scale human activities in the region (Friedlander 1996; Maragos and Gulko 2002).

The potential coral reef area surrounding the NWHI is estimated at 1,595 square kilometers within the 10-fathom contour (Rohmann et al. 2005).

Many reefs in the NWHI are made up of calcareous algae (Green 1997). A peak in coral species diversity occurs in the middle of the Hawaiian Archipelago at French Frigate Shoals and Maro Reef (Grigg 1983). In general, fish species diversity appears to be lower in the NWHI than in the MHI. Although the inshore fish assemblages of the two regions are similar, fish size, density, and biomass are higher in the NWHI and fish communities in the NWHI are dominated by apex predators (sharks and jacks), whereas those in the MHI are not (Friedlander and DeMartini 2002). Some fish species that are common in parts of the NWHI are rare in the MHI (Green 1997). In 2006, President Bush established the NWHI Marine National Monument and instructed the Secretaries of Commerce and Interior to co-manage the marine resources within monument boundaries (71 FR 36447; June 26, 2006). For more information on the monument see http://www.hawaiireef.noaa.gov/.

Deep Reef Slope, Banks, and Seamount Habitat

Within the Hawaii Archipelago, there are numerous banks and seamounts, with more located in the NWHI than in the MHI. In the MHI, the largest bank is Penguin Bank, which is located southeast of Oahu.

Pelagic Habitat

The archipelago's position in the Pacific Ocean lies within the clockwise rotating North Pacific Subtropical Gyre, extending from the northern portion of the North Equatorial Current into the region south of the Subtropical High, where the water moves eastward in the North Pacific Current. At the pass between the MHI and the NWHI, there is often a westward flow from the region of Kauai along the lee side of the lower NWHI. This flow, the North Hawaiian Ridge Current (NHRC), is extremely variable and can also be absent at times. The analysis of 10 years of shipboard acoustic Doppler current profiler data collected by the NOAA research vessel *Townsend Cromwell* shows mean flow through the ridge between Oahu and Nihoa, extending to a depth of 200 meters (Firing and Brainard, in press).

Imbedded in the mean east-to-west flow is an abundance of mesoscale eddies created from a mixture of wind, current, and seafloor interactions. The eddies, which can rotate either clockwise or counterclockwise, have important biological impacts. For example, eddies create vertical fluxes, with regions of divergence (upwelling), where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling), where the thermocline deepens. Sea surface temperatures around the Hawaiian Archipelago experience seasonal variability, but generally vary between 18° to 28° C (64° to 82° F), with the colder waters occurring more often in the NWHI.

Significant sources of inter-annual physical and biological variation around Hawaii are El Niño and La Niña events. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll.

Physical and biological oceanographic changes have also been observed on decadal time scales. These low-frequency changes, termed *regime shifts*, can impact the entire ocean ecosystem. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts (Polovina 1996; Polovina et al. 1995). In the late 1980s, an ecosystem shift from high carrying capacity to low carrying capacity occurred in the NWHI. The shift was associated with the weakening of the Aleutian Low Pressure System (North Pacific) and the Subtropical Counter Current. The ecosystem effects of this shift were observed in lower nutrient and productivity levels and decreased abundance of numerous species in the NWHI, including the spiny lobster, the Hawaiian monk seal, various reef fish, the red-footed booby, and the red-tailed tropic bird (Demartini et al., 2002; Polovina and Haight, 1999).

Protected Species

Sea Turtles

Green and hawksbill turtles are known to occur in nearshore waters around Hawaii, and loggerhead, leatherback, and olive ridley turtles have been incidentally caught by Hawaii-based pelagic longline vessels (NMFS 2005a).

Leatherback Sea Turtles

Leatherback turtles are not known to nest in the Hawaiian Islands; however, anecdotal reports indicate that they have been sighted within EEZ waters (NMFS 2001).

Loggerhead Sea Turtles

Loggerhead turtles occur around the Hawaiian Islands and there have been loggerheads migrations tracked that include transits through the Hawaiian Archipelago (Wallace et al. 1999).

Green Sea Turtles

The Hawaii population of green sea turtles is the only Pacific population known to be increasing, with both the foraging population and nesting populations showing 30-year increasing trends (Balazs and Chaloupka 2004).

Hawksbill Sea Turtles

Hawksbill turtle are known to reside and nest in the MHI, primarily on several small beaches on the islands of Hawaii (Balazs et al. 1992; Katahira et al. 1994). Although the local population has increased, there are still only a few dozen nesters each year (Balazs 2002).

Olive Ridley Sea Turtles

There have been two reports of single nests in Hawaii. The first was in 1985 on Maui, but the eggs did not hatch (Balazs and Hau 1986); the second was in 2002 on the island of Hawaii.

Marine Mammals and Seabirds

Humpback Whales

Humpback whales occur off all eight Main Hawaiian Islands during the winter breeding season, but particularly within the shallow waters of the four-island region (Kahoolawe, Molokai, Lanai, and Maui including Penguin Bank); the northwestern coast of the island of Hawaii; and the waters around Niihau, Kauai, and Oahu.

Hawaiian Monk Seals

Monk seals are found at six main reproductive sites in the NWHI: Kure Atoll, Midway Island, Pearl and Hermes Reef, Lisianski Island, Laysan Island, and French Frigate Shoals. Smaller populations occur on Necker Island and Nihoa Island, and NMFS researchers have also observed monk seals at Gardner Pinnacles and Maro Reef. The 2004 U.S. Pacific Marine Mammal Stock Assessment estimates that there are 1,304 monk seals in the Hawaiian Islands with at least 52 of those occurring in the MHI (Carretta el al. 2005).

Other Marine Mammals

Sperm whales, rough-toothed dolphins, Risso’s dolphins, bottlenose dolphins, pantropical spotted dolphins, spinner dolphins, striped dolphins, pygmy killer whales, false killer whales, melon-headed whales, short-finned pilot whales, Bryde’s whales, Blainsville’s beaked whales, and pygmy sperm whales are known to occur around Hawaii.

Seabirds

Seabirds known to occur around Hawaii include short-tailed, black-footed, and Laysan albatrosses; Christmas, Newell's, flesh-footed, wedge-tailed, and sooty shearwaters; and masked, brown, and red-footed boobies.

Fisheries

Under the authority of the MSA, the Council established (and the Secretary of Commerce approved) criteria to determine overfishing (i.e., fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region. Since 2000, the NWHI lobster fishery has been closed because of uncertainty in lobster stock assessments. On December 15, 2004, the Council was notified by letter that the Secretary of Commerce had determined on June 14, 2004, that overfishing of bigeye tuna (*Thunnus obesus*) was occurring throughout the Pacific Ocean (69 FR 78397). On May 25, 2005, it was determined that the Hawaii Archipelago multispecies botttomfish complex was subject to overfishing as defined in the MSA, with the MHI the area where the overfishing problem primarily occurs (70 FR 34452, June 14, 2005). On March 16, 2006, the Council was notified by letter that the Secretary of Commerce had determined that overfishing is occurring on the yellowfin tuna (*Thunnus albacares*) stock in the western and central Pacific Ocean (71 FR 14837). As required under the MSA, the Council has made management recommendations to address these overfishing determinations. NMFS is now processing these recommendations and accompanying NEPA analyses.

Demersal Fisheries

Coral Reefs

In recent decades, there has been a notable decline in nearshore fishery resources in the MHI (Shomura 1987). Excessive fishing is considered to be one of the major causes of this decline (Grigg 1997; Harman and Katekaru 1988), coastal construction, sedimentation, and other effects of urbanization have also caused extensive damage to coral reefs and benthic habitat near the populated islands.

The majority of the total commercial catch of inshore fishes, invertebrates, and seaweed comes from nearshore reef areas around the MHI. Nearshore reefs in the MHI are the focus for commercial reef ornamentals harvesting and black coral collecting (Friedlander 1996).

Although precise fishing locations are not reported, fishing gear types that mainly target inshore and coastal pelagic species accounted for about 10 percent (1.5 million lbs) of total annual commercial fish catches from 1990 to 1995. Recreational and subsistence catches are not reported in Hawaii, but creel surveys at Kaneohe, Hanalei, and Hilo Bays suggest that these catches are at least equivalent to the reported commercial catch and may be two or three times greater (Friedlander 1996).

Commercial catches of coral reef fish include surgeonfishes (20 %), goatfishes (13 percent), squirrelfishes (11 percent), unicornfishes (8 %), and parrotfishes (8 %; DeMello 2004). Crabs, octopus, seaweed, limpets, and other types of coral reef associated species are also harvested regularly. No MSY values have been estimated for Hawaii's coral reef fisheries.

There is a long history of coral reef fishing in the NWHI. Iverson et al. (1990) found extensive evidence of fishing by the ancient Hawaiians as far north as Necker Island. Starting in the 1920s, a handful of commercial boats ventured into the NWHI to fish for shallow and deep-water bottomfish, spiny lobsters, and other reef and inshore species. Black-lipped pearl oysters at Pearl and Hermes Reef in the NWHI were overfished in the late 1920s, and although there seems to be some pearl oyster recruitment occurring, the population has not recovered to preexploitation levels (Keenan et al., in press). From the late 1940s to the late 1950s, there was a large commercial fishery for akule and reef fish (e.g., ulua) around French Frigate Shoals and Nihoa Island.

During the 1960s, and as recently as 1978, Asian fleets harvested tuna, billfish, precious corals, and groundfish in and around the NWHI using longliners, pole-and-line vessels, draggers, and trawlers. Foreign fishing in now prohibited throughout the archipelago. Currently, there are no active coral reef fisheries in the NWHI.

Crustaceans

Ula (lobster) was a traditional source of food for Native Hawaiians and was sometimes used in early religious ceremonies (Titcomb 1978). After the arrival of Europeans in Hawaii, the lobster fishery became by far the most productive of Hawaii's commercial shellfish fisheries. It was reported that the MHI commercial lobster catch in 1901 was 131,200 pounds (Cobb 1902). By the early 1950s, the commercial catch of spine lobsters (*P. penicillatus*) around the MHI had dropped by 75 percent to 85 percent (Shomura 1987).

In the late 1970s, NMFS, the U.S. Fish and Wildlife Service, Hawaii's DAR, and the University of Hawaii's Sea Grant Program joined in a cooperative agreement to conduct a 5-year assessment of the biotic resources of the NWHI. The survey reported that Necker Island and Maro Reef had sufficiently large stocks of lobsters to support some commercial exploitation (Uchida and Tagami 1984).

Shortly after, several commercial vessels began lobster-trapping operations. A period of low catches was followed by a rapid increase in landings as more vessels entered the fishery and markets were developed (Polovina 1993). In the mid-1980s, the NWHI lobster fishery was Hawaii's most lucrative fishery (Pooley 1993b).

Trapping activity fell in 1987 principally because of the exit of several large vessels from the fishery (Samples and Sproul 1988), but landings reached a record high in 1988 when wind and sea conditions allowed for an extended period of fishing in the upper bank areas where spiny lobsters tend to congregate (Clarke 1989).

In 1990, however, lobster catch rates fell dramatically, although overfishing is not thought to be responsible for the decline (Polovina and Mitchum 1992). Rather, the decrease was found to be most likely due to a climate-induced change in oceanic productivity (Polovina et al. 1994). Nevertheless, the 1990 season showed that there was excessive fishing capacity in the industry given the reduced population size (Polovina and Haight 1999). Responding to this concern, the Council established a limited access program and a fleet-wide seasonal harvest guideline (or quota) in 1991 that significantly altered fishing operations (Kawamoto and Pooley 2000).

From 1992 through 1997, Necker Island accounted for 48 percent to 64 percent of the total NWHI lobster fishery effort, and Gardner Pinnacles and Maro Reef accounted for most of the rest (WPRFMC 1999). In 1998, separate harvest guidelines were calculated for each of four fishing areas (Necker Island Lobster Grounds, Gardner Pinnacles Lobster Grounds, Maro Reef Lobster Grounds, and general NWHI lobster grounds) to prevent localized depletion.

By 1999, all participants in the NWHI lobster fishery used plastic dome-shaped, single-chambered traps with two entrance funnels located on opposite sides. By regulation, all traps have escape vents to allow unwanted organisms to exit. The traps are typically fished in strings of several hundred that are set before sunset in depths from 20 to 70 meters, and are retrieved the next day. Both spiny and slipper lobsters may be caught in the same trap, but fishermen can affect the proportion of each species by selecting the trapping area and depth (Polovina 1993). Almost all lobsters harvested from the NWHI were sold as a frozen tails; however, from 1996 to 1998, the fleet also landed a significant quantity of live lobsters.

Between 1985 and 1991, total landings showed varying trends. Beginning in 1992, landings were capped by the harvest guidelines (see Figure 3-18).

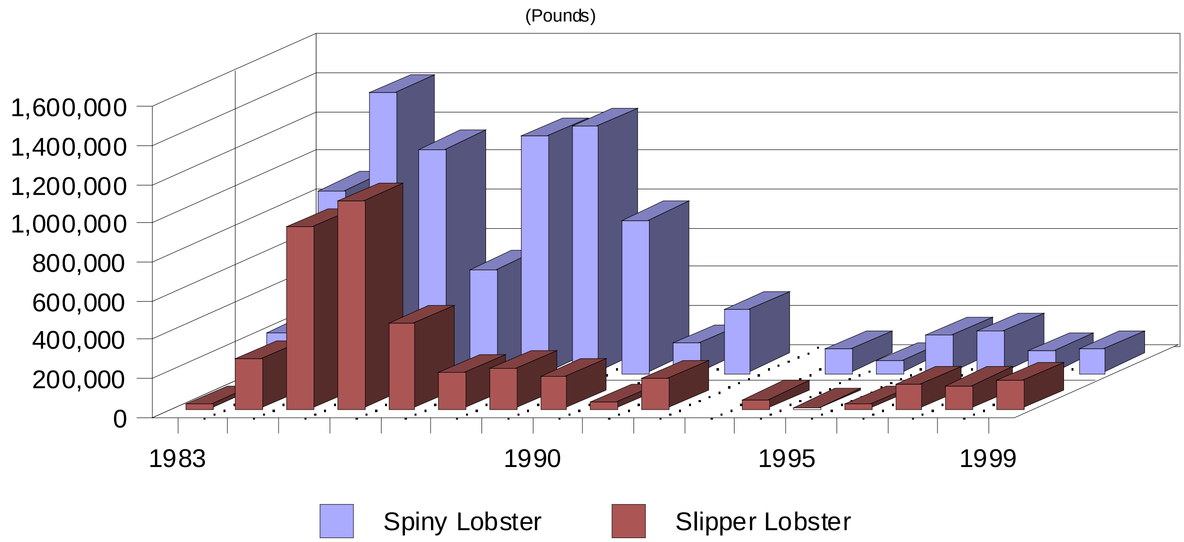

Figure 3-18: NWHI Lobster Fishery Landings 1983 to 1999.
Source: PIFSC 2003 unpublished data.

Nontargeted species account for a small percentage of the total catch in the NWHI lobster fishery, as the traps are designed for high selectivity. Using data from 1976 to 1991 (wire traps) and 1986 to 2003 (plastic traps) from research cruises in the NWHI, Moffit et al. (2005) examined the diversity of catch composition. The traps used for the research were more conservative than commercial traps as they did not have escape vents, but otherwise they conformed to fishery regulations. Both wire and plastic traps were found to be highly selective; that is, they primarily caught lobsters. Wire traps caught a total of 82 species over the study period, of which the two target species of lobsters accounted for 90.5 percent by number. Plastic traps caught a total of 258 species over the study period, of which 73.1 percent by number were the lobster species. Because lobsters are one of the larger organisms captured, they would be a much higher percentage of the total catch if measured by weight. Of the organisms that were caught incidentally, hermit crabs made up the largest component, which was followed by moray eels and small reef fish.

Octopus abundance was also evaluated because of its potential as a prey species for the Hawaiian monk seal. Eighty-three individuals were captured during the entire 1986–2003 study period, and examination of the data showed no significant decline or increase in their capture rate over time. Based on the data, the study found that it is highly unlikely that lobster-trapping activities have lowered octopus abundance to such a degree that monk seal populations would be negatively impacted (Moffit et al. 2005).

Overall, Moffit et al. (2005) concluded that lobster-trapping activities are responsible for changes in abundance of a few species (target species have declined, and some crab species have increased because of competitive replacement) of the benthic community in the NWHI, but do not appear to have resulted in major changes to the ecosystem. Moffit et al. (2005) also observed that gear lost in this fishery has not been found to be "ghost fishing" (still catching organisms), and although direct damage to the benthic habitat by the traps has not been studied, it is not likely to be substantial because of the low-relief, hard substrate that characterizes the fishing grounds.

Since 1999, NMFS has not issued harvest guidelines for the NWHI lobster fishery because of uncertainties in accurate lobster stock assessments. In 2006, President Bush essentially closed the fishery permanently in his proclamation establishing the NWHI Marine National Monument by instructing the Secretaries (Interior and Commerce) to ensure that any commercial lobster fishing permit shall be subject to a zero annual harvest limit (71 FR 36447; June 26, 2006).

Bottomfish

Bottomfish fishing was a part of the economy and culture of the indigenous people of Hawaii long before European explorers first visited the islands. Descriptions of traditional fishing practices indicate that Native Hawaiians harvested the same deep-sea bottomfish species as the modern fishery and used some of the same specialized gear and techniques employed today.

The deep-slope bottomfish fishery in Hawaii concentrates on species of eteline snappers (e.g., opakapaka), carangids (e.g., jacks), and a single species of grouper (hapuupuu) concentrated at depths of 30–150 fathoms. The fishery can be divided into two geographical areas: the inhabited MHI with their surrounding reefs and offshore banks and the NWHI, a 1,200-nautical chain of largely uninhabited islets, reefs, and shoals. Bottomfish fishing grounds within federal waters around the MHI include Middle Bank, most of Penguin Bank, and approximately 45 nautical miles of 100-fathom bottomfish habitat in the Maui–Lanai–Molokai complex. For management purposes, the NWHI fishery has been separated into the closer Mau Zone between 165° W and 161° 20' W, and the more northwestern Hoomalu Zone to the west of 165° W.

In the small-boat bottomfish fishery that is active around the MHI, the distinction between recreational and commercial fishermen is extremely tenuous, with many otherwise recreational fishermen selling small amounts of fish to cover trip expenses. The State of Hawaii maintains a bottomfish vessel registry which numbers around 3,700 vessels. The number of vessels used each year to commercially target bottomfish in MHI varies between 250 and 500. The majority of bottomfish fishermen in the MHI often concentrate their fishing efforts during December, due to the year-end holiday demand for red snappers.

In contrast, bottomfish fishing in the NWHI is conducted solely by commercial fishermen, and the vessels used tend to be larger (although required to 60 feet or less) than those fishing around the MHI, as the distance to fishing grounds is greater. Participation in the NWHI bottomfish fishery is controlled through limited access programs in each of the two sub-management zones (Mau and Hoomalu). These zones were established to reduce the risk of biological overfishing and to improve the economic health and stability of the bottomfish fishery in the NWHI. Permits may not be sold, leased, or chartered. On the basis of the biological, economic, and social characteristics of the bottomfish fisheries in the two zones, the long-term target fleet sizes for the Hoomalu and Mau Zones were determined to be seven and ten vessels, respectively. In 2004, four vessels fished in the Hoomalu Zone, and five vessels fished in the Mau Zone. All of these vessels are independent, owner-operated fishing operations. In 2005, four vessels operated in each zone, for a total of eight operating in the NWHI.

Bottomfish gear and fishing strategies are highly selective for desired species and sizes. In addition, the use of bottom trawls, bottom gillnets, explosives, and poisons are forbidden under the Bottomfish and Seamount Groundfish FMP.

On the basis of recent (1998 to 2002) harvest data, commercial bottomfish catches in the MHI fishery represent approximately 60 percent of the total commercial bottomfish harvest in Hawaii (WPRFMC 2004a, 2004b). Data for 2003 indicate that a total of 272,569 pounds of commercial landings were made by 325 vessels in the MHI, with a total ex-vessel value of $1,460,000 (Figures 3-19 and 3-20). Mau Zone landings for 2003 were estimated to total 77,000 pounds, with a total ex-vessel value of $356,769, while Hoomalu Zone landings were 145,000 pounds, with a total ex-vessel value of $494,450 (WPRFMC 2005). Bottomfish MSY values for the MHI is estimated at 353,435 lbs. Bottomfish MSY values for the Mau and Hoomalu Zones are estimated at 97,904 lbs and 339,728 lbs, respectively (Moffitt et al. 2006).

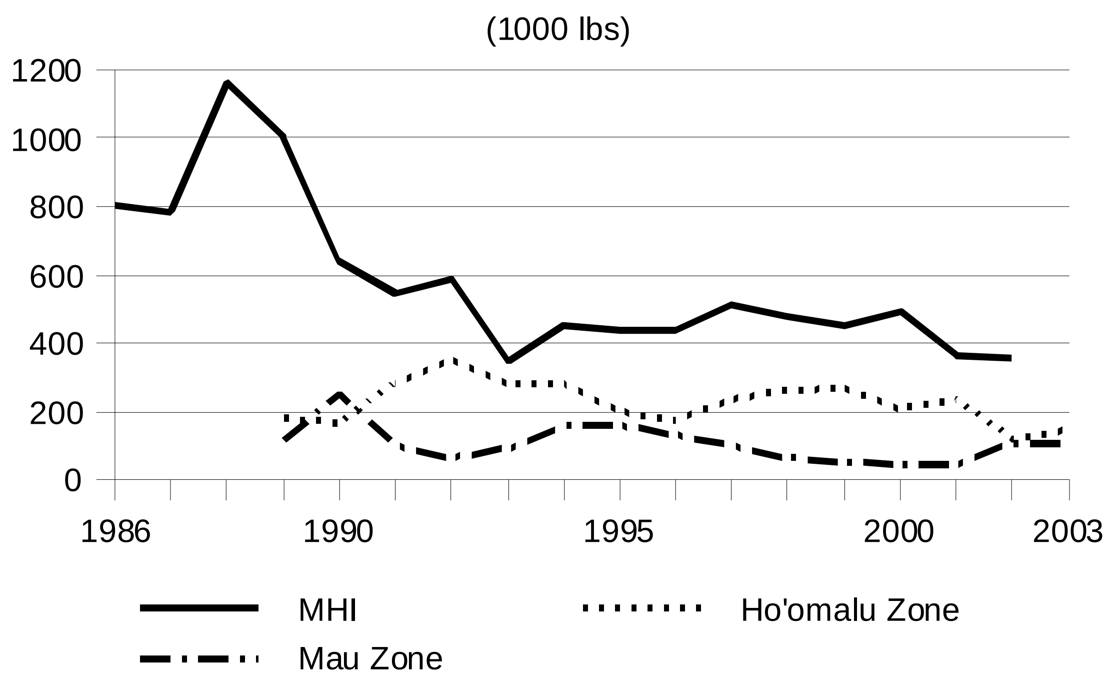

Figure 3-19: MHI and NWHI Bottomfish Landings 1986 to 2003.
Source: WPRFMC 2004c; 2003 Bottomfish Annual Report.

Note: Due time lags between submitted catch records and data analysis, 2003 is the most recent compiled Hawaii bottomfish data.

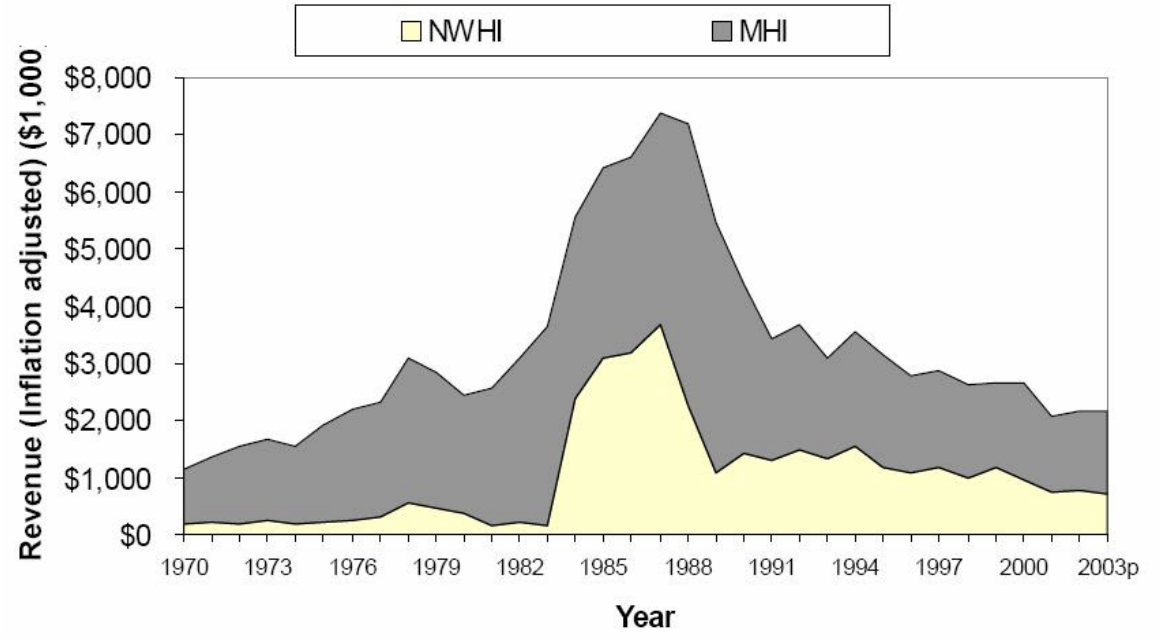

Figure 3-20: Hawaii Bottomfish Revenue (Inflation Adjusted) by Area 1970 to 2003.

Source: WPRFMC 2004c.

Nearly all bottomfish caught in the NWHI fisheries are sold through the Honolulu fish auction (United Fishing Agency, Ltd.). Bottomfish caught in the MHI fishery are sold in a wide variety of market outlets (Haight et al. 1993a). Some fish are marketed through the fish auction and intermediary buyers on all islands. Sales of MHI bottomfish also occur through less formal market channels such as local restaurants, hotels, grocery stores, and individual consumers. Unsold fish are consumed by fishermen and their families, given to friends and relatives as gifts, and bartered in exchange for various goods and services.

Onaga and opakapaka make up the largest valued landings in each area for most years (ignoring the highly fluctuating landings of uku); NWHI ex-vessel prices were $4.53 and $4.79 per pound, respectively, in 2003 while MHI were $5.89 and $5.01, respectively. However, the NWHI landings comprise a higher percentage of these higher priced species compared with the MHI, so the difference in price for individual species by area is ironed out by the different species compositions between the two areas (see Figure 3-21).

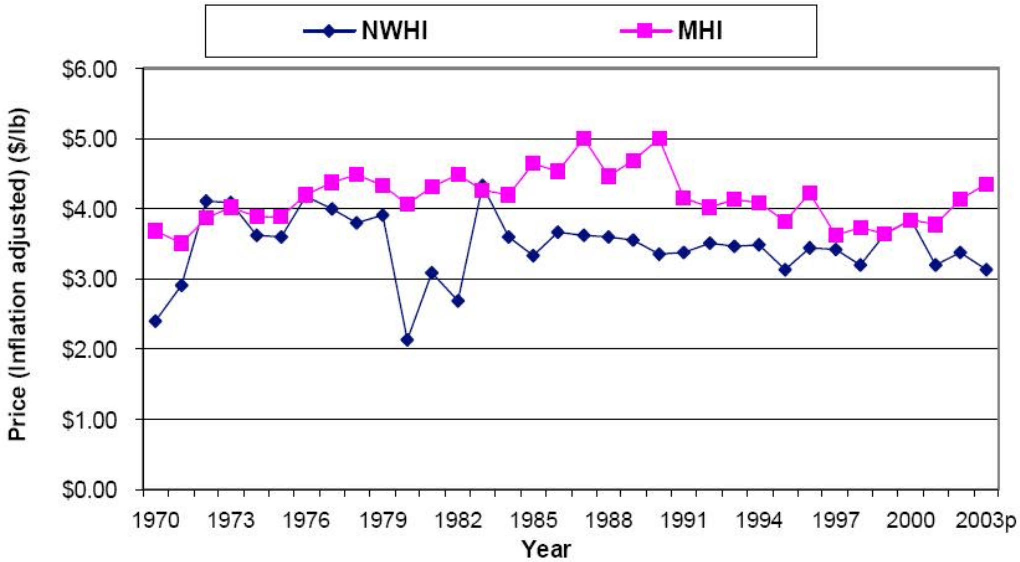

Figure 3-21: Average Prices for NWHI and MHI BMUS Landings 1970 to 2003.
Source: WPRFMC 2004c.

According to U.S. Customs data for the Port of Honolulu, 801,000 pounds of snapper were imported in 2003 and were worth $2.26 million ($2.82 per pound). This exceeded the domestic supply and thus was a significant factor in ex-vessel prices (WPRFMC 2004c). Tonga and Australia were the largest sources of fresh snapper, with Fiji and New Zealand also being major sources. Not only has the quantity of foreign-caught fresh fish increased during the last few years, but the number of countries exporting fresh fish to Hawaii has also increased. A decade ago, for example, fresh snapper was exported to Hawaii mainly from within the South Pacific region. In recent years, Tonga and Australia were the largest sources of imported fresh snapper, along with Fiji and New Zealand, but snapper and other types of bottomfish have also been received from Indonesia, Samoa, Solomon Islands, Chad, Japan, Kiribati, Mozambique, Philippines, and Vietnam .[42]

In 2005, it was determined that the Hawaii Archipelago multispecies botttomfish complex was experiencing overfishing as defined in the MSA, with the MHI the area where the overfishing problem primarily occurs (70 FR 34452; June 14, 2005). The Council was given one year to take action to end overfishing, and in March 2005 recommended the closure of Penguin and Middle Banks to the harvest of seven species of deep water BMUS. To obtain a copy of the Draft EIS and Draft FMP amendment regarding this action, please visit www.wpcouncil.org. The Final EIS and proposed rule for this action will be available for public review during 2007.

The President's proclamation of June 15, 2006 calls for the closure of most fisheries within the monument's boundaries immediately and of the NWHI bottomfish fishery by June 15, 2011. However, Native Hawaiian cultural practices, including subsistence fishing may be permitted to continue. Although the commercial bottomfish and associated pelagic fishing operations in the

[42]http://www.st.nmfs.gov/pls/webpls/trade_dist_allproducts_mth.results?qtype=IMP&qmonthfrom=01&qmonthto=01&qyearfrom=1996&qyearto=2005&qproduct=%25&qdistrict=32&qsort=COUNTRY&qoutput=TABLE (January 2007).

NWHI may continue over the five-year period, they will be subject to a landing limit on each species complex. No more than 350,000 pounds of bottomfish and no more than 180,000 pounds of pelagic fish may be landed within a given year. Furthermore, over the next five years, all bottomfish fishing operations in the NWHI must comply with new area closures, vessel monitoring and reporting requirements in addition to existing regulations.

Precious Corals

The collection of black coral from depths of 30–100 meters by scuba divers has continued in Hawaii since black coral beds were discovered off Lahaina, Maui, in the late 1950s, although harvest levels have fluctuated with changes in demand. Since 1980, virtually all of the black coral harvested around the Hawaiian Islands has been taken from a bed located in the Auau Channel. Most of the harvest has come from State of Hawaii waters, and no black coral diver has ever received a federal permit to harvest precious coral in the EEZ. However, a substantial portion of the black coral bed in the Auau Channel is located in the EEZ. In 1999, concern about the potential for greater harvesting pressure on the black coral resources led the State of Hawaii to prohibit taking the harvest of black coral with a base diameter of less than three-quarters inches from state waters. The Council has recommended that a minimum size limit also be established for black coral harvested in the EEZ (WPRFMC 1999).

After two decades of minimal activity, the domestic fishery for pink, gold, and bamboo precious corals in the EEZ of Hawaii resumed in December 1999. One company used two one-man submersibles to survey and harvest pink and gold corals at depths between 400 and 500 meters during 1999 and 2001; however, they did not continue their operations after that time and the actual harvests cannot be reported here because of data confidentiality policies that prohibit the publication of proprietary information unless there are at least three separate operations included in the dataset.

In 1988, the domestic fishing vessel *Kilauea* used a tangle net dredge (now prohibited) to harvest beds at Hancock Seamount. Their catch, however, consisted mostly of dead or low-quality pink coral, and the operation was soon discontinued. In the mid-1980s, a company experimented with manned submersibles equipped with spotlights, cameras, and a variety of maneuverable tools to harvest individual colonies, chosen by size and quality prior to cutting, in a highly controlled and efficient manner (Carleton 1987).

Between 1990 and 1997, the annual harvest of black coral in Hawaii varied from a low of 864 pounds to a high of 6,017 pounds, with a yearly average of 3,084 pounds (Table 3-12). Landings and ex-vessel values of the black corals recently harvested in Hawaii cannot be presented because of the low number of active harvesting operations (less than three).

Because the Precious Corals FMP allows harvest only by selective gear (i.e with submersibles or by hand), federal precious coral fisheries in Hawaii have no bycatch.

Table 3-12: Volume and Value of Black Coral Landings in Hawaii 1990 to 1997.

Year	Harvested (lb)	Sold (lb)	Value ($)
1990	2,349	2,169	31,575
1991	2,305	2,250	35,080
1992	2,398	2,328	46,560
1993	864	769	15,380
1994	4,354	4,209	84,180
1995	6,017	5,912	122,765
1996	4,865	1,703	41,325
1997	1,520	415	10,394

Source: Hawaii Division of Aquatic Resources unpublished data.
Note: Years 1998 to present are not provided due to data confidentially policies.

The naming of black coral as the Hawaii state gem in 1987 increased consumer interest in this precious coral. However, the quantity of black coral required by jewelry manufactures in Hawaii has dropped considerably because the jewelry items produced are smaller and of higher quality and because modern cutting procedures have become much more efficient (Carleton 1987). In 1976, Grigg estimated a black coral MSY of 5,000 kg/yr (Grigg 1976). Recently, Grigg discovered a greater impact to the black coral resource from an invasive soft coral, *Carijoa riisei*, and based on that, coupled with harvesting impacts, estimated a reduced MSY of 3,750 kg/yr (Grigg 2004) for this area.

A worldwide glut of *Corallium* produced during the boom years of the early 1980s caused the market value of pink coral to fall. Consequently, many fishermen dropped out of the fishery and the worldwide supply of deep-water precious corals has dwindled. The precious corals jewelry industry in Hawaii has been estimated to be worth at least $25 million in annual revenue (Grigg 1993).

Pelagic Fisheries

Hawaii's pelagic fisheries, which include the longline, troll and handline, offshore handline, and the aku boat (poleline) fisheries are the state's largest and most valuable (Figures 3-22 and 3-23). The target species are tunas and billfish, but a variety of other species are also important (e.g., mahimahi, ono). Collectively, these pelagic fisheries made approximately 22 million pounds of commercial landings with a total ex-vessel value nearly $50 million in 2004 (WPFMC 2005).

The largest component of pelagic catch in 2004 was tuna. Bigeye tuna was the largest component of the commercial catch, and has increased almost fivefold from its 1987 catch. Swordfish was the largest component of the billfish catch from 1990 through 2000, was replaced by blue marlin in the next years and by striped marlin in 2003. Mahimahi was the largest component of the nontuna and nonbillfish catch though ono (wahoo) and moonfish catches have increased to comparable levels in recent years (WPFMC 2005).

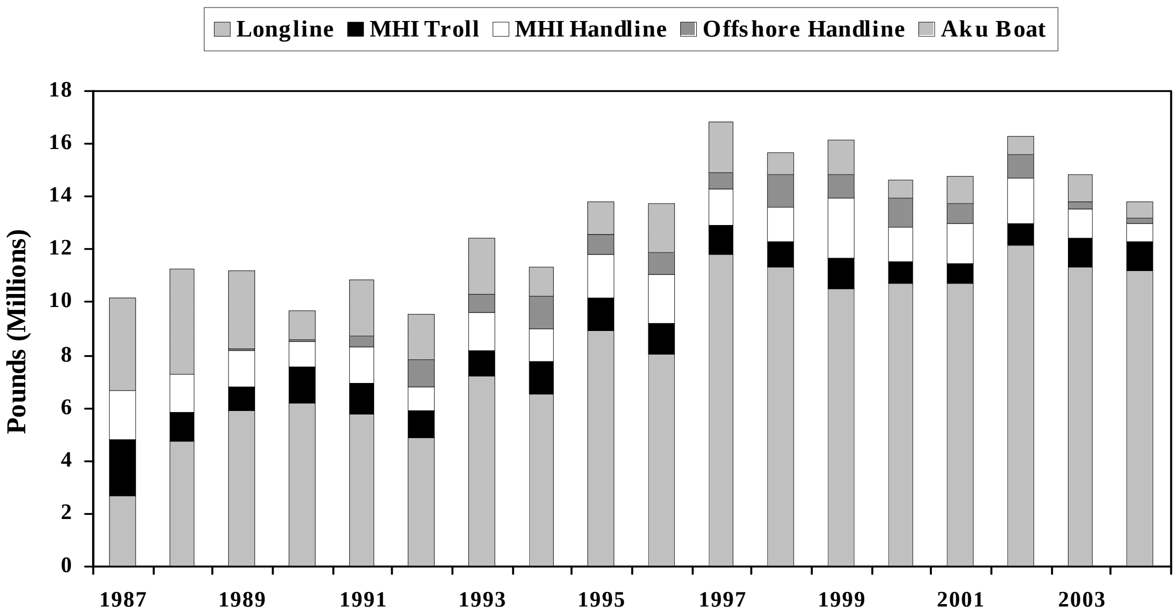

Figure 3-22: Hawaii Commercial Pelagic Catch by Gear Type, 1987 to 2004.
Source: WPRFMC 2005; 2004 Pelagic Annual Report.

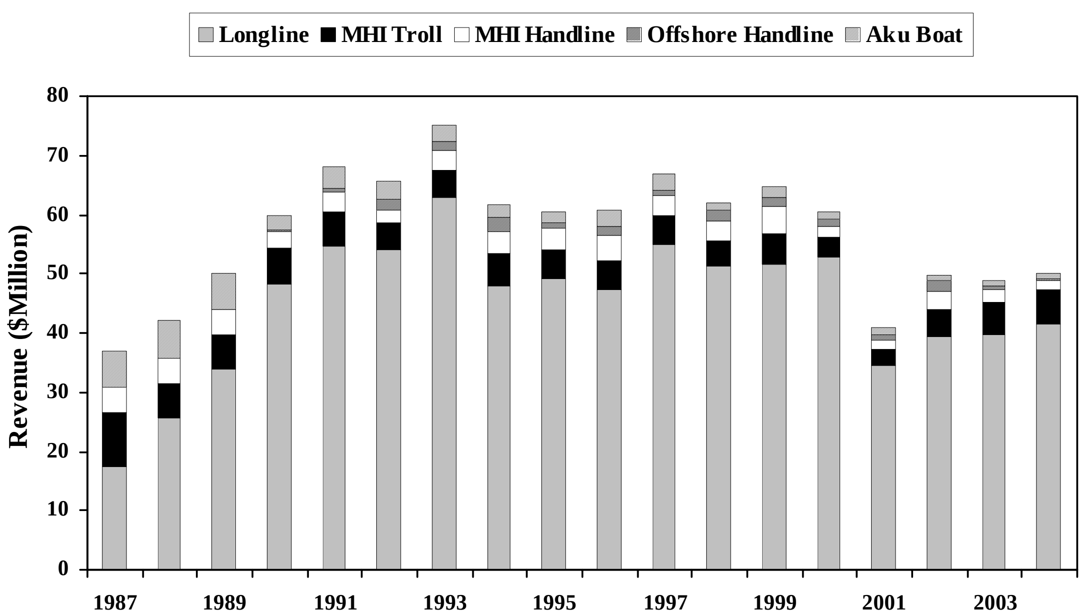

Figure 3-23: Hawaii Pelagic Revenue by Gear Type, 1987 to 2004.

Source: WPRFMC 2005; 2004 Pelagic Annual Report.

Figure 3-23: Hawaii Pelagic Revenue by Gear Type, 1987 to 2004.
Source: WPRFMC 2005; 2004 Pelagic Annual Report.

The total number of recreational fishers in Hawaii is unknown but there are about 14,300 small vessels in Hawaii, of which about 90 percent are registered as 'pleasure craft'. McConnell and Haab (2001) estimated that 6,600 of these vessels might be used for recreational fishing. Out of a sample of 1008 respondents from these 6,600 vessel owners in a phone survey, 17 percent indicated that their vessel was either not being used or was not used for fishing. Based on these data it is estimated that Hawai's recreational small boat fleet numbers about 5,500 vessels. The Hawaii Marine Recreational Fisheries Survey (HMRFS) has been sampling recreational catches since 2003. The data indicate that little to no bigeye tuna is caught by recreational fishers, while yellowfin landings have been estimated to range between 2270 and 5050 tons, with a three year mean of 3,295 tons. However, caution must be exercised in interpreting the figures from the HMFRS program, which are generated through the product of catch per trip from intercept surveys at landing sites, and a random digit dialing phone survey to estimate effort in trips. The National Research Council review of the entire NMFS Marine Recreational Fisheries Statisical Survey (MRFSS) has been highly critical of the sampling methods and statistical algortithms employed to develop recreational catch totals. As such this Council has recommended that HMRFS catch estimates should not be used for management purposes until these problems have been fixed. Nonetheless, Hawaii's recreational pelagic fishery is believed to catch notable amounts of yellowfin tuna, billfish, and other PMUS such as mahimahi and ono (wahoo).

The Council was notified by letter on December, 15, 2004, that the Secretary of Commerce had determined that overfishing of bigeye tuna (*Thunnus obesus*) was occurring Pacific-wide. As indicated in the MSA, and required by the implementing regulations for National Standard 1 (50 CFR 600.310(e)(3), the Council was requested by the Secretary to take remedial action (i.e., recommend to NMFS an amendment to its Pelagics Fishery Management Plan) within one year. More recently in August 2005, the Scientific Committee of the Western and Central Pacific Fisheries Commission reviewed a stock assessment that indicated that yellowfin tuna (*Thunnus albacares*) in the Western and Central Pacific Ocean also appears to being subjected to overfishing.

Pacific bigeye and yellowfin tunas occur in the waters of multiple nations and the high seas and are fished by the fleets of other nations in addition to those of the U.S. The capacity for unilateral action by the U.S. to prevent overfishing, as required under National Standard 1 of the Magnuson-Stevens Act (16 U.S.C. 1851(a)(1), is limited as is the capacity for actions taken by the Councils to end overfishing, as required under 50 CFR 600.310(e)(4)(i)) (69 FR 78397). Bigeye tuna catches by commercial fisheries under the Council's jurisdiction in 2004 amounted to 5,163 metric tonnes (t), or 2.3 percent of the 2004 total Pacific-wide bigeye catch. Similarly, 2004 yellowfin tuna catches by commercial fisheries under the Council's jurisdiction amounted to 2,383 t or about 0.35 percent of the 2004 total Pacific-wide yellowfin catches, and 0.58 percent of the yellowfin caught in the WCPO. The Council has recommended management action for research, monitoring and management of international and domestic fisheries that address the management and end overfishing of Pacific bigeye and WCPO yellowfin tunas in a cost-effective and equitable manner. For more information on this issue, please visit www.wpcouncil.org or contact the Council[43].

Communities

The most recent estimate of the contribution of the commercial, charter, and recreational fishing sectors to the state economy indicated that in 1992 these sectors contributed $118.79 million of output (production) and $34.29 million of household income, employing 1,469 people (Sharma et al. 1999). These contributions accounted for 0.25 percent of total state output ($47.4 billion), 0.17 percent of household income ($20.2 billion), and 0.19 percent of employment (757,132 jobs). In contrast to the sharp decline in some traditional mainstays of Hawaii's economy, such as large-scale agriculture, the fishing industry has been fairly stable during the past decade. Total revenues in Hawaii's pelagic, bottomfish, and lobster fisheries in 1998 were about 10 percent higher than 1988 revenues (adjusted for inflation) in those fisheries.

The Hawaii longline fishery is by far the most economically important of Hawaii's commercial fisheries, accounting for 77 percent of the estimated ex-vessel value of the total commercial fish landings in the state in 2003 (WPRFMC 2004a, 2004b).

Income generation in Hawaii is characterized by tourism, federal defense spending, and, to a lesser extent, agriculture. Tourism is by far the leading industry in Hawaii in terms of generating jobs and contributing to gross state product. The World Travel and Tourism Council (1999) estimated that tourism in Hawaii directly generated 134,300 jobs in 1999. This figure represents 22.6 percent of the total workforce.

For 2002, Department of Business, Economic Development and Tourism (2003) estimated that direct and indirect visitor contribution to the state economy was 22.3 percent. A bit less than half of that (10.2 %) was generated in Waikiki. Total visitor expenditures in Hawaii were $9,993,775,000. Tourism's direct and indirect contribution to Hawaii's gross state product in 2002 was estimated at $7,974,000,000, or 17.3 percent of the total. Directly and indirectly, tourism accounted for 22.3 percent of all civilian jobs, and 26.4 percent of all local and state taxes.

Department of Defense expenditures are also important to Hawaii's economy. Defense expenditures in Hawaii are expected to increase significantly in the near future because of the pending arrival of the Stryker force and the renovation and construction of military housing. As of late July 2004, Hawaii expected to receive $496.7 million in defense-related spending. When combined with funds earmarked for construction that are contained in a measure before the Senate, Hawaii stands to receive more than $865 million in defense dollars, which do not include funds for day-to-day operations or payroll (Inouye 2004).

[43] WPRFMC. 1164 Bishop St. Ste. 1400, Honolulu, HI. 96813.

Agricultural products include sugarcane, pineapples, nursery stock, livestock, and macadamia nuts. In 2002, agriculture generated a total of $510,672,000 in sales. Agricultural employment decreased from 7,850 workers in 2000 to 6,850 in 2003.

Table 3-13: Statistical Summary of Hawaii's Economy: 1995 to 1999, 2002.

Category	Units	1995	1996	1997	1998	1999	2002
Civilian labor force	Number	576,400	590,200	592,000	595,000	594,800	582,200
Unemployment	Percent	5.9	6.4	6.4	6.2	5.6	4.2
Gross state product in 1996 dollars	Millions (in dollars)	37,963	37,517	37,996	38,015	38,047	38,839 (2001)
Manufacturing sales	Millions (in dollars)	2,045	1,724	1468.8	NA	NA	NA
Agriculture (all crops and livestock)	Millions (in dollars)	492.7	494.6	486.5	492.6	512,992	510,672
Construction completed	Millions (in dollars)	3,153.3	3,196.4	2,864.9	NA	NA	NA
Retail sales	Millions (in dollars)	15,693.3	16,565	16,426	NA	NA	NA
Defense expenditures	Millions (in dollars)	3,782.5	3,883.5	4,074.9	4,103.7	4,174.2	4,293,459

Source: Bank of Hawaii, 1999a; Department of Business, Economic Development and Tourism 1999, 2003.

Median household income in Hawaii was calculated to be $30,040, or 97 percent, of the national average in 2002. Hawaii per capita income as a percentage of the national average has fallen steadily since 1970 (Department of Business, Economic Development and Tourism 2003). In 1999, approximately 10 percent of Hawaii's families were below poverty level, compared with approximately 12 percent nationally, according to the 2000 U.S. Census.[44] Civilian employment decreased from 411,250 in 1991 to 396,050 in 2002, which is a decrease from a 98 percent employment rate to a 96 percent rate.

For several decades, Hawaii benefited from the strength of regional economies around the Pacific that supported the state's dominant economic sector and principal source of external receipts—tourism (Bank of Hawaii 1999a). In addition, industries of long-standing importance in Hawaii, such as the federal military sector and plantation agriculture, also experienced

[44] http://quickfacts.census.gov/qfd/states/15000.html

significant growth. However, Hawaii's economic situation changed dramatically in the 1990s. The state's main tourist market, Japan, entered a long period of economic malaise that caused the tourism industry in Hawaii to stagnate. The post–Cold War era brought military downsizing. Tens of thousands of acres of plantation lands, along with downstream processing facilities, were idled by the end of the decade because of high production costs. Employment in Hawaii sugar production fell by 20 percent between 1990 and 1993 and by an additional 50 percent from 1994 to 1995 (Yuen et al. 1997). Net out-migration became the norm in Hawaii, notwithstanding the state's appeal as a place to live. In 1998, the statewide unemployment rate was 6.2 percent, and unemployment on the island of Molokai reached 15 percent (Department of Business, Economic Development and Tourism 1999).

As a consequence of the economic upheaval of the 1990s and the extensive bankruptcies, foreclosures, and unemployment, Hawaii never entered the period of economic prosperity that many U.S. mainland states experienced. Between 1998 and 2000, Hawaii's tourism industry recovered substantially, mainly because the strength of the national economy promoted growth in visitor arrivals from the continental United States (Brewbaker 2000).

By 2002, an improving economy resulted in a statewide unemployment rate of 4.4 percent, with Molokai down to 8.6 percent (Department of Business, Economic Development and Tourism 2003). Despite downswings in tourism in the past few years because of 9/11, the SARS scare, Japanese economic issues, and world political conditions, tourism in Hawaii is improving to the point that there were fears that there would not be enough hotel rooms to accommodate all of the Japanese tourists who wanted to come for O Bon season[45] in August 2004 (Schafers 2004).

However, efforts to diversify the economy and thereby make it less vulnerable to future economic downturns have met with little success. To date, economic development initiatives such as promoting Hawaii as a center for high-tech industry have attracted few investors, and it seems unlikely that any new major industry will develop in Hawaii in the near future to significantly increase employment opportunities and broaden the state's economy beyond tourism, the military, and construction.

3.5.5 Pacific Remote Island Areas

The following sections provide detailed information on the physical, biological, and social environments of the PRIA managed under this FEP.

Baker Island

Baker Island, which is part of the Phoenix Islands Archipelago, is located 13 miles north of the equator at 0° 13' N and 176° 38' W and approximately 1,600 nautical miles to the southwest of Honolulu. The total amount of emergent land area of Baker Island is 1.4 square kilometers (Central Intelligence World Fact Book 2005).

[45] Festival of Souls, a Japanese cultural event.

Coral Reefs

Within the 10-fathom curve, the potential coral reef area of Baker Island is estimated at 5.2 square kilometers (Rohmann et al. 2005). At Baker Island, the following numbers of coral reef associated organisms are reported to occur: 80 species of corals, 13 genera of algae, and 241 species coral reef fishes (Brainard et al. 2005). Although environmental and anthropogenic stressors such as climate change and coral bleaching, diseases, tropical storms, and marine debris remain, the coral reef ecosystem around Baker Island appears to be healthy and productive (Brainard et al. 2005).

Deep Reef Slope

Baker Island is a seamount surrounded by a narrow-fringing reef that drops steeply very close to the shore. To date, data on the habitat of Baker Island's deep- reef slope and the marine life it supports are unavailable.

Pelagic Habitat

Because of its position near the equator, Baker Island lies within the westward-flowing South Equatorial Current. Baker Island also experiences an eastward-flowing Equatorial Undercurrent that causes upwelling of nutrient and plankton rich waters on the west side of the island (Brainard et al. 2005). Sea-surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C.[46] Although the depth of the mixed layer in the pelagic waters around Baker Island is seasonally variable, average mixed layer depth is around 100 meters (R. Moffit, PIFSC, personal communication, July 2005).

Sea Turtles

Green sea turtles have been observed foraging in the nearshore areas around Baker Island. However, they have not been observed nesting on the island (Beth Flint, USFWS personal communication, July 2005). Other species of sea turtles may occur in the EEZ waters around Baker Island, but to date, data on species type or their abundance are not available.

Marine Mammals and Seabirds

A resident population of bottlenose dolphins is reported to occur near Howland and Baker Islands (Brainard et al. 2005). Although other cetaceans such as sperm whales are believed to occur around Baker Island, information on the types of species and their abundance is currently unknown. In the summer of 2005, researchers from the NMFS's Southwest Science Center

[46] http://oceanwatch.pifsc.noaa.gov

conducted a cruise to record the occurrence of marine mammals around the PRIA. The data from that research cruise are presently being analyzed.

Seabirds

Baker Island provides habitat for a wide variety of resident and migratory seabirds. The U.S. Fish and Wildlife Service is currently compiling information on the number species of seabirds that utilize the island.

Social Environment

In the early nineteenth century, several whaling ships landed on the island, including the *Gideon Howard* for whose captain, Michael Baker, the island is named. Captain Baker later sold his rights to the island to the American Guano Company, which extensively mined the island's phosphate deposits from 1859 to 1878. In 1935, American colonists attempted to settle the island and built dwellings, a lighthouse, and planted trees and shrubs.[47] The settlement was abandoned due to World War II. Baker Island was designated a National Wildlife Refuge in 1974 and is administered by the USFWS. The Refuge boundary, established by the U.S. Fish and Wildlife Service, extends from the shoreline seaward to 3 nautical miles. The U.S. Fish and Wildlife Service prohibit fishing within the Refuge boundaries. Currently, Baker Island is uninhabited. There is, designated in the Council's Coral Reef Ecosystem FMP (69 FR 8336), a no-take MPA from 0 to 50 fathoms around Baker Island.

Howland Island

Howland Island, which is also part of Phoenix Islands archipelago, is located 48 miles north of the equator at 0° 48' N and 176° 38' W, and 36 nautical miles north of Baker Island. The island, which is the emergent top of a seamount, is fringed by a relatively flat coral reef that drops off sharply. Howland Island is approximately 1.5 miles long and 0.5 miles wide. The island is flat and supports some grasses and small shrubs. The total land area is 1.6 square kilometers (Central Intelligence Agency World Fact Book 2005).

Coral Reefs

The potential coral reef area with the 10-fathom curve of Howland is estimated 3.0 square kilometers (Rohmann et al. 2005). At Howland Island, the following numbers of coral reef associated organisms are reported to occur: 91 species of corals, nine genera of algae, and 302 species coral reef fishes (Brainard et al. 2005). Although environmental and anthropogenic stressors such as climate change, coral bleaching, diseases, tropical storms, and marine debris

[47] http://www.janeresture.com/baker (accessed July 2005).

remain, the coral reef ecosystem around Howland Island appears healthy and productive (Brainard et al. 2005).

Deep Reef Slope

Howland Island is a seamount surrounded by a narrow-fringing reef that drops steeply very close to the shore. To date, data on the habitat of Howland Island's deep reef slope and the marine life it supports are unavailable.

Pelagic Habitat

Because of its position slightly north of the equator, Howland Island lies within the margins of the eastward-flowing North Equatorial Counter Current and the margins of the westward-flowing South Equatorial Current. Sea-surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C.[48] Although the depth of the mixed layer in the pelagic waters around Howland Island is seasonally variable, average mixed layer depth is around 70 meters to 90 meters (R. Moffit, PIFSC, personal communication).

Sea Turtles

Neither the occurrence nor abundance of sea turtles around Howland Island is currently known.

Marine Mammals and Seabirds

A resident population of bottlenose dolphins is reported to occur near Howland and Baker Islands (Brainard et al. 2005). Although other cetaceans such as sperm whales are believed to occur in the EEZ around Howland Island, information on the types of species and their abundance is currently unknown. In the summer of 2005, researchers from the NMFS's Southwest Science Center conducted a cruise to record the occurrence of marine mammals around the PRIA. The data from that research cruise are presently being analyzed.

Seabirds

Howland Island provides habitat for a wide variety of resident and migratory seabirds. The U.S. Fish and Wildlife Service is currently compiling information on the number species of seabirds that utilize the island.

Social Environment

[48] http://oceanwatch.pifsc.noaa.gov

In 1924, Bishop Museum archaeologist Kenneth Emory discovered several Polynesian structures as well as stone paths and pits, and concluded that Baker Island was known to early Polynesians.[49] Throughout the whaling era of the early nineteenth century, several ships are believed to have landed at Howland Island. In 1857, Howland Island was claimed by the American Guano Company, which mined several hundred thousand tons of guano between 1857 and 1878. American colonists landed on the island in 1935 and later built a runway that was planned to be used by Ameila Earhart on her circumnavigation flight in 1937. Earhart was supposed to land on Howland on July 2, 1937, as a stopover during her flight from Lau, New Guinea, to Oahu, Hawaii. However, Earhart never arrived nor was she heard from again. The lighthouse at Howland Island is called Amelia Earhart light.[50] In 1942, following attacks on the island by Japanese forces, the American colonists were removed. Since that time, the island has remained uninhabited. In 1974, management authority of the refuge was transferred to the U.S. Fish and Wildlife Service. The refuge boundary around Howland Island extends seaward from the shoreline to 3 nautical miles. The U.S. Fish and Wildlife Service prohibit fishing within the refuge boundaries. Currently, Howland Island is uninhabited. There is, designated in the Council's Coral Reef Ecosystems FMP (69 FR 8336), a no-take MPA from 0 to 50 fathoms around Howland Island.

Jarvis Island

Jarvis Island, which is part of the Line Island archipelago, is located at 0° 23' S, 160° 01' W and approximately 1,300 miles south of Honolulu and 1,000 miles east of Baker Island. Jarvis Island is a relatively flat (15 to 20-ft beach rise), sandy coral island with a total land area of 4.5 square kilometers. It experiences a very dry climate with limited rainfall (Central Intelligence World Fact Book 2005).

Coral Reefs

Jarvis Island is surrounded by a narrow-fringing reef. The potential coral reef area with the 10-fathom curve is estimated at 3.0 square kilometers (Rohmann et al. 2005). At Jarvis Island, the following numbers of coral reef associated organisms are reported to occur: 49 species of corals, 10 genera of algae, and 252 species of coral reef fishes (Brainard et al. 2005). Although environmental and anthropogenic stressors such as climate change, coral bleaching, diseases, tropical storms, and marine debris remain, the coral reef ecosystem around Jarvis Island appears healthy and productive (Brainard et al. 2005).

Deep Reef Slope

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[49] http://www.bishopmuseum.org/exhibits/pastExhibits/1995/hawaiilo/hawbaker.html
[50] http://www.janeresture.com/howland (accessed July 2005)

Jarvis Island is surrounded by a narrow-fringing reef that drops steeply very close to the shore. To date, data on the habitat of Jarvis Island's deep reef slope and the marine life it supports are unavailable.

Pelagic Habitat

Because of its position below the equator, Jarvis Island lies within the South Equatorial Current, which runs in a westerly direction. Sea surface temperatures of pelagic EEZ waters around Jarvis Island are often 28° to 30° C.[51] Although depth of the mixed layer in the pelagic waters around Jarvis Island is seasonally variable, average mixed layer depth is around 80 meters (R. Moffit, PIFSC, personal communication).

Sea Turtles

Neither the occurrence nor abundance of sea turtles around Jarvis Island is currently known.

Marine Mammals and Seabirds

A resident population of bottlenose dolphins is reported to occur near Jarvis Island (Brainard et al. 2005). Although other cetaceans such as sperm whales are believed to occur in the EEZ around Jarvis Island, the types of species and their abundance is currently unknown. In the summer of 2005, researchers from the NMFS's Southwest Science Center conducted a cruise to record the occurrence of marine mammals around the PRIA. The data from that research cruise are currently being analyzed.

Seabirds

Jarvis Island provides habitat for a wide variety of resident and migratory seabirds. The U.S. Fish and Wildlife Service is currently compiling information on the number species of seabirds that utilize the island.

Social Environment

Between 1859 and 1878, Jarvis Island was extensively mined for its rich guano deposits by the American Guano Company. In 1889, Great Britain annexed the island and leased it to a British mining company, which did not extract large amounts of guano. In 1935, American colonists reclaimed Jarvis as an American possession and built a group of buildings that they named Millerstown. Jarvis was abandoned by the colonists due to attacks from Japanese forces during World War II, and since 1974 it has been a National Wildlife Refuge administered by the U.S.

[51] http://oceanwatch.pifsc.noaa.gov

Fish and Wildlife Service. The Refuge boundary around Jarvis Island extends seaward from the shoreline to 3 nautical miles. The U.S. Fish and Wildlife Service prohibit fishing within the Refuge boundaries. There is, designated in the Council's Coral Reef Ecosystems FMP (69 FR 8336), a no-take MPA from 0 to 50 fathoms around Jarvis Island.

Palmyra Atoll

Palmyra Atoll comprises approximately 52 islets surrounding three central lagoons. This low-lying coral atoll system is approximately 1,056 nm south of Honolulu and is located at 5° 53' N latitude and 162° 05' W longitude. Palmyra Atoll occurs at the northern end of the Line Island Archipelago, situated halfway between Hawaii and American Samoa. Palmyra Atoll is located in the ITCZ, an area of high rainfall (see Section 3.1.1.1).

Coral Reefs

Palmyra Atoll is surrounded by extensive reef flats on all sides. The potential coral reef area within the 10-fathom curve around Palmyra Atoll is estimated at 47.2 square kilometers (Rohmann et al. 2005). At Palmyra Atoll, the following numbers of coral reef associated organisms are reported to occur: 170 species of corals, 13 genera of algae, and 343 species of coral reef fishes (Brainard et al. 2005). Palmyra Atoll is observed to have a higher diversity of corals, anemones, and fishes than other PRIA because it is located within the eastward-flowing Equatorial Counter Current which flows from areas in the western Pacific with high levels of biodiversity (Brainard et al. 2005).

Deep Reef Slope

Data on the deep reef slope around Palmyra and the marine life it supports are unavailable. However, the area of deep reef slope is not believed to be extensive.

Pelagic Habitat

Because of its relative proximity to the equator, Palmyra Atoll is subject to the North Equatorial Counter Current, which flows in an eastward direction. Sea surface temperatures of pelagic EEZ waters around Palmyra Atoll are often 27°–30° C.[52] Although the depth of the mixed layer in the pelagic waters around Palmyra Atoll is seasonally variable, average mixed layer depth is around 90 meters (R. Moffit, PIFSC, personal communication).

Sea Turtles

Both green sea turtles and hawksbill sea turtles have been observed at Palmyra Atoll, with only the green sea turtle observed to nest on Cooper's Island, which is the largest island within the Palmyra Atoll system (U.S. Fish and Wildlife Service 1998).

[52] http://oceanwatch.pifsc.noaa.gov

Marine Mammals and Seabirds

Pilot whales and bottlenose dolphins have been observed in the lagoon of Palmyra (Fefer 1987), and the Hawaiian monk seal was sighted in 1990 (Redmond 1990). Melon headed whales, which primarily feed on squid, have been observed on the southwestern side of Palmyra Atoll. Palmyra's southwestern side is likely an area of higher productivity because the main channel into the lagoon is located there and is believed to be the major output source of nutrient-rich lagoon waters (Brainard et al. 2005).

Seabirds

Palmyra Atoll supports 29 species migratory seabirds and shorebirds and has the largest nesting colonies of red-footed boobies and black noddies in the central Pacific (U.S. Fish and Wildlife Service 1998).

Social Environment

Palmyra has had an interesting history involving shipwrecks, pirates, and buried treasure, and a double murder in the mid-1970s. Palmyra first became an American possession when it was claimed by the American Guano Company in 1859. In 1862, King Kamehameha IV claimed Palmyra for the kingdom of Hawaii. In 1898, when the U.S. annexed the Territory of Hawaii, President McKinley also included Palmyra Atoll. In 1912, a judge from Honolulu bought all of Palmyra Atoll, which he later sold to the Fullard-Leo family. From 1940 to 1946, the U.S. Navy took control of Palmyra and used it as a naval aviation facility. In 1947, the U.S. Supreme Court returned ownership of Palmyra to the Fullard-Leo family from the U.S. Navy. In 1961, President Kennedy assigned the U.S. Department of Interior to have civil administration over Palmyra. In 2000, The Nature Conservancy bought Palmyra Atoll from the Fullard-Leo family, and currently manages it as a nature preserve with limited recreational fishing (e.g., flyfishing for bonefish). The U.S. Fish and Wildlife Service also administer the island as a National Wildlife Refuge and assert a 12-nautical mile boundary around the atoll. The Coral Reef Ecosystems FMP (69 FR 8336) established a low-use MPA from 0 to 50 fathoms around Palmyra Atoll.

Kingman Reef

Kingman Reef, which is located 33 nautical miles northwest of Palmyra Atoll at 6° 23' N and 162° 24' W, is a series of fringing reefs around a central lagoon. Kingman Reef does not have any emergent islets that support vegetation.

Coral Reefs

The potential coral reef area within the 10-fathom curve Kingman Reef is estimated at 20.9 square kilometers (Rohmann et al. 2005). At Kingman Reef, 155 species of corals, 15 genera of algae, and 225 species of reef fishes are reported to occur (Brainard et al. 2005).

Deep Reef Slope

Data on the deep reef slope around Kingman Reef and the marine life it supports are unavailable. However, the area of deep reef slope is not believed to be extensive.

Pelagic Habitat

Because of its relative proximity to the equator, Palmyra Atoll and Kingman Reef lie in the North Equatorial Countercurrent, which flows in a west to east direction. Sea-surface temperatures of pelagic EEZ waters around Palmyra Atoll are often 27° to 30° C.[53] Although the depth of the mixed layer in the pelagic waters around Kingman Reef is seasonally variable, average mixed layer depth is around 80 meters (R. Moffit, PIFSC, personal communication).

Sea Turtles

Green sea turtles and hawksbill sea turtles are likely found at Kingman Reef, as both species are found at nearby Palmyra Atoll.

Marine Mammals and Seabirds

Because of its close proximity to Palmyra Atoll, bottlenose dolphins, pilot whales, melon headed whales, and other cetaceans are likely to occur around Kingman Reef.

Seabirds

Seabirds that nest at Palmyra are likely to visit areas near Kingman Reef. However, because there are no emergent islands at Kingman Reef, it is believed no seabirds nest there.

Social Environment

In 2001, management authority of the refuge was transferred to the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service administer the area as a National Wildlife Refuge and assert a 12-nautical mile boundary around the reef. The Coral Reef Ecosystems FMP (69 FR 8336) established a low-use MPA from 0 to 50 fathoms around Kingman Reef.

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[53] http://oceanwatch.pifsc.noaa.gov (accessed July 2005)

Johnston Atoll

Johnston Atoll is located at 16° 44' N latitude and 169° 31' W longitude and approximately 720 nautical miles southwest of Honolulu. French Frigate Shoals in the NWHI is the nearest land mass (approximately 450 nm to the northwest), and because of its proximity to the Hawaiian Islands, there is believed to be genetic and larval connectivity between Johnston Atoll and the Hawaiian Islands. Johnston Atoll is an egg-shaped coral reef and lagoon complex residing on a relatively flat, shallow platform approximately 21 miles in circumference (205 km^2). Johnston Atoll comprises four small islands totaling 2.8 square kilometers. Johnston Island, the largest and main island, is natural in origin, but has been enlarged by dredge and fill operations. Sand Island is composed of a naturally formed island (eastern portion) connected by a narrow, man-made causeway to a dredged coral island (western portion). The remaining two islands, North Island and East Island, are completely manmade from dredged coral (U.S. Air Force 2004).

Coral Reefs

The potential coral reef area within the 10-fathom curve of Johnston Atoll is estimated at 150 square kilometers (Rohmann et al. 2005). Johnston Atoll, with only 34 *Scleractinian* and *Hydrozoan* corals present, has fewer coral species than are found in the Hawaiian Islands. The reef is composed of alternating sand/loose coral and live coral, with the most dominant coral species present being *Acropora*. The coral *Montipora* is also widely found. Approximately 300 species of fish have been recorded in the nearshore waters and reefs of Johnston Atoll. This number is smaller than that of other islands in the Central Pacific, and is likely due to Johnston Atoll's small size and remote location. One species of angelfish, *Centropyge nahackyi*, is endemic (U.S. Air Force 2004).

Deep Reef Slope

Data on the deep reef slope around Johnston Atoll and the marine life it supports are unavailable. However, the area of deep reef slope is not believed to be extensive.

Pelagic Habitat

Sea surface temperatures of the EEZ waters around Johnston Atoll are often 27°–30° C.[54] Although the depth of the mixed layer in the pelagic waters around Johnston Atoll is seasonally variable, average mixed layer depth is around 80 meters (R. Moffit, personal communication).

Sea Turtles

[54] http://oceanwatch.pifsc.noaa.gov

Only green sea turtles have been observed at Johnston Atoll. It is estimated that nearly 200 green sea turtles forage near its southern shore. However, it is thought that green sea turtles do not nest on Johnston Atoll (U.S. Air Force 2004).

Marine Mammals and Seabirds

The following marine mammals have been observed at Johnston Atoll: Hawaiian monk seal, humpback whale, Cuvier's beaked whale, spinner dolphin, and bottlenose dolphin (U.S. Air Force 2004).

Most marine mammals are observed near Johnston Atoll occur outside the lagoon, however one Cuvier's beaked whale has been seen inside the lagoon. Nine Hawaiian monk seals were translocated to Johnston Atoll from Laysan Island in 1984, and one or two of these tagged seals have repeatedly been observed at Johnston Atoll (U.S.ACHPPM and Raytheon 2000).

Seabirds

The following table provides a list of seabirds observed at Johnston Atoll.

Table 3-14: Seabirds of Johnston Atoll.

Scientific Name	Common Name
Fregata minor	Great frigatebird
Sula leucogaster	Brown booby
Sula dactylatra	Masked booby
Sula sula	Red-footed booby
Phaethon rubricauda	Red-tailed tropicbird
Phaethon lepturus	White-tailed tropicbird
Puffinus nativitatis	Christmas shearwater
Puffinus pacificus	Wedge-tailed shearwater
Bulweria bulwerii	Bulwer's petrel
Sterna fuscata	Sooty tern
Sterna lunata	Gray-backed tern
Gygis alba	White tern
Anous minutus	Black noddy
Anous stolidus	Brown noddy
Winter Residents	
Numenius tahitiensis	Bristle-thighed curlew
Pluvialis fulva	Pacific golden-plover
Arenaria interpres	Ruddy turnstone
Calidris alba	Sanderling
Heteroscelus incanus	Wandering tattler

Procelsterna cerulea	Blue-gray noddy

Source: U.S. Air Force 2004.

Social Environment

Although both the United States and Great Britain annexed Johnston Atoll in the mid-1850s, only the United States (American Guano Company) mined phosphates from the island (Central Intelligence World Fact Book 2005). President Calvin Coolidge designated Johnston Atoll as a Federal bird refuge in 1926, and in 1934, Franklin Roosevelt placed the atoll under U.S. Navy administration.In 1948, Johnston Atoll was managed by the U.S. Air Force, which in the 1950s 1960s used the area for high-altitude nuclear tests. Until 2000, Johnston Atoll was managed by the U.S. Department of Defense as a storage and disposal site for chemical weapons. In 2004, cleanup and closure of the storage and disposal facilities was completed. Today, the U.S. Fish and Wildlife Service continue to manage Johnston Atoll as a National Wildlife Refuge, but do allow some recreational fishing within the refuge boundary (0–3 nm). There is, designated in the Council's Coral Reef Ecosystems FMP (69 FR 8336), a low-use MPA from 0 to 50 fathoms around Johnston Atoll.

Wake Island

Wake Island is located at 19° 18' N latitude and 166° 35' E longitude, and is the northernmost atoll of the Marshall Islands Archipelago, located approximately 2,100 miles west of Hawaii. Wake Island has a total land area of 6.5 square kilometers and comprises three atolls: Wake, Peale, and Wilkes.

Coral Reefs

The potential coral reef area within the 10-fathom curve around Wake is estimated at 22.9 square kilometers (Rohmann et al. 2005). One hundred and twenty-four species of reef fish have been recorded at Wake, as well as a diverse assemblage of commercially important species of tuna, snappers, jacks, and groupers. Sharks, particularly the gray reef, are reportedly abundant. The giant clam (*T. maxima*) is reported to be abundant in the lagoon. Fishing is prohibited within the lagoon. There is, designated in the Council Coral Reef Ecosystem FMP (69 FR8336), a low-use MPA from 0 to 50 fathoms around Wake Island.

Deep Reef Slope

Data on the deep reef slope around Wake Island and the marine life it supports are unavailable. However, the area of deep reef slope is not believed to be extensive.

Pelagic Habitat

Sea surface temperatures of EEZ waters around Wake Island are often 27°–30° C.[55] Although the depth of the mixed layer in the pelagic waters around Wake Atoll is seasonally variable, average mixed layer depth is around 80 meters (R. Moffit, PIFSC, personal communication).

Sea Turtles

Green sea turtles are believed to be present in the nearshore areas around Wake Island. However, their abundance and the occurrence of other sea turtles are unknown.

Marine Mammals and Seabirds

Spinner dolphins, Pacific bottlenose dolphins (*Tursiops truncatus*), and Cuvier's beaked whales are thought to occur at Wake Island.

Seabirds

Wake Island supports a wide variety of both resident and migratory seabirds.

Social Environment

The written historical record provides no evidence of prehistoric populations on Wake Island, but Marshall Islanders are believed to have occasionally visited Wake Island, giving it the name *Enenkio*. The island was annexed by the United States in 1899. Before the 1930s, the only visitors were scientists and survivors of shipwrecks. The U.S. Navy received administrative control of Wake in 1934, and established an air base on the atoll in January 1941. Wake Island figured prominently in World War II, and the Japanese overtook U.S. forces on Wake in 1941. The United States reoccupied the atoll after the war, and administrative authority was held by the Federal Aviation Administration until 1962, when it was transferred to the Department of the Interior, which in turn assigned authority to the U.S. Air Force. Since 1994, the Department of the Army has maintained administrative use of Wake Island. This area is closed to the public and permission is needed to enter the area. The U.S. Fish and Wildlife Service is currently considering incorporating Wake Island as part of the National Wildlife Refuge system. There is, designated in the Council's Coral Reef Ecosystems FMP (69 FR 8336), a low-use MPA from 0 to 50 fathoms around Wake Island.

[55] http://oceanwatch.pifsc.noaa.gov (accessed July 2005).

PRIA Fisheries

Most of the PRIA are protected both by their isolation as well as through their status as National Wildlife Refuges. Nevertheless, nearshore fishing has occurred at Johnston Atoll, Wake Island and Palmyra Atoll. The catch at these locations is primarily surgeonfish, goatfish, rudderfish, wrasses, parrotfish, and soldierfish (Irons et al. 1990). Several outbreaks of ciguatera have been reported on Johnston that have been attributed to dredging operations. This has limited the take of fish for food, although catch and release is still common. Commercial fishing occurs at Palmyra Atoll and Kingman Reef, and recreational fishing, through The Nature Conservancy, is being developed at Palmyra. The recent renovation of the airstrip, and construction of vessel re-provisioning facilities by a fishing venture, may promote increased fishing activity in and around Palmyra Atoll and Kingman Reef.

PRIA Bottomfish Fisheries

In 1998, two Hawaii-based troll and handline vessels, and one demersal longline vessel targeting sharks, fished in the EEZ around Palmyra and Kingman Reef. These vessels targeted both pelagic and bottomfish species, including yellowfin and bigeye tuna, wahoo, mahimahi, deep slope snappers and sharks (WPRFMC 2000). One vessel made seven trips to these areas in 1999, targeting the two-spot snapper, *Lutjanus bohar*, at Kingman Reef, of which they caught 40,000 pounds total. The fishermen tested much of the catch for ciguatera without a single positive and shipped the catch to New York and Florida. They stopped fishing after results of a single specimen submitted for testing to the University of Hawaii's School of Medicine showed slight traces of ciguatera.

Very little bottomfish research has been conducted in the PRIA to date. An assessment was conducted at Johnston Atoll in 1965, looking at the effects of dredging. The Coral Reef Initiative of 1995–1996 conducted general assessments of the reefs surrounding the PRIA and a joint coral reef assessment investigation between the U.S. Fish and Wildlife Service and NMFS Honolulu Laboratory is ongoing. Cruises to Howland, Baker and Jarvis Islands, and Palmyra Atoll and Kingman Reef were conducted in 2000, 2001, and 2002. These investigations focused on the status of the shallow-water habitat including percentage of live reef coverage, biodiversity, and reef species stock assessments. As the assessments are being conducted with towed-sled scuba techniques, the deep-water habitat, including many of the commercially valuable snappers, is still unknown. To date, no data have been published from these cruises. No MSY values have been estimated for PRIA bottomfish resources.

PRIA Crustaceans Fisheries

A few fishermen have expressed interest in fishing for lobsters in the PRIA, and at least two have attempted it. In 1999, one vessel left Hawaii to explore the lobster fishery in Palmyra/Kingman waters. However, tropical lobsters (green spiny, *P. penicillatus*) do not enter traps readily, and the lobster harvest was unsuccessful as 800 traps were deployed and no lobsters were caught. They also dove on the reef to try to catch lobsters by hand, but were not very successful and returned with only 20 lobster tails. This venture was also believed to attempt to target the red crab (*Chaceon* spp.), but no information was on that catch was made available. In addition, the vessel targeted deep-water shrimp (*Heterocarpus* sp.) and red crab at 300 to 800 meters around Palmyra and Kingman. Reportedly, the operation did not lose many traps, and CPUE was very high, at approximately 30 kilograms per trap. No MSY values have been estimated for PRIA crustacean resources.

PRIA Pelagic Fisheries

As many tropical pelagic species (e.g., skipjack tuna) are highly migratory, the fishing fleets targeting them often travel great distances. Although the EEZ waters around Johnston Atoll and Palmyra Atoll are more than 750 nm and 1,000 nm, away from Honolulu, the Hawaii longline fleet does seasonally fish in those areas. For example, the EEZ around Palmyra is often visited by Hawaii-based longline vessels targeting yellowfin tuna, whereas at Johnston Atoll, albacore tuna is often caught in greater numbers than yellowfin or bigyeye tuna. Similarly, the U.S. purse seine fleet also targets pelagic species (primarily skipjack tuna) in the EEZs around some PRIA, specifically, the equatorial areas of Howland, Baker, and Jarvis Islands. The combined amount of fish harvested from these areas from the U.S. purse seine on average is less than 5 percent of their total annual harvest.

3.6 Administration and Enforcement

3.6.1 Western Pacific Regional Fishery Management Council

As mentioned in Section 1.2, the Council is one of eight regional fisheries management councils that provide advice and recommendations to the Secretary through the U.S. Department of Commerce, NOAA, and NMFS. The fishery management councils are responsible for the preparation and transmittal to the Secretary of appropriate, science-based FMPs (and amendments to those plans) for fisheries under their jurisdiction. Under the MSA, the Western Pacific Fishery Management Council has management responsibility for U.S. fisheries in the Pacific Ocean 3 to 200 miles offshore of American Samoa, CNMI, Guam, Hawaii, and the PRIA (16 U.S.C. §302(a)(H)). The Council has 13 voting members, eight of which are knowledgable about conservation and management, or commercial and recreational harvests and are appointed by the Secretary, and five of which are the principal Federal, and State, Territory or Commonwealth officials with fishery management responsibility. The Council also retains three non-voting members that include: U.S. Department of State, U.S. Fish and Wildlife Service, and the U.S. Coast Guard. The Council's office is located in Honolulu, HI and is staffed with an Executive Director, 10 staff responsible for various program areas, and 5 administrative workers. The Council also maintains island coordinators in American Samoa, CNMI, and Guam.

3.6.2 NMFS Pacific Islands Regional Office

The Pacific Islands Regional Office manages programs that support both domestic and international conservation and management of living marine resources within the Pacific. The Pacific Islands Region is comprised of American Samoa, Guam, Hawaii, the Northern Mariana Islands, and other U.S. Pacific islands. The Pacific Islands Regional Office is responsible for assisting the Council in the development of fishery management plans and amendments, drafting and implementing federal fishery regulations, issuing federal fishing permits, and monitoring fisheries through its observer program. Other major responsibilities include the conservation and recovery of protected species, the preservation and restoration of marine habitat, and the coordination with international organizations to implement and monitor fishery agreements and treaties. The Pacific Islands Regional Office has one field office located in Pago Pago, American Samoa, and staff located in Guam and CNMI.

3.6.3 NMFS Pacific Islands Science Center

Headquarted in Honolulu, HI, the Pacific Islands Fisheries Science Center (PIFSC) administers scientific research and monitoring programs that support the domestic and international conservation and management of living marine resources. PIFSC has taken a leading role in marine research on ecosystems, both in the insular and pelagic environments. It is implementing a multidisciplinary research strategy including an ecosystem observation system and scientific analysis to support ecosystem approaches to management and restoration of living marine resources. The Pacific Islands Science Center conducts a wide range of activities including, but not limited to the following:

- Resource surveys and stock assessments
- Economic and sociological studies
- Oceanographic research and monitoring
- Critical habitat evaluation
- Life history and ecology studies
- Advanced oceanographic and ecosystem modeling and simulations

3.6.4 NMFS Office of Law Enforcement Pacific Islands Division

Based in Honolulu, HI, NMFS's Office of Law Enforcement Pacific Islands Division (OLE PID) conduct investigations of alleged violations of NOAA statutes and regulations, including the MSA, the Lacey Act, the Shark Finning Prohibition Act, the Marine Mammal Protection Act, and the ESA, on the basis of case packages forwarded from the U.S. Coast Guard. NMFS OLE PID employs around nine enforcement agents and two officers. A fundamental tool utilized by NMFS OLE PID for are the Vessel Monitoring Systems (VMS), which are automated real-time, satellite-based tracking systems that transmit near-continuous position reports from vessels at sea. VMS is used in the following fisheries: American Samoa longline, Hawaii longline, and NWHI bottomfish.

3.6.5 U.S. Coast Guard

The U.S. Coast Guard's (USCG) Fourtenth Distict (Honolulu) jurisdicition is the U.S. EEZ as well as the high seas in the Western and Central Pacific. At over 10 million square miles, its area of responsibility is the largest of any U.S.CG District. The U.S.CG patrols the region with airplanes, helicopters, and surface vessels, as well as monitors vessels through VMS. The U.S.CG also maintains patrol assets on Guam.

3.7 Fishery Management Plans

The following is a discussion of the NEPA documents associated with the current species-based FMPs. Impacts of the fisheries to the human environment have been analyzed in prior NEPA documents associated with the species-based FMPs; each of the original five species-based FMPs has its own associated NEPA documents. This section contains summaries of these prior NEPA analyses to provide a fuller view of the current impacts to the fisheries of the Western Pacific Region.

FMPs are dynamic, and are often amended in response to changes in the fisheries and management unit species they are used to manage and conserve, respectively. . Impacts of the following amendments or regulatory amendments to the FMPs have been analyzed in prior NEPA documents. Implementation of future amendments or regulatory amendments to these FMPs or FEPs will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration . It is noted that several amendments or regulatory amendments to these FMPs are currently in development as this Draft Programmatic EIS is being prepared.

3.7.1 Bottomfish FMP

Bottomfish fisheries in the Federal waters that encompass the State of Hawaii, the territories of American Samoa and Guam, CNMI, and several central and western Pacific islands/atolls that are U.S. island possessions (referred to in the FMPs as Pacific remote island areas or PRIA) are managed under the Bottomfish FMP, established in 1986 (July 31, 1986; 51 FR 27413; Correction: August 26, 1986; 51 FR 30367). NEPA documents for the various amendments and regulatory amendments to the Bottomfish FMP are outlined in Table 3-15 and are many of these documents are available at the NMFS PIR website (http://www.fpir.noaa.gov/).

An updated analytical review of the impacts of the bottomfish fisheries, throughout the region, under the Bottomfish FMP was completed in a 2005 EIS (NMFS 2005c). The 2005 EIS provides a comprehensive analysis of the environmental impacts of various alternatives for management of Federal bottomfish fisheries in the Western Pacific Region. Major conclusions of the 2005 EIS are listed on pages 4 and 5 in the summary and include the following:

Target Species - Bottomfish managed unit species (BMUS) under the Bottomfish FMP are not currently overfished[56].

Non-target Species - Bottomfish fishing gear and operational practices are relatively selective for target species.

Threatened and Endangered Species Listed under the Endangered Species Act - Direct interaction between the NWHI bottomfish fishery and the endangered Hawaiian monk seal is comprised of a rare and accidental hooking event. There has been no interaction with the endangered short-tailed albatross that is known to occasionally visit the NWHI. Likewise, there have been no interactions between the fishery and threatened green sea turtles. Indirect interactions through competition between the bottomfish fishery and the Hawaiian monk seal for seal prey species are minimal and are unlikely to affect the recovery of the monk seal population.

Other Marine Mammals –Bottlenose dolphins have been observed stealing bait and catch from NWHI bottomfish vessels. These interactions are unlikely to harm individuals or populations.

Essential Fish Habitat, Biodiversity and Ecosystems - All alternatives involving continued fishing have the potential to affect habitat through anchor damage or vessel grounding. Bottomfish fishing in NWHI has been found not to adversely affect EFH, biodiversity, or ecosystems of the Western Pacific Region.

Commercial, Recreational and Charter Fishing Sectors - Alternatives that eliminate or reduce bottomfish fishing effort in the NWHI (Alternatives 2, 3 and 4 in the 2005 EIS) would result in reduced income for fishery participants and ancillary businesses. Some portion of lost revenues may be recovered if fishermen switch to other fisheries. The displacement of fishing effort from the NWHI could increase competition in the Main Hawaiian Islands. Also, local markets are likely to import bottomfish from out-of-state sources to meet consumer demands, for example, fresh local bottomfish for high-end restaurants and specific bottomfish for cultural occasions in Hawaii.

Regional Economy - All of the alternatives in the 2005 EIS would have a limited effect on the Hawaii economy.

Fishing Community - Alternatives involving continued fishing in the NWHI (Alternatives 1 A and 1B and Alternative 4A 4B in the 2005 EIS) would promote social and economic stability within the community of fishermen in Hawaii and help preserve elements of local fishing culture. Alternatives that eliminate bottomfish fishing in the NWHI (Alternatives 2 and, eventually, Alternative 3 in the 2005 EIS) could have a disproportionately adverse effect on minority populations, as minorities constitute a large portion of the total bottomfish fishery participants and bottomfish consumers.

[56] Seamount groundfish managed under the Bottomfish FMP was determined to be overfished in 1986 when the Bottomfish FMP was established and the fishery has been closed under a moratorium since that time.

Native Hawaiian Community - Participation of Native Hawaiians in the NWHI bottomfish fishery is currently low. Alternatives involving continued fishing (Alternatives 1 A and B and Alternatives 4A and B in the 2005 EIS) have the potential to encourage Native Hawaiian participation in the fishery. A Community Development Program, authorized under Section 305(i) of the MSA that would allocate 20 percent of the Mau Zone (southeastern portion of the Northwestern Hawaiian Islands) permits to Native Hawaiians is contained in Alternative 1B in the 2005 EIS. In addition, the zoning schemes of Alternative 4 in the 2005 EIS would provide Native Hawaiians preferential access to certain areas for subsistence, cultural, and religious purposes.

Administration and Enforcement - Closure of the NWHI bottomfish fishery would reduce or eliminate most of the administrative costs associated with managing the bottomfish fishery in the region. Enforcement costs would be less affected because other threats to biological resources and habitats would remain.

At the time this document is being prepared, a Record of Decision has not been issued for the 2005 EIS (NMFS 2005c). Since the 2005 EIS analysis of the impacts of the fisheries, summarized above, there have been several developments that may have altered the impact analysis and actual impacts of the bottomfish fisheries on the biological environment, and these include recent amendments to the Bottomfish FMP. There have been two amendments to the Bottomfish FMP since 2005, Amendments 8 and 9 (Table 3-15). Both amendments have accompanying environmental assessments that update the affected environment and impacts of the bottomfish fisheries on the environment. A discussion of these amendments follows.

Prior to Amendment 8 (September 12, 2006), the Federal waters that encompass CNMI were not included in the FMPs for Bottomfish, Crustaceans, or Precious Corals. Similarly, Federal waters that encompass PRIA were not included in the Bottomfish or Crustaceans FMPs. As discussed in Chapter 3, vessels have been known to fish for bottomfish and crustaceans in the Federal waters around the CNMI and PRIA, but this fishing typically occurs on a small scale. Until recently, there were no bottomfish fisheries operating in the PRIA. Moreover, currently there are no precious corals fisheries operating in the CNMI. Amendment 8 to the Bottomfish FMP addressed potential bottomfish fisheries operating in these areas. The amendment established monitoring systems and management mechanisms to implement specific regulatory controls should the need arise. The associated environmental assessments to Amendment 8 updated the analysis of the impacts of the bottomfish fisheries and management regime on the environment in the CNMI and PRIA.

Amendment 9 (November 2, 2006) to the Bottomfish FMP prohibits large vessels, that is, those 50 feet (15.2 meters) or longer, from fishing for bottomfish in Federal waters within 50 nautical miles (92.6 kilometers) around Guam, and established Federal permitting and reporting requirements for these large bottomfish fishing vessels. The associated environmental assessments to Amendment 9 updated the analysis of the impacts of the bottomfish fishery and management regime on the environment around Guam.

As noted earlier, the 2005 EIS also concludes that "[b]ottomfish species managed under the Bottomfish FMP are currently not overfished." However, concurrent with the completion of the

2005 EIS, NMFS informed the Council that the Hawaii archipelagic bottomfish multi-species stock complex, which occurs in both federal and state jurisdictions throughout the Hawaiian Archipelago, was determined to be experiencing overfishing.

Amendment 14 to the Bottomfish FMP is currently under development. Amendment 14 will contain the Council's recommendation to end overfishing of bottomfish in the Hawaiian Archipelago. A Draft Supplemental Environmental Impact Statement has been completed for this amendment, dated March 30, 2006. The proposed Federal Action in Amendment 14 is to prohibit recreational and commercial fishermen from targeting, possessing, landing, or selling any of the "deep 7 bottomfish species" (i.e., onaga, opakapaka, ehu, lehi, gindai, kalekale and hapu'upu'u) from Federal waters around Penguin Bank and Middle Bank. Historically, the proposed areas represented between 16 percent and 20 percent of MHI bottomfish landings. Penguin Bank and Middle Bank represent the majority of the deep-slope bottomfish harvest within the Federal waters (0 to 3 miles) of the MHI.

In addition, Amendment 14 would require recreational and commercial fishermen fishing in Federal waters around the MHI to obtain a Federal bottomfish permit, and to report catch and effort data to NMFS. These proposed Federal Actions are expected to reduce fishing mortality and end overfishing of bottomfish in the MHI. The associated Supplemental Environmental Impact Statement for Amendment 14 updated the analysis of the impacts of the bottomfish fisheries and management regime on the environment within the Hawaiian Archipelago.

Table 3-15. Amendments, Regulatory Amendments and the Associated National Environmental Policy Act Documents for the Bottomfish Fishery Management Plan in the Western Pacific Region.

BOTTOMFISH [1]

Fishery Management Plan (FMP)/ Amendment / Regulatory Amendment	Proposed Federal Action Analyzed	Final Rule	Associated National Environmental Policy Act Document
Bottomfish and Seamount Groundfish Fishery Management Plan	Establishment of a new FMP	July 31, 1986; 51 FR 27413 Correction: August 26, 1986; 51 FR 30367	Environmental Assessment
Amendment 1	Extension of Plan Framework to Include EEZs of American Samoa and	October 14, 1987; 52 FR 38103	Environmental Assessment

	Guam; Extension of Management Team Annual Report Deadline		
Amendment 2	Limited Entry Vessel Participation for NWHI	August 9, 1988; 53 FR 29907	Environmental Assessment
Amendment 3	Overfishing Definition Per Dept. of Commerce's Revised FMP Guidelines	January 23, 1991; 56 FR 2503	Environmental Assessment
Amendment 4	Vessel Operator Requirement to Notify NMFS for NWHI Trips	May 30, 1991; 56 FR 24351	Environmental Assessment
Amendment 5	Establishment of Limited Entry Program for Mau Zone of NWHI	May 28, 1999; 64 FR 22810	Environmental Assessment
Amendment 6	Redefinition of Overfishing Per MSA Re-approval. Amendment 6 is contained in the "Magnuson-Stevens Act Definitions and Required Provisions."	April 19, 1999; 64 FR 19067	Environmental Assessment
Amendment 7	This amendment prohibits fishing for Bottomfish Management Unit Species in the Coral Reef Ecosystems (CRE) FMP's no-take areas.	February 24, 2004; 69 FR 8336	Environmental Impact Statement, a notice of availability was published on May 10, 2002 67 FR 31801.
Bottomfish and Seamount Fishery Management Plan	An updated analytical review of the FMP	Notice of Availability of Final EIS June 17, 2005; 70 FR 35275	Environmental Impact Statement
Amendment 14: Supplemental	Measures to end Bottomfish	Draft Supplemental,	Environmental Impact

Bottomfish and Seamount Fishery Management Plan	Overfishing in the Hawaiian Archipelago	dated March 30, 2006	Statement
Amendment 8	Inclusion of EEZ Waters around Northern Mariana Islands and Pacific Remote Island Areas (PRIA).	September 12, 2006; 71 FR 53605	Environmental Assessment
Amendment 9	Limit large vessels in Federal waters around Guam	November 2, 2006; 71 FR 64474	Environmental Assessment
Amendment 10	Reserved by the Council for later use.	[-]	[-]
Amendment 11	Reserved by the Council for later use.	[-]	[-]
Amendment 12	Reserved by the Council for later use.	[-]	[-]
Amendment 13	Reserved by the Council for later use.	[-]	[-]
Amendment 14	Measures to end Bottomfish Overfishing in the Hawaiian Archipelago	Draft Supplemental, dated March 30, 2006	Environmental Impact Statement
Regulatory Amendment	Federal Requirement for Reporting Catch	October 25, 1990; 55 FR 42966	Categorical Exclusion
Regulatory Amendment	Extension of Fishing Moratorium for Hancock Seamount Fishery	August 27, 1992; 57 FR 36907	Categorical Exclusion
Regulatory Amendment	Protected Species Workshop Requirement for NWHI Operators	June 2, 1993; 58 FR 26255	Categorical Exclusion

Regulatory Amendment	Impose a 2-year moratorium on issuing new permits for harvesting bottomfish in the Mau Zone of the Northwestern Hawaiian Islands	February 26, 1997; 62 FR 8637	[Categorical Exclusion]
Regulatory Amendment	Extension of the moratorium on harvesting seamount groundfish from the Hancock Seamount in the Northwestern Hawaiian Islands until August 31, 2004	June 29, 1998; 63 FR 35162	Categorical Exclusion

[1] Lightly shaded row(s) within each section signify National Environmental Policy Act documents on the Fishery Management Plan.

3.7.2 Precious Corals FMP

Precious coral fisheries in the Federal waters that encompass the State of Hawaii, the territories of American Samoa and Guam, CNMI and several central and western Pacific islands/atolls that are U.S. island possessions or PRIA are managed under the Fishery Management Plan for Precious Coral Fisheries in the Western Pacific Region (Precious Corals FMP). NEPA documents for the various amendments and regulatory amendments to the Precious Corals FMP, which was established in 1983, are outlined in Table 3-16.

An EIS was completed for the approval and implementation of the Precious Corals FMP in 1983. The Precious Corals FMP has been amended six times since 1983 (in 1988, 1991, 1998, 1999, 2004, and 2006). Each NEPA document associated with these amendments primarily focused on the Federal action related to the particular amendment (Table 3-16). The two most recent amendments, Amendments 5 and 6, include an updated analysis of the impacts of the precious coral fisheries and management regime on the human environment within the affected areas. A discussion of these amendments follows.

Amendment 5 (February 24, 2004) prohibits the precious coral harvest in No-take Marine Protected Areas as designated by the Coral Reef Ecosystem FMP. Amendment 6 (September 12, 2006) includes the Federal waters that encompass CNMI and PRIA under the Precious Corals

FMP. Amendment 6 established monitoring systems and management mechanisms to implement specific regulatory controls should the need arise. The associated environmental assessment to Amendment 6 updated the analysis of the impacts of the Federal precious coral fisheries and management regime on the human environment in the CNMI and PRIA.

As discussed in Section 3.5, most of the recent precious coral harvest under the Precious Corals FMP has been in State of Hawaii waters. In particular, since 1980, virtually all of the black coral harvested within the Hawaiian Archipelago has been taken from the Au‘au Channel Bed. Even though a substantial portion of the Au‘au Channel Bed is located in the Federal waters and therefore under the jurisdiction of the Precious Corals FMP, all reported harvest has been confined to the waters of the State of Hawaii.

At the time this document is being prepared, a regulatory amendment to the Precious Corals FMP is in development for the fisheries in the Federal waters of the Au‘au Channel Bed (see Table 3-16). The regulatory amendment recommended by the Council would permanently remove an exemption that allows for harvest of black corals with a minimum base diameter of three-quarters of an inch by persons who reported harvest to the State of Hawaii within five years prior to the effective date of March 18, 2002. An associated environmental assessment to this regulatory amendment is being completed and will update the analysis of the impacts of Federal fisheries and management regime on the human environment around the Hawaiian Archipelago.

It is also noted that the Council announced its intention to prepare an EIS on the Federal management of precious corals in the Western Pacific Region on February 9, 2000 (65 FR 6352). The scope of the EIS analysis was to include all activities related to the conduct of the precious coral fisheries and examine the impacts of precious coral harvest on, among other things, protected species. However, with the elimination of the NWHI precious coral fishery (which will be discussed later), the need for a comprehensive analysis of Federal fisheries operating under the Precious Corals FMP throughout the Western Pacific Region has been diminished substantially. As mentioned above, the Council is developing a regulatory amendment to the Precious Corals FMP for the Federal precious coral fisheries within the Au‘au Channel Bed. The associated environmental assessment will update the analysis of the impacts of the only currently active precious coral fisheries within the region. The 2000 Notice of Intent (NOI) to prepare an EIS on the Federal management of precious corals throughout the region under the Precious Coral FMP will be withdrawn.

Table 3-16. Amendments, Regulatory Amendments and the Associated National Environmental Policy Act Documents for the Precious Coral Fishery Management Plan in the Western Pacific Region.

PRECIOUS CORAL [1]

Fishery Management Plan (FMP)/ Amendment / Regulatory Amendment	Proposed Federal Action Analyzed	Final Rule	Associated National Environmental Policy Act Document
Precious Coral Fishery Management Plan	Establishment of a new FMP	September 29, 1983; 48 FR 39229	Environmental Impact Statement (EIS)
Amendment 1	Designation of Single exclusive economic zone (EEZ) Exploratory Area	July 21, 1988; 50 FR 27519	Environmental Assessment
Amendment 2	Definition of Precious Coral Overfishing	January 28, 1991; 56 FR 3072	Environmental Assessment
Amendment 3	Establishment of Framework Procedures for New Management Measures	October 19, 1998; 63 FR 55809	Environmental Assessment
Amendment 4	Overfishing Redefinitions and Provisions Following MSA Re-approval. Amendment 4 is contained in the "Magnuson-Stevens Act Definitions and Required Provisions."	April 19, 1999; 64 FR 19067	Environmental Assessment
Amendment 5	Prohibition of Coral Harvest in No-take Marine Protected Areas Designated by Coral Reef Ecosystems (CRE) FMP.	February 24, 2004; 69 FR 8336	Environmental Impact Statement, the notice of availability was published on May 10, 2002 67 FR

			31801.
Amendment 6	Inclusion of EEZ Waters around Northern Mariana Islands and Pacific Remote Island Areas (PRIA).	September 12, 2006; 71 FR 53605	Environmental Assessment

[1] Lightly shaded row(s) within each section signify National Environmental Policy Act documents on the Fishery Management Plan.

3.7.3 Coral Reef Ecosystem FMP

On June 14, 2002, NMFS partially approved the Coral Reef Ecosystem FMP and parallel amendments to the Bottomfish FMP, Pelagics FMP, Precious Corals FMP, and the Crustaceans FMP. The Coral Reef Ecosystem FMP was approved by NMFS, with the exception of that portion of the Coral Reef Ecosystem FMP that applied to fishing in Federal waters around the NWHI. NMFS disapproved this portion of the plan because it was inconsistent with, or duplicate to, certain provisions of Executive Orders 13178 and 13196, which together established the NWHI Coral Reef Ecosystem Reserve. A final rule implementing the Coral Reef Ecosystems FMP was published on February 24, 2004 (69 FR 8336). Prior to the implementation of the Coral Reef Ecosystem FMP, coral reef ecosystem fisheries in federally managed waters of the western Pacific were unregulated under the MSA.

The Coral Reef Ecosystem FMP applies ecosystem principles to fisheries management to conserve and protect coral reef fisheries, their ecosystems, and associated habitats. The Coral Reef Ecosystem FMP adopted a precautionary approach by preventing harmful activities and adverse impacts to the environment before these impacts could occur. The 2004 Coral Reef Ecosystems FMP established a coral reef ecosystem regulatory area, marine protected areas, permitting and reporting requirements, no-anchoring zone, gear restrictions, and a framework regulatory process.

The Coral Reef Ecosystem FMP established the framework that could institute management measures rapidly in response to changes in the coral reef fishery. At the time of its inception, tt was anticipated that the Coral Reef Ecosystem FMP would maintain the sustainability of target and non-target species; safeguard against substantial damage to the ocean and coastal habitats and/or EFH; protect endangered or threatened species, marine mammals, and critical habitat; help ensure public health and safety; prevent the occurrence of cumulative adverse effects that could have a substantial effect on the target species or non-target species; promote biodiversity and ecosystem function within the affected area; and minimize, if not eliminate, negative social or economic impacts. Although state and territorial regulations control most impacts from coral reef fisheries in near-shore areas, the establishment of the Coral Reef Ecosystem FMP allows for framework measures to be established in complement with state and territorial regulations, as appropriate, for adjacent Federal waters.

The Coral Reef Ecosystem FMP was primarily a precautionary plan, as limited fisheries were occurring within the Federal waters. Prior to the implementation of the Coral Reef Ecosystem FMP, it was estimated that approximately 1 percent, 8 percent, 11 percent, and 10 percent of the total ex-vessel value of the harvest of coral reef resources was taken from Federal waters within American Samoa, Guam, Hawaii, and CNMI, respectively (p. 68 of the Coral Reef Ecosystems FMP). By the definition used in the FMP, this harvest did not include fisheries for finfish, crustaceans, and precious coral in benthic environments deeper than 50 fathoms, or in the pelagic fisheries. As of February 2006, no permits to participate in the coral reef fisheries within Federal waters have been issued.

An informal consultation under the ESA was concluded for the Coral Reef Ecosystems FMP on March 7, 2002. As a result of the informal consultation, the NMFS Regional Administrator determined that fishing activities conducted under this FMP are not likely to adversely affect endangered or threatened species or critical habitat under NMFS's jurisdiction. On May 22, 2002, the U.S. Fish and Wildlife Service concurred with this determination that the activities conducted under Coral Reef Ecosystems FMP are not likely to adversely affect listed species under their exclusive jurisdiction (i.e., seabirds and terrestrial plants) and listed species that are under shared jurisdiction with NMFS (i.e., sea turtles).

The Coral Reef Ecosystem FMP has not been amended to date.

Table 3-17. Amendments, Regulatory Amendments and the Associated National Environmental Policy Act Documents for the Coral Reef Ecosystem Fishery Management Plan in the Western Pacific Region.

CORAL REEF ECOSYSTEM

Fishery Management Plan (FMP)/ Amendment / Regulatory Amendment	Proposed Federal Action Analyzed	Final Rule	Associated National Environmental Policy Act Document
Coral Reef Ecosystem Fishery Management Plan	Establishment of a new FMP	February 24, 2004; 69 FR 8336	Environmental Impact Statement, a notice of availability was published on May 10, 2002 67 FR 31801.

3.7.4 Crustaceans FMP

Since 1983, the crustacean fisheries within the Federal waters in the Western Pacific Region have been managed under the Fishery Management Plan for Crustacean Fisheries of the Western Pacific Region (Crustaceans FMP)[57]. There have been 12 amendments to the Crustaceans FMP since 1983 (Table 3-18). The most recent amendment to the Crustaceans FMP is Amendment 12 (September 12, 2006; 71 FR 53605). Amendment 12 established new permitting and reporting requirements for vessel operators targeting crustacean species within the Federal waters of PRIA (shoreline to 200 miles) and from 3 to 200 miles of CNMI.

Similar to the Precious Corals FMP, on December 17, 1999 (64 FR 70680), the Council announced its intention to prepare an EIS on the Federal management of crustaceans in the Western Pacific Region. The scope of the EIS analysis was to include all activities related to the conduct of the Federal crustacean fisheries and examine the impacts of crustacean harvest on, among other things, protected species. At the time, the only major Federal crustacean fishery for the Western Pacific Region was occurring in the NWHI. Of particular concern were the potential direct, indirect, and cumulative impacts of the crustacean (commercial lobster) fishery in the NWHI on Hawaiian monk seal. Although it was determined direct impacts with seals had occurred with the crustacean fishery gear, indirect impacts through a reduction of the prey base of monk seal were unknown.

However, the crustacean fishery in the NWHI has been closed since 2000. This closure was reinforced by the President's proclamation establishing the Northwestern Hawaiian Islands Marine National Monument. The President's proclamation on June 15, 2006 closed most fisheries within the monument's boundaries immediately (including any potential crustacean fishery) and established that the NWHI bottomfish fishery be closed by June 15, 2011. With the elimination of the potential for a NWHI crustacean fishery, the need for a comprehensive analysis of the fisheries operating under the Crustaceans FMP was diminished substantially. Very few crustacean fisheries currently occur in the Federal waters of the Western Pacific Region. The 1999 NOI to prepare an EIS on the Federal management of crustaceans throughout the region under the Crustaceans FMP will be withdrawn.

[57] The initial FMP was for spiny lobsters but later it became Crustaceans FMP when slipper lobsters and kona crabs were included as MUS.

Table 3-18. Amendments, Regulatory Amendments and the Associated National Environmental Policy Act Documents for the Crustaceans Fishery Management Plan in the Western Pacific Region.

CRUSTACEANS [1]

Fishery Management Plan (FMP)/ Amendment / Regulatory Amendment	Proposed Federal Action Analyzed	Final Rule	Associated National Environmental Policy Act Document
Crustaceans Fishery Management Plan	Establishment of a new FMP	February 7, 1983; 48 FR 5560	Environmental Impact Statement (EIS)
Amendment 1	Coordination of Main Hawaii Island (MHI) EEZ Commercial Lobster Fishery with MHI State Regulations	November 23, 1983; 48 FR 52922	Environmental Assessment
Amendment 2	Regulation of Trap Opening Measurement	January 4, 1984; 49 FR 407	Environmental Assessment
Amendment 3	Replacement of Minimum Carapace Length with Minimum Tail Length and Elimination of 15 Percent Undersize Allowance.	March 12, 1986; 51 FR 8506	Environmental Assessment
Amendment 4	Prohibition of Fishing in Refuge Areas	March 25, 1987; 52 FR 9496	Environmental Assessment
Amendment 5	Inclusion of Slippery Lobster Management	December 15, 1987; 52 FR 47573	Environmental Assessment
Amendment 6	Adoption of Overfishing Definition Per MSA Renewal	January 28, 1991; 56 FR 3071	Environmental Assessment
Amendment 7	Fishery Restrictions in Response to	April 27, 1992;	Environmental Assessment

	Serious CPUE Declines	57 FR 10437	
Amendment 8	Adjustments to Facilitate Monitoring and Management	[December 12, 1994; 59 FR 56004]	Environmental Assessment
Amendment 9	Adoption of Constant Harvest Rate Method for Quota	July 5, 1996; 61 FR 35145	Environmental Assessment
Amendment 10	Redefinition of Overfishing Per MSA Re-approval. Amendment 10 is contained in the "Magnuson-Stevens Act Definitions and Required Provisions."	April 19, 1999; 64 FR 19067	Environmental Assessment
Amendment 11	Crustaceans Amendment for Coral Reef Ecosystem Plan	February 24, 2004; 69 FR 8336	Environmental Impact Statement, a notice of availability was published on May 10, 2002; 67 FR 31801.
Amendment 12	Inclusion of EEZ Waters around Northern Mariana Islands and Pacific Remote Island Areas (PRIA).	September 12, 2006; 71 FR 53605	Environmental Assessment
Amendment	Addition of *Heterocarpus ss*. as an MUS under the Crustaceans FMP	In Development	Environmental Assessment
Regulatory Amendment	Revises Amendment 5	December 30, 1988; 53 FR 52998	Categorical Exclusion

Regulatory Amendment	Implement a vessel monitoring system (VMS) program in the crustaceans fishery of the Northwestern Hawaiian Islands (NWHI)	July 1, 1997; 62 FR 35448	Categorical Exclusion
Regulatory Amendment	Implement three management measures, including allows fishing vessels in the Northwestern Hawaiian Islands (NWHI) lobster fishery with vessel monitoring system (VMS) units to transit the prohibited Crustaceans Permit Area 1	April 27, 1998; 63 FR 20539	Categorical Exclusion
Regulatory Amendment	This rule allocates the overall 1998 Northwestern Hawaiian Islands (NWHI) harvest guideline	July 29, 1998; 63 FR 40377	Categorical Exclusion
Regulatory Amendment	A bank-specific harvest guidelines for the NWHI crustacean fisheries	July 8, 1999; 64 FR 36820	[Categorical Exclusion]

[1] Lightly shaded row(s) within each section signify National Environmental Policy Act documents on the Fishery Management Plan.

3.7.5 Pelagics FMP

The Federal pelagic fisheries in the Western Pacific Region are managed under the Pelagics FMP, which was established in 1987. NEPA documents for the various amendments and regulatory amendments to the Pelagics FMP are outlined in Table 3-19. It is noted that an updated analytical review of the impacts of the pelagic fisheries under the Pelagics FMP, throughout the region, was completed in 2001.

The 2001 EIS provided a comprehensive analysis of the environmental impacts of various alternatives for management of U.S. pelagic fisheries in the Western Pacific Region. The fisheries analyzed in the 2001 EIS include longline fisheries in Hawaii and American Samoa; commercial troll fisheries in Hawaii, American Samoa, Guam and the CNMI; charter troll fisheries in Hawai'i, Guam and CNMI; commercial pelagic handliners in Hawaii; recreational troll fishing in Hawaii, American Samoa, Guam and CNMI; and the commercial pole-and-line skipjack fishery in Hawaii.

Based on the 2001 EIS, the associated Record of Decision provides a summary of the environmental impacts of the alternatives, along with the rational for the selection of the identified Preferred Alternative. In terms of the expected impacts of the selected alternative, the most relevant environmental resources were fish stocks, sea turtles, seabirds, and marine mammals. Potential impacts on ocean and coastal habitat, biodiversity, and ecosystem function was also assessed. The Record of Decision for the 2001 EIS found the following for the selected alternative, Alternative 4.

> Fish stocks - Fish stocks that would be affected include tunas (bigeye, yellowfin, skipjack, albacore), billfishes (swordfish, blue marlin, striped marlin), and sharks. Fishing effort by the Hawaii-based longline fishery on these stocks and consequent fishing mortality are relatively predictable. The environmental impacts of the pelagic fisheries under the Pelagics FMP with respect to target stocks, as well as stocks of other species targeted and incidentally caught, are as expected in accordance with established harvest limits . This is because the fishing mortality is likely minor compared to total fishing mortality of the stocks.
>
> Sea turtles - The 2001 EIS discusses the anticipated interaction and mortality rates of direct impacts of pelagic fishery gear and operations (managed under the Pelagics FMP) on sea turtles. The indirect effects of interactions on sea turtle populations are less certain. The analyses of these effects were addressed in a 2004 biological opinion that concluded that the anticipated interactions are not likely to jeopardize the continued existence of affected sea turtle species.
>
> Seabirds - Most seabird interactions in the Hawaii-based longline fisheries are with Laysan and blackfooted albatrosses. No interactions with the ESA-listed short-tailed albatross have been observed or reported in the pelagic fishery. Albatross interactions occur primarily in the relatively high latitudes, mostly between 25° and 40° N. latitude. A 2000 biological opinion on the Hawaii-based longline fishery issued by the U.S. Fish and Wildlife Service for the short-tailed albatross concluded that the fishery as managed in

2000 was not likely to jeopardize the continued existence of the short-tailed albatross. The selected alternative in the 2001 EIS was more restrictive, with respect to seabirds, than the management regime in place at that time.

Marine mammals - A number of marine mammal species, some of them ESA-listed, occur in the region where the Hawaii-based longline fishery occurs. However, according to the 2001 EIS, the marine mammal interaction rates and resultant adverse impacts are not expected to be substantial, in part because marine mammal interactions in the fishery are relatively rare.

Habitat - Given the inert nature of the gear used to longline and the deployment of the gear in the epipelagic zone far from coastal waters, the selected alternative was not expected to adversely affect coastal or ocean habitat, including EFH and HAPC.

Biodiversity and ecosystem function - Given that the Hawaii-based longline fishery catches a very small fraction of the total international catch and biomass in the tropical and subtropical pelagic ecosystems, the selected alternative was not expected to significantly adversely affect ecosystem function.

There have been at least two amendments and one regulatory amendment to Pelagics FMP since the 2001 EIS (Table 3-19). Both of these amendments, Amendments 10 and 11, have associated environmental assessments. The regulatory amendment has an associated EIS completed in April 2005. A discussion of these amendments and regulatory amendment follows.

Amendment 10 (February 24, 2004) prohibits the pelagic fisheries in No-take Marine Protected Areas as designated by the Coral Reef Ecosystem FMP. Amendment 11 (May 24, 2005) established a limited entry system for pelagic longline vessels fishing in the waters of the U.S. EEZ around American Samoa.

Amendment 11 was intended to establish management measures that would stabilize effort in the fishery to avoid a ''boom and bust'' cycle that could disrupt community participation and limit opportunity for substantial participation in the fishery by indigenous islanders. An environmental assessment associated with Amendment 11 analyzes the impacts of the fisheries and management regime on the human environment around American Samoa.

On November 15, 2005, NMFS issued a final rule (70 FR 69282) for a regulatory amendment to the Pelagics FMP to reduce and mitigate interactions between sea turtles and fisheries managed under the Pelagics FMP. The regulatory amendment has an associated environmental assessment, and included requirements for attending protected species workshops; for handling, resuscitating, and releasing sea turtles that are hooked or entangled in fishing gear; and for fishing gear configuration. The regulatory amendment was taken in part to comply with the terms and conditions of a 2004 biological opinion on the impacts of pelagic fishery gear and operations on sea turtles.

In the biological opinion issued on February 23, 2004, NMFS concluded that the fisheries managed under the Pelagics FMP, with terms and conditions, were not likely to jeopardize the continued existence of sea turtles or other species listed as threatened or endangered under the ESA. Among other things, the terms and conditions of the 2004 Biological Opinion require the following:

(1) owners and operators of vessels registered for use under longline general permits to attend protected species workshops annually,

(2) owners and operators of vessels registered for use under longline general permits to carry and use dip nets, line clippers, and bolt cutters, and follow handling, resuscitation, and release requirements for incidentally hooked or entangled sea turtles, and

(3) operators of non-longline vessels using hooks to target pelagic management unit species to follow sea turtle handling, resuscitation, and release requirements, as well as to remove the maximum amount of the gear possible from incidentally hooked or entangled sea turtles.

In addition to recommending the above three measures, the Council also recommended that NMFS include a fourth measure to extend to all longline vessels managed under the Pelagics FMP that may shallow-set north of the equator the conservation benefits derived from the use of circle hooks, mackerel-type bait, and dehookers. The fourth measure also removes incentives for owners of Hawaii-based longline vessels to give up their permits in favor of general permits or the purpose of avoiding the requirement to use circle hooks, mackerel bait, etc., when shallow setting north of the equator.

On December 19, 2005, NMFS issued a final rule (70 FR 75075) for a regulatory amendment to implement measures to further reduce the incidental catch of seabirds in the Hawaii-based longline fishery. Depending on the fishing method and area where the vessels operate, owners, and operators of longline fishing vessels must either side-set (deploy longline gear from the side of the vessel rather than from the stern) or use a combination of other seabird mitigation measures to prevent seabirds from being accidentally hooked, entangled, and killed during fishing operations. The NEPA document for this regulatory amendment was titled ''Final Environmental Impact Statement, Seabird Interaction Avoidance Methods under the Fishery Management Plan for Pelagics Fisheries of the Western Pacific Region and Pelagic Squid Fishery Management under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region and the High Seas Fishing Compliance Act,'' dated April, 2005. The associated Record of Decision established the selection of the Preferred Alternative of the 2005 EIS (with slight modification) to cost-effectively further reduce the potentially harmful effects of the Hawaii-based longline fishery on seabirds.

Regarding bigeye tuna managed under the Pelagics FMP, on December 15, 2004, the Council was notified by letter that the Secretary of Commerce had determined on June 14, 2004, that overfishing of bigeye tuna was occurring throughout the Pacific Ocean (69 FR 78397). On March 16, 2006, the Council was notified by letter that the Secretary of Commerce had determined that overfishing is occurring on the yellowfin tuna stock in the western and central Pacific Ocean (71 FR 14837). As required under the MSA, Amendment 14 is currently in development (as this document is being prepared) and will contain management measures intended to address this issue. The associated environmental assessment for Amendment 14 will provide an update of the impact analysis of the pelagic fisheries and management regime on the human environment.

Table 3-19. Amendments, Regulatory Amendments and the Associated National Environmental Policy Act Documents for the Pelagics Fishery Management Plan in the Western Pacific Region.

PELAGICS [1]

Fishery Management Plan (FMP)/ Amendment / Regulatory Amendment	Proposed Federal Action Analyzed	Final Rule	Associated National Environmental Policy Act Document
Pelagics Fishery Management Plan	Establishment of new FMP	February 27, 1987; 52 FR 5983 Correction: August 25, 1987; 52 FR 32015	Environmental Assessment
Amendment 1	Definition of Pelagics Overfishing	March 7, 1991; 56 FR 9686	Environmental Assessment
Amendment 2	Redefinition of FMU, Requirement of Longline Fishing Permits and Observer Coverage in NWHI	May 31, 1991; 56 FR 24731	Environmental Assessment
Amendment 3	Extension of PSZ for Longline Fishery	October 18, 1991; 56 FR 52214	Environmental Assessment
Amendment 4	Extension of Longline Moratorium	October 16, 1991; 56 FR 51849	Environmental Assessment (not CE)
Amendment 5	Permanent Establishment of MHI Area Closures	March 2, 1992; 57 FR 7661	Environmental Assessment
Amendment 6	Inclusion of Tuna in	November 27,	Environmental

	FMU and Regulation of Consistent Foreign and Domestic Vessel Regulations	1992; 57 FR 48564	Assessment
Amendment 7	Transformation of Moratorium to Limited-Entry Permit Program	June 24, 1994; 59 FR 26979	Environmental Impact Statement
Amendment 8	Permit and Reporting Requirement for the Pelagic Troll and Handline Fishery in PRIA	April 19, 1999; 64 FR 19067	Environmental Assessment
Amendment 9	Shark Quota in Longline Fishery and Prohibition of Bottom Longline Gear	[-]	[In development.]
Final Environmental Impact Statement Fishery Management Plan Pelagic Fisheries of the Western Pacific Region, March 30, 2001.	Review of the management of fisheries governed by the Pelagics FMP	The notice of availability of the Final EIS April 6, 2001; 66 FR 18243	Environmental Impact Statement
Amendment 10	Pelagics Amendment for Coral Reef Ecosystem Plan	February 24, 2004; 69 FR 8336	Environmental Assessment
Amendment 11	Measure to Limit Pelagic Longline Fishing Effort in the Exclusive Economic Zone around American Samoa	May 24, 2005 70 FR 29646	Environmental Assessment
Amendment 12	Reserved for later use.	[-]	[-]
Amendment 13	Reserved for later use - Council.	[-]	[-]
Amendment 14	Bigeye and Yellowfin Tuna Overfishing - Recommendation of Management, Monitoring, and Research Actions for	[In development]	Environmental Assessment

	International Fisheries, Including Implementation of New Permit and Reporting Requirements for Hawaii-based Non-longline Vessels		
Amendment 15	Inclusion of Squid as Managed Unit Species in and Establishment of Monitoring, Reporting, and Management of Squid.	[-]	[In development.]
Regulatory Amendment	Reporting Requirements for Catch and Effort to State Agencies	October 25, 1990; 55 FR 42967	[Categorical Exclusion]
Regulatory Amendment	Revision of Regulations Governing Identification of Longline Floats and Buoys	March 16, 1993; 58 FR 14170	[Categorical Exclusion]
Regulatory Amendment	Removal of Regulations Governing Exclusive Economic Zone off the Commonwealth of the Northern Mariana Islands and West Coast of U.S. Mainland	September 23, 1993; 58 FR 49438	[Categorical Exclusion]
Regulatory Amendment	Requirement for Longline Fishery Vessel Operators to Accommodate Observers	April 19, 1994; 59 FR 18499	[Categorical Exclusion]
Regulatory Amendment	Implementation of Experimental Vessel Monitoring Program in Pelagic Longline Fishery around Hawaii	November 15, 1994; 59 FR 58789	[Categorical Exclusion]

Regulatory Amendment	Sea Turtle Take Mitigation Measures, Including Pelagic Longline Gear Restrictions and Seasonal Area Closures	67 FR 40232; June 12, 2002	[Environmental Assessment]
Regulatory Amendment	Establishing Permit and Reporting Requirements for the Pelagic Troll and Handline Fishery in the U.S. Remote Island Areas	September 4, 2002; 67 FR 56497	Environmental Assessment
Regulatory Amendment	Management Measures to Implement New Technologies for the Western Pacific Pelagic Longline Fisheries	April 2, 2004; 69 FR 17329	Supplemental Environmental Impact Statement

Regulatory Amendment	Sea Turtle Mitigation Measures Gear and Handling Requirements, Protected Species Workshop Attendance, and Shallow- Setting Restrictions	November 15, 2005; 70 FR 69282	Environmental Assessment
Regulatory Amendment	Additional Measures to Reduce the Incidental Catch of Seabirds in the Hawaii-Based Longline Fishery	December 19, 2005; 70 FR 75075	Environmental Impact Statement
Regulatory Amendment	Allowance for Vessel Operators to Use Electronic Logbooks for Reporting Catch and Effort	[-]	[In development.]

[1] Lightly shaded row(s) within each section signify National Environmental Policy Act documents on the Fishery Management Plan.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 presents discussions of direct, indirect, and cumulative effects for each alternative considered in detail. The chapter is organized by the five action components: (1) Replacing the existing FMPs with FEPs; (2) Species to be managed under each FEP; (3) Council advisory structure; (4) Regional coordination; and, (5) International coordination (Table 4-1). The discussion under each component is further organized by alternative.

As discussed in Chapter 2, Components 1 and 2 are regulatory in nature and considered the Federal action in this document. Components 3, 4, and 5 are nonregulatory (i.e., they have no regulatory effect), and their consideration is included to assist the Council in identifying an appropriate advisory structure and coordination activities under an ecosystem-based fishery management structure. Component 2 is contingent upon selecting one of the action alternatives under Component 1 (Alternative 1B through Alternative 1E).

Table 4–1: Descriptions of the Components and list of alternatives considered in detail.

Components	Alternatives
Component 1: Replace FMPs with FEPs	Alternatives 1A-1E
Component 2: Species to be managed under each FEP	Alternatives 2A-2D
Component 3: Council Advisory Structure	Alternatives 3A-3D
Component 4: Regional Coordination	Alternatives 4A-4D
Component 5: International Coordination	Alternatives 5A-5C

4.1 Component 1: Replace FMPs with FEPs

As stated in Chapter 1, the purpose of the proposed Federal Action in this EIS is to establish an institutional framework that facilitates a shift to an ecosystem approach for fisheries management in the Western Pacific Region. The shift will be accomplished, in part, through the approval and implementation of place-based FEPs, without any substantive changes to current fishing regulations. Component 1 is the associated reorganization of existing species-based FMP regulations into place-based FEP regulations. For each alternative under Component 1 the impacts are discussed arranged by the following areas: American Samoa, Mariana, Hawaii, PRIA, and Pelagic. For each area the potential impacts on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration are discussed.

The structure of the discussion for Component 1 is intended to allow a reader interested in just one alternative and one area to focus on the description of the environmental consequences specific to that alternative and area.

4.1.1 Alternative 1A, the No Action Alternative

The following sections discuss the potential impacts of Alternative 1A, the No Action Alternative, on the physical environment; the biological environment; essential fish habitat; protected species; fishery participants and communities; and enforcement and administration. Federal fisheries in the Western Pacific Region are currently managed under five species-based FMPs: Bottomfish; Precious Corals; Coral Reef Ecosystems; Crustaceans; and Pelagics. Alternative 1A would continue fisheries management under these existing species-based FMPs and their corresponding regulations. The existing FMPs would not be changed and the proposed FEPs would not be approved or implemented. Under Alternative 1A, Federal fisheries would continue to be adaptively managed under each FMP in accordance with the MSA and other applicable laws.

American Samoa Archipelago

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the American Samoa Archipelago.

Physical Environment

The physical environment of the American Samoa Archipelago is comprised of its geology and topography as well as surrounding ocean layers, ocean depth zones, ocean water circulation, surface currents, transition zones, eddies, and deep-ocean currents. Under Alternative 1A, Federal fisheries within the American Samoa Archipelago would continue to be adaptively managed under the existing species-based FMPs.

As discussed in Chapter 3, and in more detail in Section 3.5.1.1, existing fisheries operating under the species-based FMPs in the American Samoa Archipelago may affect marine ecosystems in a variety of ways. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, or introduction of exotic species, pollution, and habitat disturbance. The day-to-day operation of a fishing vessel can produce a number of waste products, including oil, sewage, garbage, and lost gear, any of which may have a negative impact on the marine environment. However, no long-term significant impacts on the physical environment from waste products directly related to fishery operations conducted under the FMPs, within the American Samoa Archipelago, have been documented.

Additionally, the accidental grounding of fishing vessels can adversely affect marine habitat and coral reefs. Potential impacts of a vessel striking the bottom include physical harm to the marine substrate, and the possible subsequent break-up of the vessel would release fuel and oil that could result in pollution of the marine environment and mortality of marine life. However, groundings of fishing vessels operating in the Western Pacific Region are infrequent. In the occasional cases of vessel groundings in the past, some short-term localized damage to the marine substrate did take place, but no long-term impacts on the surrounding marine environment have been documented.

Biological Environment

The affected biological environment of the American Samoa Archipelago includes the benthic environment and the pelagic environment. Alternative 1A would not change the current institutional framework of FMPs, the accompanying regulations, or fishery management strategies.

The affected biological environment of the American Samoa Archipelago is discussed generally in Section 3.2 and in more detail in Section 3.5.1. The Territory of American Samoa manages all marine resources and regulated fisheries within the territorial waters of 0 to 3 miles from its shoreline. Fisheries in the EEZ (3 to 200 miles offshore) of the American Samoa Archipelago are regulated under the FMPs. Under the authority of the MSA, the Council developed and recommended (and the Secretary of Commerce approved) criteria to determine overfishing (fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region, including those for American Samoa. Where MSY has been determined for a demersal fishery within the American Samoa Archipelago, no demersal fishery has been determined to be experiencing overfishing or to be overfished. Under Alternative 1A, the status and trends of target and non-target species stocks would continue to be evaluated annually.

A discussion of the biological impacts of the demersal fisheries specific to the EEZ of the American Samoa Archipelago under each of the FMPs follows. A discussion of the biological impacts of the American Samoa pelagic fisheries may be found in Section 4.6.1.5.

Biological Impacts on Bottomfish

Biological impacts of the bottomfish fisheries in the EEZ surrounding the American Samoa are managed under the Bottomfish FMP and were comprehensively addressed in a 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15). The 2005 EIS contains relevant analysis of the impacts of the American Samoa fisheries (see Sections 3.4.3.2 and 3.5.2 and in Chapter 4 of the 2005 EIS [June 17, 2005; 70 FR 35275]) to the biological environment under Alternative 1A, the No Action alternative.

As discussed in Chapter 3, and in more detail in Section 3.5.1.3, the bottomfish fishery of American Samoa currently consists of approximately 19 part-time fishing vessels. Since few boats carry ice, the bottomfish fishing fleet typically fish within 20 miles of shore. In recent years, however, a growing number of fishermen in American Samoa have been acquiring larger (greater than 35 feet in length) vessels with the capacity for chilling or freezing fish, and as a result, these vessels have a much greater fishing range.

In 2005, a total of 16 boats from American Samoa landed an estimated 21,157 pounds of both commercial and recreational bottomfish, and approximately 30 percent of the total landing was sold commercially. Revenues from the commercial bottomfish fishery in 2005 were estimated at

$16,744, including all catch that was sold locally. The percentage of the American Samoa bottomfish harvest that comes from the EEZ is not known. Federal permits are not required to participate in the bottomfish fisheries in the EEZ that encompasses American Samoa Archipelago. However, the current annual commercial and recreational harvest levels (21,157 pounds) are well below the estimated MSY for deep-water bottomfish around American Samoa of 74,974 pounds.

Based on the low level of participation in recent years, the current estimates of the harvest being well below MSY, and the trend in harvest in this fishery, it is anticipated that future harvest from the bottomfish fishery within the American Samoa Archipelago would continue to have limited biological impacts under the status quo. NMFS and the Council are working closely with the Government of American Samoa, Department of Marine and Wildlife Resources (DMWR), on cooperative monitoring and reporting programs that will detect any substantial changes in participation or harvest in the current bottomfish fisheries originating from American Samoa.

Under Alternative 1A, the No Action Alternative, Federal bottomfish fisheries in the American Samoa Archipelago would continue to be adaptively managed under the Bottomfish FMP. No changes would occur to the regulations affecting the American Samoa fisheries under Alternative 1A. The biological impacts of the current Bottomfish FMP on the American Samoa Archipelago would continue as discussed in Section 3.5.1 and as previously analyzed in the 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15). Implementation of future management plan amendments or regulatory amendments to the Bottomfish FMP that may affect the American Samoa fisheries will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Precious Corals

As discussed in Section 3.5.1, there are no known historical or current precious coral fisheries in American Samoa. An estimate of MSY for precious coral around American Samoa has not been determined; however, an OY of 1,000 kg (all precious coral species combined) has been set for Permit Area X-P-AS, which encompasses the EEZ waters around American Samoa. A Federal permit is required to participate in precious coral fisheries in the EEZ (3 to 200 miles offshore) that encompasses American Samoa. There is no limit to the number of permits that may be issued; however, and the annual harvest for Permit Area XP-AS is 1,000 kg (all precious coral species combined). All harvest of precious corals using selective gear such as manned or unmanned underwater submersibles. Non-selective fishing gear such as tangle nets is prohibited. No exploratory permits have been issued to date. Based on the lack of participation in this Federal fishery in recent years and the selective gear requirement, it is anticipated that the biological impacts of any future fishery under the Precious Corals FMP within the American Samoa Archipelago would continue to be very limited or have no biological impact.

Under Alternative 1A, the No Action Alternative, the precious coral fisheries in the American Samoa Archipelago would continue to be adaptively managed under the Precious Corals FMP. Under this alternative, no changes would occur to the Federal regulations affecting the American Samoa fisheries. In the event that a precious coral fishery occurs within the EEZ of the American Samoa Archipelago, the fishery would be cooperatively monitored by NMFS, the Council, and the Government of American Samoa, DMWR. Implementation of future management plan amendments, or regulatory amendments to the Precious Corals FMP affecting the American Samoa fisheries, will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Coral Reef Ecosystems

Biological impacts on the coral reef fishes and invertebrates of the American Samoa under Alternative 1A would include current and potential landing levels. Coral reef fishes and invertebrates are harvested in American Samoa by various gear types including hook-and-line, spear gun, and gillnets. In 2003, approximately 25,000 pounds of coral reef species were reported landed by domestic commercial fisheries in American Samoa. Prior to the implementation of the Coral Reef Ecosystem FMP, it was estimated that approximately 1 percent of the total ex-vessel value of the harvest of coral reef resources is taken from the EEZ (3 to 200 miles offshore) that encompasses American Samoa (p. 68 of the Coral Reef Ecosystems FMP). An estimate of MSY for the coral reef fisheries around American Samoa has not been determined. A Federal permit is required for participation in the coral reef fisheries in the EEZ that encompass American Samoa for "Potentially Harvested Coral Reef Taxa" (see Appendix A). There is no limit to the number of permits that may be issued; however, applications are evaluated on a case-by-case basis and fishing activities and harvests may be restricted as a permit condition. Since the implementation of the Coral Reef Ecosystem FMP, no Federal permits have been issued.

Besides permitting requirements, the 2004 Coral Reef Ecosystems FMP established a coral reef ecosystem regulatory area, marine protected areas, permit reporting requirements, no-anchoring zones, gear restrictions, and a framework regulatory process. In 2002, an EIS (May 10, 2002 67 FR 31801) was prepared for the Coral Reef Ecosystems FMP. There have been no amendments to this FMP to date (see Table 3-17). NMFS and the Council are working closely with the American Samoa DMWR on cooperative monitoring and reporting programs that will detect any changes in participation or harvest in the current coral reef fisheries within the EEZ. Based on the lack of permit participation and limited harvest in this Federal fishery historically, it is anticipated that the future harvest from the coral reef fishery under the Coral Reef Ecosystems FMP would continue to have a very limited or no effect on the biological environment of the American Samoa Archipelago.

Under Alternative 1A, the No Action Alternative, Federal coral reef fisheries in the American Samoa Archipelago would continue to be adaptively managed under the Coral Reef Ecosystem FMP. No changes would occur to the Federal regulations affecting the American Samoa fisheries under this alternative. The biological impacts of the current coral reef fisheries under the Coral Reef Ecosystem FMP on the American Samoa Archipelago would continue as discussed in Section 3.5.1 and as previously analyzed in the 2002 EIS (May 10, 2002 67 FR 31801). Implementation of future management plan amendments or regulatory amendments to the Coral Reef Ecosystem FMP affecting American will be subject to appropriate the NEPA analysis and other applicable laws at the time of their consideration.

Biological Impacts on Crustaceans

As discussed in Section 3.5.1.3, within the American Samoa Archipelago, spiny lobster is the main crustacean species harvested, and is taken primarily by spear at night near the outer slope of the reefs by free divers while they are diving for finfish. Total annual commercial landings estimated from surveys average 1,271 pounds annually. Subsistence and recreational catches of lobster in the American Samoa Archipelago are not known at this time. However, the harvest of lobster primarily occurs in the territorial waters of American Samoa (0 to 3 miles offshore). An estimate of MSY for the crustacean fisheries around American Samoa has not been determined. A Federal permit (Permit Area 3) is required to participate in the lobster fisheries in the EEZ (3 to 200 miles offshore) that encompasses American Samoa. There is no limit to the number of permits that may be issued. There is no harvest limit placed on the permit. Since the implementation of the Crustaceans FMP, two permits have been issued for Permit Area 3. There are no active permits in the fishery as this EIS is being prepared.

Under Alternative 1A no changes would occur to the Federal regulations affecting the American Samoa crustacean fisheries. Based on the low level of participation and limited harvest historically in this Federal permit fishery, it is anticipated that the impact of future crustacean fisheries managed under the Crustaceans FMP to the biological environment of the American Samoa Archipelago would continue to be limited. Any crustacean fisheries within the EEZ will be cooperatively monitored by NMFS, the Council, and American Samoa DMWR. Implementation of future management plan amendments or regulatory amendments to the Crustaceans FMP affecting American Samoa will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Essential Fish Habitat

Under the status quo, the affected essential fish habitat (EFH) and habitat areas of particular concern (HAPC) are designated by the existing species-based FMPs. For bottomfish and crustaceans, the preferred depth ranges of specific life stages are used to designate EFH. In the case of crustaceans, the designation is further refined based on productivity data. The precious corals designation combines depth and bottom type as indicators, but it is further refined based on the known distribution of the most productive areas for these organisms. The affected EFH and HAPC for the Western Pacific Region are discussed in more detail in Section 3.3.

Under Alternative 1A, American Samoa fisheries would continue to be managed under existing FMPs. Alternative 1A would not change current Federal fisheries regulations or designations of EFH or HAPC within the American Samoa Archipelago. Thus, no changes would occur to the existing regulations affecting the American Samoa fisheries. The impacts of the current fishing activities under existing FMPs on EFH and HAPC within the American Samoa Archipelago would continue as discussed in Section 3.3 and below.

Adverse fishing impacts on these habitat areas may include physical or biological alterations to the substrate and loss of, or injury to, benthic organisms, prey species, and their habitat or other components of the ecosystems. However, the predominant fishing gear types (hook-and-line, longline, troll, traps, and submersibles) used in the fisheries cause few fishing-related impacts on the benthic habitat and other EFH occupied and used by coral reef species, bottomfish, crustaceans, or precious corals. In addition, the current management regime prohibits the use of bottom trawls, bottom-set nets, explosives, and poisons.

The following are potential sources of fishery-related impacts on EFH that may occur during normal fishing operations:

- anchor damage from vessels attempting to maintain position over productive fishing habitat;
- heavy weight and line entanglement occurring during normal hook-and-line fishing operations; and,
- lost gear (leaders, hooks, and weights) by fishing vessels

Implementation of future management plan amendments or regulatory amendments to the current FMPs that may affect the EFH and HAPC within the American Samoa Archipelago will be subject to appropriate the NEPA analysis and other applicable laws at the time of their consideration.

Protected Species

Under Alternative 1A, the American Samoa Archipelago fisheries would continue to be managed under the existing five species-based FMPs, no changes would occur to the existing regulations affecting the fisheries within the American Samoa Archipelago, and no additional impacts to protected species would be expected. The impacts on protected species from the fisheries managed under the existing FMPs within the American Samoa Archipelago would continue as discussed in Section 3.5.1.2.

When trying to balance the need to reduce interactions with protected species with the needs of fishing industries, it is important to determine how many individuals the protected species population can afford to lose before this take jeopardizes the stability (or in the case of ESA listed species, the recovery) of the species population. For species listed under the ESA, such an analysis is conducted during a Section 7 consultation, and articulated in the resultant biological opinion.

In a March 18, 2002 Biological Opinion, NMFS determined that the American Samoa bottomfish fisheries were not likely to adversely affect listed marine mammal and sea turtle populations. A March 7, 2002 informal consultation under the ESA determined that the American Samoa coral reef fisheries were not likely to adversely affect endangered species or their critical habitat. Similarly, a May 24, 1996 Biological Opinion determined that the American Samoa crustacean fisheries will not adversely affect threatened or endangered species or their critical habitat. Because of the selective methods used to harvest precious coral, an October 5, 1978 Biological Opinion determined that a precious coral fishery in American Samoa is no threat to endangered species or their critical habitat.

Alternative 1A would continue data collection programs (e.g., logbooks, observers) within the American Samoa Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated through area closures, and gear and handling requirements. Implementation of future management plan amendments or regulatory amendments to these FMPs would be reviewed to determine their potential to affect protected species within the American Samoa Archipelago and will be subject to the appropriate NEPA analysis and other statutes such as the ESA and MMPA at the time of their consideration.

Fishery Participants and Communities

American Samoa has been defined as a fishing community under the MSA. Under Alternative 1A, the fisheries within EEZ waters around the American Samoa Archipelago would continue to be managed under the five existing FMPs. No changes would occur to the regulations affecting the American Samoa Archipelago fisheries. The impacts of the current FMPs on the fishery participants and communities within the American Samoa Archipelago would continue as discussed in Chapter 3, and in more detail in Section 3.5.1.4. Over time, a species-based approach to management could fail to raise considerations of the full range of impacts by all fisheries and other activities on the marine ecosystem could result in stock depletion; overfishing; habitat damage and degradation; or loss of marine resources on which fishery participants and communities depend. Implementation of future management plan amendments or regulatory amendments to these FMPs affecting the fishery participation and communities within American Samoa will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Administration and Enforcement

In the Western Pacific Region, the management of ocean and coastal activities is conducted by a number of agencies and organizations at the Federal, state, county, and village or community levels. These groups administer programs and initiatives that address often overlapping and sometimes conflicting ocean and coastal issues.
Numerous research and data collection projects and programs have been undertaken and have resulted in the collection of huge volumes of potentially valuable detailed bathymetric and biological data, among other data. Some of this information has been processed and analyzed; however, much has proven difficult to utilize and integrate due to differences in collection methodologies coupled with a lack of metadata or documentation of how the data were collected and coded. This has resulted in incompatible datasets as well as data that are virtually inaccessible to anyone except the primary researchers

Under Alternative 1A the fisheries within EEZ waters around the American Samoa Archipelago would continue to be managed under the five existing FMPs. No changes would occur to the regulations affecting the American Samoa Archipelago fisheries under this alternative. The impacts of the current FMPs on the fishery administration and enforcement within the American Samoa Archipelago would continue as discussed in Chapter 3, and in more detail in Section 3.6. Concerns of incompatible or inaccessible datasets as discussed above would continue under this alternative. Implementation of future management plan amendments or regulatory amendments to these FMPs on the administration and enforcement affecting the American Samoa will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Mariana Archipelago

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Mariana Archipelago (Guam and CNMI combined).

Physical Environment

The physical environment of the Mariana Archipelago is comprised of its geology and topography as well as surrounding ocean layers, ocean depth zones, ocean water circulation, surface currents, transition zones, eddies, and deep-ocean currents. Under Alternative 1A, the No Action Alternative, Federal fisheries within the Mariana Archipelago would continue to be adaptively managed under the existing species-based FMPs.

As discussed in Chapter 3, in more detail in Section 3.5.2.1 for CNMI and Section 3.5.3.1 for Guam, current fisheries operating under the species-based FMPs in the Mariana Archipelago may affect marine ecosystems in a variety of ways. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can also affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, or introduction of exotic species, pollution, and habitat disturbance. The day-to-day operation of a fishing vessel can produce a number of waste products, including oil, sewage, garbage, and lost gear, any of which may have a negative impact on the marine environment. However, no long-term significant impacts on the physical environment from waste products directly related to fishery operations conducted under the FMPs, within the Mariana Archipelago, have been documented.

Additionally, the accidental grounding of fishing vessels can adversely affect marine habitat and coral reefs. Potential impacts of a vessel striking the bottom include physical harm to the marine substrate, and the possible subsequent break-up of the vessel would release fuel and oil that could result in pollution of the marine environment and mortality of marine life. However, groundings of fishing vessels operating in the Western Pacific Region are infrequent. In these occasional cases of vessel groundings in the past, some short-term localized damage to the marine substrate did take place, but no long-term significant impacts on the surrounding marine environment have been documented.

Biological Environment

The affected biological environment of the Mariana Archipelago includes the benthic environment and the pelagic environment. Alternative 1A would not change the current institutional framework of FMPs, accompanying regulations, or fishery management strategies.

Thus, this alternative would not introduce additional impacts beyond those impacts on the biological environment already analyzed.

The Mariana Archipelago includes the waters that encompass both CNMI and Guam. The affected biological environment of the Mariana Archipelago is discussed generally in Section 3.2, in more detail in Section 3.5.1 for CNMI and in Section 3.5.3 for Guam.

Similar to American Samoa as discussed above, the Territory of Guam has sole management authority for submerged lands, marine resources and regulated fisheries within the territorial waters of 0 to 3 miles from its shorelines. This is not the same for CNMI where the submerged lands from the shoreline (0) to 200 miles offshore of CNMI have all been determined to be under the jurisdiction of the Federal Government. Despite this Court ruling, the CNMI government retains its authority (and existing fishing regulations) to regulate fishing activities by CNMI residents via the issuance of business licenses and landing restrictions. Accordingly, existing Federal permitting and reporting requirements apply to fishing activities for those fisheries operating in that portion of the EEZ from 3 to 200 miles offshore surrounding the CNMI. NMFS and the Council work closely with the marine resource management agencies of CNMI (Department of Land and Natural Resources, Division of Fish and Wildlife, or DFW) and the Territory of Guam (Division of Aquatic Resources or DAWR) on cooperative monitoring and reporting programs for Federal fisheries, including those occurring within 0 to 3 miles of the shoreline of CNMI.

Where MSY has been estimated for a demersal fishery in the Mariana Archipelago, none have been determined to be experiencing overfishing or to be overfished. Under Alternative 1A, the status and trends of target and non-target species would continue to be evaluated annually. A discussion of the biological impacts of the demersal fisheries specific to the EEZ of the Mariana Archipelago under each of the FMPs follows. A discussion of the biological impacts of the Mariana Archipelago pelagic fisheries may be found in Section 4.6.1.5.

Biological Impacts on Bottomfish

Biological impacts of the bottomfish fisheries managed under the Bottomfish FMP throughout the region, including those for the fisheries in the EEZ of the Mariana Archipelago, were addressed in a 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15), and contain relevant analysis of the impacts under Alternative 1A, the No Action alternative. The Mariana Archipelago includes the waters that encompass both the CNMI and Guam and each will be discussed separately.

Commonwealth of the Northern Mariana Islands

As discussed in Section 3.5.2.3, the CNMI bottomfish fisheries are categorized into two segments: deep (greater than 500 feet) and shallow (less than 500 feet) water fisheries. The deepwater fishery is primarily commercial, whereas the shallow-water fishery includes commercial, recreational, and subsistence fishermen. CNMI DFW and Guam DAWR work cooperatively with NMFS and the Council to monitor fisheries. In the CNMI bottomfish fisheries, there are approximately 150 skiffs used for subsistence and recreational fishing and 8 vessels, ranging from 29 to 70 feet used commercially within the EEZ around CNMI. As discussed in Chapter 3, this fishery has a high turnover rate of participants as an increasing number of local fishermen are focusing more on reef fishes in preference to bottomfish.

In 2004, it is estimated that 54,452 pounds of commercial landings of bottomfish were made, with a total ex-vessel value of $142,260 in the CNMI bottomfish fisheries. Recreational and subsistence bottomfish harvest for CNMI are unknown. All of the CNMI bottomfish harvest occurs in the EEZ (0 to 200 miles offshore). Federal permits are not required to participate in the bottomfish fisheries in the EEZ of CNMI.[58] However, the total combined harvest is estimated to be under the MSY of 184,254 pounds of bottomfish estimated for the CNMI bottomfish fisheries (see Table 3–4). NMFS and the Council are working closely with CNMI, DFW on cooperative monitoring and reporting programs that will detect any substantial changes in participation or harvest in current fisheries.

Guam

Similar to CNMI, there are two distinct Guam bottomfish fisheries. The shallow-water component is the larger of the two in terms of participation because of the lower expenditure for effort and relative ease of fishing close to shore. Participants in the shallow-water component seldom sell their catch because they fish mainly for recreational or subsistence purposes. As discussed in Section 3.5.3, it is estimated that less than 20 percent of the total shallow-water marine resources harvested in Guam are taken outside 3 miles from shore, thus in Federal waters. The commercially oriented vessels tend to be longer than 25 feet, and their effort is usually concentrated on the deep-water bottomfish complex. It is reported that in 2004, 233 domestic vessels landed 61,601 pounds of bottomfish in Guam, with an ex-vessel value of $69,186. Of this harvest, 35,761 pounds were both deep-water and shallow-water Bottomfish MUS (see Table 3–15), with the remaining harvest made up of non-Bottomfish MUS. Recreational and subsistence bottomfish harvest for Guam are unknown. The percentage of the Mariana Archipelago bottomfish harvest from Guam that occurs in the EEZ (3 to 200 miles offshore) is not known. However, total harvest of deep-water Bottomfish MUS is estimated to be under the MSY established for Guam's deep-water bottomfish fishery of 56,863 pounds. An estimate of MSY for the shallow-water bottomfish fisheries around Guam has not been determined. NMFS and the Council are working closely with Guam, DAWR on cooperative monitoring and reporting programs that will detect any substantial changes in participation and harvest in current bottomfish fisheries

With the exception of large vessels (50 feet or longer), Federal permits are not required to participate in the bottomfish fisheries in the EEZ that encompass Guam. Amendment 9 (November 2, 2006; 71 FR 64474) to the Bottomfish FMP prohibits large vessels, that is, those 50 feet (15.2 meters) or longer, from fishing for bottomfish in Federal waters within 50 nautical miles (92.6 kilometers) around Guam, and established Federal permitting and reporting requirements for these large bottomfish fishing vessels. The associated environmental assessments to Amendment 9 updated the analysis of the impacts of the bottomfish fisheries and management regime on the human environment around Guam.

[58] The Council has recommended permit and reporting requirements for all commercial bottomfish fishermen operating within the EEZ around CNMI. The regulatory package is currently being processed by NMFS.

Mariana Archipelago

Where MSY has been estimated for demersal fisheries in the Mariana Archipelago (CNMI and Guam), none have been determined to be experiencing overfishing or to be overfished. Under Alternative 1A, the status and trends of target and non-target species would continue to be evaluated annually.

Under Alternative 1A, the Mariana Archipelago fisheries within the EEZ would continue to be managed under the current framework, regulations, and management strategies and subject to adaptive management under the Bottomfish FMP. No changes would occur to the regulations affecting the Mariana Archipelago bottomfish fisheries under this alternative. The impacts of the current Federal bottomfish fisheries within the Mariana Archipelago on the biological environment would continue as discussed in Section 3.5.2.3 for CNMI and Section 3.5.3.3 for Guam, respectively, and as previously analyzed in the 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15). Implementation of future management plan amendments or regulatory amendments to the Bottomfish FMP that may affect the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Biological Impacts on Precious Corals

The Mariana Archipelago includes the waters that encompass both CNMI and Guam. As discussed in Section 3.5.2.3 for CNMI, there are no known precious coral fisheries that are currently operating in the EEZ of CNMI (0 to 200 miles offshore). Furthermore, as discussed in Section 3.5.3.3 for Guam, there is no precious coral fishery currently operating within the territorial waters of Guam (0 to 3 miles offshore), nor have there been any reported landings of precious corals harvests from the EEZ that encompass Guam (3 to 200 miles offshore). An estimate of MSY for precious coral around the Mariana Archipelago has not been determined; however, an OY of 1,000 kg (all precious corals species combined) have been set for Permit Areas XP-G (EEZ waters around Guam) and XP-CNMI (EEZ waters around CNMI). Annual harvests for each area are limited to 1,000 kg (all precious coral species combined), and the use on non-selective gear is prohibited. A Federal permit is required to participate in precious coral fisheries in the EEZ of 3 to 200 miles that encompass both CNMI and Guam. There is no limit to the number of permits that may be issued. No Federal permits have been issued to date. Although, it is noted that no Federal permit is required to target precious coral within the EEZ of CNMI from shoreline (0) to 3 miles offshore.

Amendment 6 (September 12, 2006; 71 FR 53605) to the Precious Corals FMP established new permitting and reporting requirements for vessel operators targeting precious coral within the EEZ, 3 to 200 miles offshore only, of CNMI (see Table 3-16). The intent of the amendment is, in the event of a fishery, to improve the understanding of the ecology of these precious corals and the activities and harvests of the vessel operators that may target them. The associated environmental assessments to Amendment 6 provided an updated analysis of the impacts of the potential precious coral fisheries and management regime on the biological environment around CNMI.

Under Alternative 1A, the Mariana Archipelago precious coral fisheries would continue to be managed under the current framework, regulations and management strategies and subject to the adaptive management under the Precious Corals FMP. No changes would occur to the Federal regulations affecting the Mariana Archipelago precious coral fisheries under this alternative. In the event that a precious coral fishery occurs within the Mariana Archipelago, the fisheries would be cooperatively monitored by NMFS, the Council, CNMI, DFW and Territory of Guam, DAWR.

Based on the lack of permits issued and no reported harvest in the Federal permit fishery, it is anticipated that the future impacts on the biological environment of the Mariana Archipelago by Federal fisheries under the Precious Corals FMP would continue to be limited or insignificant. NMFS and the Council are working closely with CNMI, DFW and Guam, DAWR on cooperative monitoring and reporting programs that will detect any changes in participation or harvest in current precious coral fisheries. Implementation of future management plan amendments or regulatory amendments to the Precious Corals FMP that may affect the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable at the time of their consideration.

Biological Impacts on Coral Reef Ecosystem

The 2004 Coral Reef Ecosystems FMP established a coral reef ecosystem regulatory area, marine protected areas, permitting and reporting requirements, no-anchoring zones, gear restrictions, and a framework regulatory process. In 2002, an EIS (May 10, 2002 67 FR 31801) was prepared for the Coral Reef Ecosystems FMP. There have been no amendments to this FMP to date (see Table 3-17).

The Mariana Archipelago includes the waters that encompass both CNMI and Guam and will be discussed separately.

Commonwealth of the Northern Mariana Islands

As discussed in Section 3.5.2.3, in CNMI, commercial landings of coral reef fish were approximately 136,000 pounds in 2003 and included harvests of parrotfish, surgeonfish, goatfish, snappers, and emperors. The harvest of subsistence or recreational fishermen is unknown. An estimate of MSY for the coral reef ecosystem fisheries around CNMI has not been determined. However, coral reef fisheries in the CNMI are believed to be in good condition, but local depletion may be occurring in some areas.

A Federal permit is required to participate in the coral reef fisheries that encompass CNMI for Potentially Harvested CREMUS (see Appendix A) from 3 to 200 miles offshore. There is no limit to the number of permits that may be issued, however applications are evaluated on a case-by-case basis fishing activities and harvests may be restricted as a permit condition. A Federal permit is not required to harvest other CREMUS. Additionally, a Federal permit is not required to harvest oral reef fishes or invertebrates within the EEZ from shoreline (0) to 3 miles offshore of CNMI. No CNMI Federal permits have been issued to date. NMFS and the Council are working closely with the CNMI, DFW on cooperative monitoring and reporting programs that will detect any changes in participation in current coral reef fisheries within the EEZ (0 to 200 miles offshore).

Guam

As discussed in Section 3.5.3.3, in Guam, total coral reef fish landings for 2002 and 2003 were estimated at 273,799 pounds and 306,626 pounds, respectively. The harvest of subsistence or recreational fishermen is unknown. An estimate of MSY for precious coral around Guam has not been determined. However, coral reef fisheries in Guam are believed to be in good condition.

Prior to the implementation of the Coral Reef Ecosystems FMP, it was estimated that approximately 8 percent of the total ex-vessel value of the harvest of coral reef resources is taken from the EEZ (3 to 200 miles offshore) surrounding Guam (p. 68 of the Coral Reef Ecosystems FMP; May 10, 2002; 67 FR 31801). A Federal permit is required to participate in the coral reef fisheries in the EEZ that surrounds Guam (3 to 200 miles offshore) for Potentially Harvested Coral Reef Taxa. There is no limit to the number of permits that may be issued, however applications are evaluated on a case-by-case basis fishing activities and harvests may be restricted as a permit condition. Since the implementation of the Coral Reef Ecosystem FMP no Federal permits have been issued. NMFS and the Council are working closely with the Territory of Guam, DAWR on cooperative monitoring programs that will detect any changes in participation or harvest in current coral reef fisheries.

Mariana Archipelago

Under Alternative 1A, the status and trends of target and non-target species would continue to be evaluated annually. Under Alternative 1A, the Mariana Archipelago fisheries would continue to be managed under the current framework, regulations, and management strategies and subject to adaptive management under the Coral Reef Ecosystem FMP. No changes would occur to the regulations affecting the Mariana Archipelago coral reef fisheries under this alternative. The biological impacts of the current Coral Reef Ecosystems FMP on the Mariana Archipelago would continue as discussed in Section 3.5.2.3 for CNMI and Section 3.5.3.3 for Guam and as previously analyzed in the 2002 EIS (May 10, 2002 67 FR 31801). Implementation of future management plan amendments or regulatory amendments to the Coral Reef Ecosystem FMP affecting the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Crustaceans

The Mariana Archipelago includes the waters that encompass both CNMI and Guam and are discussed separately below. A more detailed discussion of the fisheries managed under the Coral Reef Ecosystem FMP within the Mariana Archipelago may be found in Section 3.5.2.3 for CNMI and Section 3.5.3.3 for Guam.

Commonwealth of the Northern Mariana Islands

The CNMI crustacean fisheries primarily target spiny lobster in nearshore waters, with reported catches taken almost exclusively within the 0 to 3 mile zone of the inhabited southern islands. Beyond 3 miles offshore, the topography in most locations drops off steeply. The directed commercial fishery is relatively small, with 493 pounds of commercial landings estimated for 2003. The level of harvest for the subsistence or recreational fisheries is unknown. As mentioned earlier, EEZ waters around CNMI extend from 0 to 200 miles offshore. With regard to the crustacean fisheries, a Federal permit is required to participate in the lobster fisheries within 3 to 200 miles offshore of CNMI. There is no limit to the number of permits that may be issued. No Federal permits have been issued to date. No Federal is required to participate in the crustacean fisheries from the shoreline to 3 miles offshore of CNMI.

Amendment 12 (71 FR 53605; September 12, 2006) to the Crustaceans FMP established permitting and reporting requirements for vessel operators targeting lobsters with the EEZ, from 3 to 200 miles offshore only, of CNMI (see Table 3-19). The intent of the amendment was, to improve the understanding of the ecology of these species and of the activities and harvests of the vessel operators that may target them. The associated environmental assessments to Amendment 6 provided an updated analysis of the impacts of the lobster fisheries and management regime on the biological environment around CNMI.

Guam

Fishing for crustaceans around Guam occurs primarily in territorial waters, usually in the subsistence or recreational fisheries. In 2003 it is estimated that a total of 2,225 pounds of spiny lobsters with a total ex-vessel value of $7,279 were commercially harvested from the territorial waters (0 to 3 miles offshore) around Guam. The level of harvest for the subsistence or recreational fisheries is unknown A Federal permit is required to participate in the lobster fisheries within the EEZ, 3 to 200 miles offshore of Guam. There is no limit to the number of permits that may be issued. In 2004, two such Federal permits were issued to vessels. There is no harvest limit placed on the permit. No Federal permits were issued to fish for lobsters in the Federal water around Guam in either 2005 or 2006.

Mariana Archipelago

Under Alternative 1A, the Mariana Archipelago crustacean fisheries would continue to be managed under the current framework, regulations, and management strategies, and subject to adaptive management under the Crustaceans FMP. No changes would occur to the regulations affecting the Mariana Archipelago crustacean fisheries under this alternative. An estimate of the MSY for the deepwater caridean shrimp, (*Heterocarpus laevigatu*) has been made for the Mariana Archipelago (CNMI and Guam combined) Federal fisheries, which is 162 ton per year. Mariana Archipelago deepwater caridean shrimp is not experiencing overfishing or to be overfished at this time.

Under Alternative 1A, the status and trends of target and non-target species would continue to be evaluated annually. Based on the limited permits issued historically and no reported harvest in the Federal permit fishery, it is anticipated that the future impacts on the biological environment of the Mariana Archipelago by Federal fisheries under the Crustaceans FMP would continue to be limited or have no impacts, including for the deepwater caridean shrimp . NMFS and the Council are working closely with the Territory of Guam, DAWR on cooperative monitoring programs that will detect any changes in participation in current crustacean fisheries. Implementation of future management plan amendments or regulatory amendments to the Crustaceans FMP affecting the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Essential Fish Habitat

Under Alternative 1A, the affected EFH and HAPC are designated by the existing species-based FMPs. For bottomfish and crustaceans, the preferred depth ranges of specific life stages are used to designate EFH. In the case of crustaceans, the designation is further refined based on productivity data. The precious corals designation combines depth and bottom type as indicators, but it is further refined based on the known distribution of the most productive areas for these organisms. The affected EFH and HAPC for the Western Pacific Region are discussed in Chapter 3, and in more detail in Section 3.3.

Under Alternative 1A, Mariana Archipelago fisheries would continue to be managed under existing FMPs. Alternative 1A would not change current Federal regulations or designations of EFH or HAPC within the Mariana Archipelago. Thus, no changes would occur to the existing regulations affecting the Mariana Archipelago fisheries. The impacts of the current activities under existing FMPs on EFH and HAPC within the Mariana Archipelago would continue as discussed below and in more detail in Section 3.3.

Adverse fishing impacts on these habitat areas may include physical or biological alterations to the substrate and loss of, or injury to, benthic organisms, prey species, and their habitat or other components of the ecosystems. However, the predominant fishing gear types, hook-and-line, longline, troll, traps, and submersibles, used in the Mariana Islands fisheries cause few fishing-related impacts on the benthic habitat and other EFH occupied and used by coral reef species, bottomfish, crustaceans, or precious corals. In addition, the current management regime prohibits the use of bottom trawls, bottom-set nets, explosives, and poisons.

The following are potential sources of fishery-related impacts on EFJ that may occur during normal fishing operations:

- anchor damage from vessels attempting to maintain position over productive fishing habitat;
- heavy weight and line entanglement occurring during normal hook-and-line fishing operations; and,
- lost gear (leaders, hooks, and weights) by fishing vessels

Implementation of future management plan amendments or regulatory amendments to the current FMPs that may affect the EFH and HAPC within the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Protected Species

Under Alternative 1A, the Mariana Archipelago fisheries would continue to be managed under the existing five species-based FMPs, no changes would occur to the existing regulations affecting the fisheries within the Mariana Archipelago and no additional impacts on protected species would be expected. The impacts on protected species from the fisheries managed under the existing FMPs within the Mariana Archipelago would continue as discussed in Section 3.5.2.3 and Section 3.5.3.2 for CNMI and Guam, respectively.

When trying to balance the need to reduce interactions with protected species and the needs of fishing industries, it is important to determine how many individuals the protected species population can afford to lose, before this take jeopardizes the stability (or in the case of ESA listed species, the recovery) of the species population. For species listed under the ESA, such an analysis is conducted during a Section 7 consultation, and articulated in the resultant biological opinion.

In a March 18, 2002 Biological Opinion, NMFS determined that the CNMI and Guam bottomfish fisheries were not likely to adversely affect listed marine mammal and sea turtle populations. A March 7, 2002 informal consultation under the ESA determined that the CNMI and Guam coral reef fisheries were not likely to adversely affect threatened or endangered species or their critical habitat. Similarly, a May 24, 1996 Biological Opinion determined that the Mariana Archipelago's crustacean fisheries will not adversely affect threatened or endangered species or their critical habitat. Because of the selective methods used to harvest precious coral, an October 5, 1978 Biological Opinion determined that the Guam's precious coral fishery is no threat to endangered species or their critical habitat. Similarly, a July 21, 1988 informal consultation under the ESA determined that CNMI precious coral fishery was not likely to adversely affect listed species.

Alternative 1A would continue the cooperative (NMFS, the Council, CNMI, DFW and Guam, DAWR) data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated through area closures, and gear and handling requirements. Implementation of future management plan amendments or regulatory amendments to these FMPs would be reviewed to determine their potential to affect protected species within the Mariana Archipelago and will be subject to the appropriate NEPA analysis and other statutes such as the ESA or MMPA at the time of their consideration.

Fishery Participants and Communities

CNMI and Guam have each been defined as fishing communities under the MSA. Under Alternative 1A Federal fisheries within the Mariana Archipelago would continue to be managed under the current five species-based FMPs. No changes would occur to the regulations affecting the Mariana Archipelago fisheries under this alternative. The impacts of the current FMPs on the fishery participants and communities within the Mariana Archipelago would continue as discussed in Section 3.5.2.4 and Section 3.5.3.4 for CNMI and Guam, respectively. Over time, a species-based approach to management could fail to raise considerations of the full range of impacts by all fisheries and other activities on the marine ecosystem, which could result in stock depletion; overfishing; habitat damage and degradation; or loss of marine resources on which fishery participants and communities depend. Implementation of future management plan amendments or regulatory amendments to these FMPs that could impact these communities will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Administration and Enforcement

In the Western Pacific Region, the management of ocean and coastal activities is conducted by a number of agencies and organizations at the Federal, state, county, and village or community levels. These groups administer programs and initiatives that address often overlapping and sometimes conflicting ocean and coastal issues.
Numerous research and data collection projects and programs have been undertaken and have resulted in the collection of huge volumes of potentially valuable detailed bathymetric and biological data, among other data. Some of this information has been processed and analyzed by fishery scientists and managers; however, much has proven difficult to utilize and integrate due to differences in collection methodologies coupled with a lack of metadata or documentation of how the data were collected and coded. This has resulted in incompatible datasets as well as data that are virtually inaccessible to anyone except the primary researchers

Under Alternative 1A the fisheries within EEZ waters around the Mariana Archipelago would continue to be managed under the existing five species-based FMPs. No changes would occur to the regulations affecting the Mariana Archipelago fisheries under this alternative. The impacts of the current FMPs on the fishery administration and enforcement within the Mariana Archipelago would continue as discussed in Section 3.6. Concerns of incompatible or inaccessible datasets would continue as discussed above under this alternative. Implementation of future management plan amendments or regulatory amendments to the FMPs on the administration and enforcement affecting the Mariana Archipelago will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Hawaiian Archipelago

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Hawaiian Archipelago.

Physical Environment

The physical environment of the Hawaiian Archipelago is comprised of its geology and topography as well as surrounding ocean layers, ocean depth zones, ocean water circulation, surface currents, transition zones, eddies, and deep-ocean currents. Under Alternative 1A, the No Action Alternative, Federal fisheries within the Hawaiian Archipelago would continue to be adaptively managed under the species-based FMPs.

As discussed in Chapter 3, and in more detail in Section 3.5.4.1, existing fisheries operating under the current species-based FMPs in the Hawaiian Archipelago may affect marine ecosystems in a variety of ways. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, or introduction of exotic species, pollution, and habitat disturbance. The day-to-day operation of a fishing vessel can produce a number of waste products, including oil, sewage, garbage, and lost gear which may have a negative impact on the marine environment. However, no long-term significant impacts on the physical environment from waste products directly related to fishery operations conducted under the FMPs, within the Hawaiian Archipelago, have been documented.

Additionally, the accidental grounding of fishing vessels can adversely affect marine habitat and coral reefs. Potential impacts of a vessel striking the bottom include physical harm to the marine substrate, and the possible subsequent break-up of the vessel would release fuel and oil that could result in pollution of the marine environment and mortality of marine life. However, groundings of fishing vessels operating in the Western Pacific Region are infrequent. In these occasional cases of vessel groundings in the past, some short-term localized damage to the marine substrate did take place, but no long-term significant impacts on the surrounding marine environment have been documented.

Biological Environment

The affected biological environment of the Hawaiian Archipelago includes the benthic environment and the pelagic environment. Alternative 1A would not change the current institutional framework of FMPs, accompanying regulations, or fishery management strategies. Thus, this alternative would not introduce additional impacts beyond those impacts on the biological environment already analyzed. The affected biological environment of the Hawaiian Archipelago is discussed generally in Section 3.2 and in more detail in Section 3.5.4.

A discussion of the impacts of the demersal fisheries on the biological environment, specific to the Hawaiian Archipelago under each of the FMPs follows. A discussion of the impacts of Hawaii’s pelagic fisheries on the biological environment may be found in Section 4.6.1.5.

Biological Impacts on Bottomfish

Biological impacts of the bottomfish fisheries (managed under the Bottomfish FMP) throughout the region, including those for the fisheries in the Hawaiian Archipelago, were addressed in a 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15). One such subsequent NEPA document is the Draft Supplemental Environmental Impact Statement for Amendment 14 (April 14, 2006; 71 FR 19505). The NEPA document for Amendment 14 updated the affected environment and analysis of the impacts of

Federal fisheries under the Bottomfish FMP on the biological environment within the Hawaiian Archipelago. Additionally, a recent President proclamation (discussed below) also impacts the biological environment from the Federal bottomfish fishery within the NWHI.

The Hawaiian Archipelago can be divided in two management areas, the MHI and the NWHI (comprised of Mau and Hoomalu Zones). As discussed in Section 3.5.4.3, based on recent harvest data, commercial bottomfish catches in the MHI fishery represent approximately 60 percent of the total commercial bottomfish harvest within the Hawaiian Archipelago. The harvest of bottomfish from subsistence and recreational fishermen is unknown. Based on recent bottomfish surveys, it is estimated that approximately 52 percent of the MHI deep-slope bottomfish habitat (100-400 m) is within the EEZ. A Federal permit is not required to participate in the bottomfish fisheries within the EEZ of the MHI (3 to 200 miles offshore). Historically, the MHI bottomfish fishery has been managed by the State of Hawaii.

The commercial bottomfish harvest in the NWHI occurs in the EEZ (3 to 200 miles offshore) and is managed under the Bottomfish FMP. A Federal permit is required to participate in the bottomfish fisheries within the NWHI. The maximum number of permits that may be issued for the Federal NWHI bottomfish fishery is 9. As mentioned earlier, pursuant to the executive proclamation on June 15, 2006 establishing the Northwestern Hawaiian Islands National Marine Monument, most fisheries within the NWHI were closed (71 FR 51134, August 29, 2006). The proclamation will close the Federal bottomfish fisheries in the NWHI in 2011, and placed the fishery on an annual landing limit until that time.

In 2004, the MHI commercial bottomfish fishery caught 366,358 pounds bottomfish. Commercial bottomfish landings for 2004 in the NWHI (Mau and Hoomalu Zones combined) were 264,785 pounds. The total Hawaiian Archipelago bottomfish commercial landings in 2004 were 627,927 pounds. Subsistence and recreational bottomfish fishermen are not required to obtain a permit and there are no reporting requirements; limited data exists on subsistence or recreational harvests, however some studies have indicated that the recreational MHI bottomfish catch may be up to double the MHI commercial catch. The estimated MSY value for the MHI bottomfish fishery is estimated at 364,441 pounds. The estimated MSY values for the Mau and Hoomalu Zones bottomfish fisheries are at 100,399 pounds and 348,385 pounds, respectively (Moffit et al. 2006).

The MSA requires the Secretary of Commerce to annually report to Congress on the status of fisheries within each regional fishery management council's geographical area of authority and identify those fisheries that are overfished or approaching a condition of being overfished (16 U.S.C 1854(e)(1)). Based on MSA National Standard 1 guidelines a stock or population is subject to overfishing if the fishing mortality rate exceeds the maximum fishing mortality threshold (MFMT) for one year (50 CFR 600.310). The MFMT for Hawaii's Bottomfish MUS complex is specified in Amendment 6 of Bottomfish FMP. In 2005, NMFS determined that overfishing of the bottomfish multi-species complex was occurring within the Hawaiian Archipelago. On behalf of the Secretary of Commerce, the NMFS Regional Administrator for the Pacific Islands Regional Office (PIRO) notified the Council of this overfishing determination on May 27, 2005 (70 FR 34452, June 14, 2005).

The Council recommended and prepared (within the required one year time frame) Amendment 14 to the Bottomfish FMP to end overfishing of the bottomfish complex in the Hawaiian Archipelago. The NEPA analysis for this amendment is currently under development. The proposed Federal Action in Amendment 14 is to prohibit recreational and commercial fishermen from targeting, possessing, landing, or selling any of the "deep 7 bottomfish species" (i.e., onaga, opakapaka, ehu, lehi, gindai, kalekale and hapu'upu'u) from the Federal waters of Penguin Bank and Middle Bank. Historically, the proposed areas represented between 16 percent and 20 percent of the total MHI bottomfish landings. Penguin Bank and Middle Bank have produced the majority of the deep-slope bottomfish harvest within EEZ waters (3 to 200 miles offshore) around the MHI. It is anticipated that following the closure of the NWHI bottomfish fishery (by 2011), and with the potential closure of Penguin Bank and Middle Bank (under Amendment 14), the bottomfish harvest anticipated from the EEZ of the Hawaiian Archipelago would be greatly reduced. The Council also recommended in Amendment 14 to require Federal permit and reporting for both commercial and recreational sectors of the MHI bottomfish fishery so as to facilitate improved monitoring of the fishery.

Under Alternative 1A, the Hawaiian Archipelago Federal bottomfish fisheries would continue to be managed under the existing framework, regulations, and management strategies, and subject to adaptive management under the Bottomfish FMP. NMFS and the Council work closely with the State of Hawaii (specifically Hawaii Division of Aquatic Resources) on cooperative monitoring and reporting programs for fisheries in the Hawaiian Archipelago. No changes would occur to the regulations affecting the Hawaiian Archipelago fisheries under this alternative. The impacts of the current Hawaiian Archipelago bottomfish fisheries on the biological environment would continue as discussed in Section 3.5.4.3 and as previously analyzed in the 2005 EIS (June 17, 2005; 70 FR 35275), as updated in the NEPA document for Amendment 14 (see Table 3-15). Implementation of future management plan amendments or regulatory amendments to the Bottomfish FMP that may affect the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Precious Corals

As discussed in Section 3.5.4.3, most of the recent harvest under the Precious Corals FMP has come from the waters of the State of Hawaii. Since 1980, virtually all of the black coral harvested around the Hawaiian Islands has been taken from the Au‘au Channel Bed. The reported harvest from this bed has been confined to the waters of the State of Hawaii (0 to 3 miles offshore). However, the State of Hawaii estimates that approximately 15 percent of the black coral harvested from the Au'ua Channel Bed is collected from further than 3 miles of the shoreline (DLNR 1979). A substantial part of the Au‘au Channel Bed is located in the EEZ (3 to 200 miles offshore) and under the jurisdiction of the Precious Corals FMP. A Federal permit is required to participate in the precious coral fishery within the EEZ waters around the Hawaiian Archipelago, including the portion of the Au‘au Channel Bed within Federal waters. There is no limit to the number of permits that may be issued. Only two Federal permits have ever been issued. One permit was issued in 2005 and another in 2006. No harvest of precious corals in the EEZ was reported under these permits in either year.

Under Alternative 1A the impacts of the Federal precious coral fisheries within the Hawaiian Archipelago, as managed under the Precious Corals FMP, would continue as discussed in Section 3.5.4.3. The Hawaiian Archipelago Federal fisheries would continue to be managed under the current framework, regulations, and management strategies, and be subject to adaptive management under the Precious Corals FMP. No changes would occur to the existing regulations affecting the Hawaiian Archipelago precious coral fisheries under this alternative. The biological impacts of the Hawaiian Archipelago precious coral fisheries would continue as discussed in Section 3.5.4.3. Additionally, the affected environment of the Hawaiian Archipelago precious coral Federal fisheries and of the Au‘au Channel Bed in particular, is being updated though an environmental assessment associated with a regulatory amendment that is in development by Council.

Based on the historically low level of participation and the lack of reported harvest in this Federal permit fishery, it is anticipated that the future biological impacts of the Federal precious coral fisheries within the Hawaiian Archipelago under the Precious Corals FMP would continue to be limited or insignificant. NMFS and the Council are working closely with the State of Hawaii HDAR on cooperative monitoring and reporting programs that will detect any changes in participation or harvest in the current precious coral fisheries. Implementation of future management plan amendments or regulatory amendments to the Precious Corals FMP affecting the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Coral Reef Ecosystem

The 2004 Coral Reef Ecosystems FMP established a coral reef ecosystem regulatory area, marine protected areas, permitting and reporting requirements, no-anchoring zones, gear restrictions, and a framework regulatory process. In 2002, an EIS (May 10, 2002; 67 FR 31801) was prepared for the Coral Reef Ecosystems FMP. There have been no amendments to this FMP to date (see Table 3-17).

Prior to the implementation of the Coral Reef Ecosystem FMP, it was estimated that approximately 11 percent of the total ex-vessel value of the harvest of coral reef resources is taken from the EEZ within the Hawaiian Archipelago (WPFMC 2002). Recreational and subsistence catches are unknown, but select creel surveys suggest that these catches are at least similar, if not greater than, the reported commercial catch. An estimate of MSY for the coral reef ecosystem fisheries within the Hawaiian Archipelago has not been determined. A Federal permit is required to participate in the coral reef fisheries for Potentially Harvested Coral Reef Taxa in the EEZ that encompass Hawaiian Archipelago, from 3 to 200 miles offshore. There is no limit to the number of permits that may be issued, however applications are evaluated on a case-by-case basis fishing activities and harvests may be restricted as a permit condition. Since the implementation of the Coral Reef Ecosystem FMP, no Federal permits have been issued.

The Hawaiian Archipelago fisheries would continue to be managed to be adaptively managed under the Coral Reef Ecosystem FMP. Under Alternative 1A, the status and trends of coral reef species would continue to be evaluated annually. NMFS and the Council are working closely with the State of Hawaii HDAR on cooperative monitoring and reporting programs that will detect any changes in participation in current coral reef fisheries within the EEZ. No changes would occur to the regulations affecting the Hawaiian Archipelago fisheries under Alternative 1A. The impacts of the current Hawaiian Archipelago coral reef fisheries to the biological environment would continue as discussed in Section 3.5.4.3 and as previously analyzed in the 2002 EIS (May 10, 2002 67 FR 31801). Implementation of future management plan amendments or regulatory amendments to the Coral Reef Ecosystem FMP affecting the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Crustaceans

The Hawaiian Archipelago can be divided in two management areas, the MHI and the NWHI. A Federal permit is required to participate in the lobster fishery in the EEZ, from 3 to 200 miles offshore, surrounding the MHI (Crustaceans Permit Area 2). There is no limit to the number of permits that may be issued. There is no harvest limit placed on the permit. An estimate of MSY for crustacean fisheries in the MHI has not been determined. At the time this EIS is being prepared, there are no active permit holders for the MHI lobster fishery. Recreational and subsistence catches for crustaceans are unknown. Because of uncertainty in the lobster stock assessment model, the crustacean fishery in the NWHI has been closed since 2000. In addition, the President's proclamation on June 15, 2006 established an immediate closure of most fisheries within the NWHI Marine National Monument, including any potential crustacean fishery (71 FR 51134; August 29, 2006).

Under Alternative 1A, the Hawaiian Archipelago fisheries would continue to be managed under the Crustaceans FMP. The crustacean fishery in the NWHI is closed. Based on the historically low level of participation in the Federal MHI permit fishery and associated harvest trend, it is anticipated that the future biological impacts of the Federal crustacean fisheries within the Hawaiian Archipelago under the Crustaceans FMP would be limited or have no impacts. NMFS and the Council are working closely with the State of Hawaii HDAR on cooperative monitoring and reporting programs that will detect any changes in participation in the current crustacean fisheries. Implementation of future management plan amendments or regulatory amendments to the Crustaceans FMP affecting the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Essential Fish Habitat

As discussed in Section 3.3, EFH and HAPC for the region are designated by the species-based FMPs. For bottomfish and crustaceans, the preferred depth ranges of specific life stages are used to designate EFH. In the case of crustaceans, the designation is further refined based on productivity data. The precious corals designation combines depth and bottom type as indicators, but it is further refined based on the known distribution of the most productive areas for these organisms.

Under Alternative 1A, Hawaii fisheries would continue to be managed under existing FMPs. Alternative 1A would not change existing Federal fisheries regulations or designations of EFH or HAPC within the Hawaiian Archipelago. Thus, no changes would occur to the regulations affecting the Hawaii fisheries. The impacts of the current activities under existing FMPs on EFH and HAPC within the Hawaiian Archipelago would continue as discussed below. These impacts have also been discussed in more detail in Section 3.3.

Adverse fishing impacts on these habitat areas may include physical or biological alterations to the substrate and loss of, or injury to, benthic organisms, prey species, and their habitat or other components of the ecosystems. However, the predominant fishing gear types—hook-and-line, longline, troll, traps, and submersibles—used in the Hawaii fisheries cause few fishing-related impacts on the benthic habitat occupied and used by coral reef species, bottomfish, crustaceans, or precious corals. The current management regime prohibits the use of bottom trawls, bottom-set nets, explosives, and poisons. In addition, the use of non-selective gear to harvest precious corals in the MHI is prohibited.

The following are potential sources of fishery-related impacts on benthic habitat that may occur during normal fishing operations:

- anchor damage from vessels attempting to maintain position over productive fishing habitat;
- heavy weight and line entanglement occurring during normal hook-and-line fishing operations;
- remotely-operated vehicle tether damage to precious coral during harvesting operations; and,
- lost gear (leaders, hooks, and weights) by fishing vessels

Implementation of future management plan amendments or regulatory amendments to the current FMPs that may affect the EFH and HAPC within the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Protected Species

Under Alternative 1A, the Hawaiian Archipelago fisheries would continue to be managed under the existing five species-based FMPs. No changes would occur to the existing regulations affecting the fisheries within the Hawaiian Archipelago and no additional impacts on protected species would be expected. The impacts on protected species from the fisheries managed under the current FMPs within the Hawaiian Archipelago would continue as discussed in Section 3.5.4.2 and below.

As mentioned earlier, the Hawaiian Archipelago can be divided in two management areas, the MHI and the NWHI; and pursuant to the executive proclamation on June 15, 2006 establishing the Northwestern Hawaiian Islands National Marine Monument; most fisheries within the NWHI M-N-M were closed. Commercial bottomfish operations in the NWHI M-N-M are subject to be closed in 2011. Until that time, all current bottomfish fishing operations in the NWHI must comply limited access permit conditions, vessel size restrictions, landing limits, area closures, vessel monitoring, and reporting requirements.

As discussed in Chapter 3, there is a concern that invasive marine and terrestrial species may be introduced into sensitive environments by fishing vessels transiting from populated islands and grounding on shallow reef areas. Of most concern is the potential for unintentional introduction of rats (*Ratus spp*.) to the remote islands in the NWHI that harbor endemic land birds. However, no invasive species introductions due to activity under FMPs have been documented. Additionally, with the establishment of the NWHI monument and the associated closures of NWHI fisheries, this concern is reduced.

When trying to balance the need to reduce interactions with protected species with the needs of fishing industries, it is important to determine how many individuals the protected species population can afford to lose, before the this take jeopardizes the continued existence of endangered species. For species listed under the ESA, such an analysis is conducted during a Section 7 consultation, and articulated in the resultant biological opinion.

In a March 18, 2002 Biological Opinion, NMFS determined that the MHI bottomfish fisheries were not likely to adversely affect listed marine mammal and sea turtle populations. A March 7, 2002 informal consultation under the ESA determined that the Hawaii coral reef fisheries were not likely to adversely affect and threatened or endangered species of critical habitat. Similarly, a May 24, 1996 Biological Opinion determined that the MHI crustacean fisheries will not adversely affect threatened or endangered species or their critical habitat. Because of the selective methods used to harvest precious coral, an October 5, 1978 Biological Opinion determined that the Hawaii precious coral fishery is no threat to endangered species or their habitat.

With regard to the NWHI, in 2000, NMFS was sued over the management of the bottomfish and crustacean fisheries within the NWHI. In the U.S. District Court of Hawaii ruling[59] on November 15, 2000, the court ruled that the lack of proper analysis of the impacts of the bottomfish and crustacean fisheries on the Hawaiian monk seal population violated NEPA and Section 7 of the ESA. As a result, the court enjoined the continuation of the bottomfish and lobster fishery in the NWHI until a comprehensive EIS and new Section 7 consultation is completed.

The lobster fishery in the NWHI has been closed since 2000. Reinforcing this closure was the President’s proclamation on June 15, 2006 that established an immediate closure of most fisheries within the NWHI Marine National Monument, including any potential crustacean fishery. The 2006 Presidential proclamation also closed the bottomfish fisheries in the NWHI Marine National Monument by 2011, and placed the fishery on an annual landing limit until then. The biological impacts of the bottomfish fisheries managed under the Bottomfish FMP throughout the region, including those for the bottomfish fisheries in the NWHI, were addressed in a 2005 EIS (70 FR 35275; June 17, 2005), as updated in subsequent NEPA documents (see Table 3-15), and contain relevant analysis of the impacts of the fisheries on the Hawaiian monk seal population. In a March 18, 2002 Biological Opinion, NMFS determined that the NWHI bottomfish fisheries were not likely to adversely affect listed marine mammal and sea turtle populations. The 2002 Biological Opinion did not contain an Incidental Take Statement for any listed species. Until the NWHI bottomfish fishery is closed (in 2011), if a listed species is taken by the NWHI bottomfish fishery, reconsultation under Section 7 of the ESA would be required.

[59] U.S. District Court of Hawaii, Greenpeace Foundation, et. al. v. Minetta, Civil No 00-00068SPKFIY.

Alternative 1A would continue data collection programs (e.g., logbooks, observers) within the Hawaiian Archipelago fisheries for which interactions with protected species can be recorded. If warranted, the implemention of area closures and gear and handling requirements through FMP amendments can prevent, reduce, or mitigate potential interactions . Future management plan amendments or regulatory amendments to these FMPs would be reviewed to determine the potential to affect protected species within the Hawaiian Archipelago and will be subject to the appropriate NEPA analysis and other statutes such as the ESA and MMPA at the time of their consideration.

Fishery Participants and Communities

Within the Hawaiian Archipelago, each of the inhabited Hawaiian Islands (Niihau, Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii) has been defined as a fishing community under the MSA. Under Alternative 1A Federal fisheries within the Hawaiian Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting the Hawaiian Archipelago fisheries under this alternative. The impacts of the FMPs on the fishery participants and communities within the Hawaiian Archipelago would continue as discussed in Chapter 3, and in more detail in Section 3.5.4.4. Over time, a species-based approach to management could fail to raise considerations of the full range of impacts by all fisheries and other activities on the marine ecosystem could result in stock depletion; overfishing; habitat damage and degradation; or loss of marine resources on which fishery participants and communities depend. Implementation of future management plan amendments or regulatory amendments to these FMPs that could impact these fishing participants or communities will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Administration and Enforcement

In the Western Pacific Region, the management of ocean and coastal activities is conducted by a number of agencies and organizations at the Federal, state, county, and village or community levels. These groups administer programs and initiatives that address often overlapping and sometimes conflicting ocean and coastal issues.

Numerous research and data collection projects and programs have been undertaken and have resulted in the collection of huge volumes of potentially valuable detailed bathymetric and biological data, among other data. Some of this information has been processed and analyzed by fishery scientists and managers; however, much has proven difficult to utilize and integrate due to differences in collection methodologies coupled with a lack of metadata or documentation of how the data were collected and coded. This has resulted in incompatible datasets as well as data that are virtually inaccessible to anyone except the primary researchers.

Under Alternative 1A the fisheries within the EEZ of the Hawaiian Archipelago would continue to be managed under the current five species-based FMPs. No changes would occur to the regulations affecting the Hawaiian Archipelago Federal fisheries under this alternative. The impacts of the current FMPs on the fishery administration and enforcement within the Hawaiian

Archipelago would continue as discussed in Chapter 3, and in more detail in Section 3.6. Concerns of incompatible or inaccessible datasets would continue. Implementation of future management plan amendments or regulatory amendments to this FMP on the administration and enforcement affecting the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

PRIA

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the PRIA.

Physical Environment

The physical environment of the PRIA is comprised of its geology and topography as well as surrounding ocean layers, ocean depth zones, ocean water circulation, surface currents, transition zones, eddies, and deep-ocean currents. Under Alternative 1A, the No Action Alternative, Federal fisheries within the PRIA would continue to be adaptively managed under the species-based FMPs.

As discussed in Chapter 3, and in more detail in Section 3.5.5, existing fisheries operating under the current species-based FMPs in the PRIA may affect marine ecosystems in a variety of ways. Fisheries under the current species-based FMPs may affect marine ecosystems. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can also affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, or introduction of exotic species, pollution, and habitat disturbance. The day-to-day operation of a fishing vessel can produce a number of waste products, including oil, sewage, garbage, and lost gear, any of which may have a negative impact on the marine environment. However, no long-term significant impacts on the physical environment from waste products directly related to fishery operations conducted under the FMPs, within the PRIA, have been documented.

Additionally, the accidental grounding of fishing vessels can adversely affect marine habitat and coral reefs. Potential impacts of a vessel striking the bottom include physical harm to the marine substrate, and the possible subsequent break-up of the vessel would release fuel and oil that could result in pollution of the marine environment and mortality of marine life. However, groundings of fishing vessels operating in the PRIA are rare. In the occasional cases of vessel groundings in the past, some short-term localized damage to the marine substrate did take place, but no long-term significant impacts on the surrounding marine environment have been documented.

Biological Environment

The affected biological environment of the PRIA includes benthic environment and pelagic environment. Alternative 1A would not change the current institutional framework of FMPs, accompanying regulations or management strategies. Thus, this alternative would impact the biological environment as discussed in Chapter 3, and in more detail in Section 3.5.5.8. The affected biological environment of the PRIA, by island, atoll, or reef, is discussed generally in Section 3.2 and in more detail in Section 3.5.5. All the submerged lands and marine resources from the shoreline (0 miles) to 200 miles offshore are under the jurisdiction of the Federal government within PRIA.

A discussion of the biological impacts of the demersal fisheries specific to the EEZ of the PRIA under each of the FMPs follows. A discussion of the biological impacts of the PRIA pelagic fisheries may be found in Section 4.6.1.5 Pelagics.

Biological Impacts on Bottomfish

Biological impacts of the bottomfish fisheries managed under the Bottomfish FMP throughout the region, including those for Federal fisheries within the PRIA, were addressed in a 2005 EIS (70 FR 35275; June 17, 2005), as updated for select areas in subsequent NEPA documents (see Table 3-15), and contain relevant analysis of the impacts under Alternative 1A.

A Federal permit is required to participate in the PRIA bottomfish fisheries. Limited bottomfish fisheries have occurred under such a Federal permit. As discussed in Section 3.5.5.8, in 1998, two Hawaii-based troll and handline vessels, and one demersal longline vessel fished in the EEZ (0 to 200 miles offshore) around Palmyra and Kingman Reef. These vessels targeted both pelagic and bottomfish species. In 1999, one vessel made seven trips to these areas. The vessel stopped fishing after results of a single specimen submitted for testing to the University of Hawaii's School of Medicine indicated the presence of ciguatera. No Federal permits were issued in 2000 through 2006 for the Federal bottomfish fishery within the PRIA.

An estimate of MSY for the Federal bottomfish fisheries within the PRIA has not been determined. All bottomfish fisheries within EEZ waters around the PRIA require a Federal permit and are monitored via Federal logbooks. Under Alternative 1A, the status and trends of target and non-target species would continue to be evaluated annually.

A renewed interest in this fishery has occurred in 2007. As of January 26, 2007, three bottomfish permits were issued, with three more in process for the PRIA (W. Ikehara, Permit Specialist, NMFS, pers. com. with K. Schultz, NMFS, January 26, 2007). These permits were issued in accordance with Amendment 8 to the Bottomfish FMP (71 FR 53605; September 12, 2006), which established new permitting and reporting requirements for vessel operators targeting bottomfish species around the PRIA. The intent of the amendment was to improve understanding of the ecology of these species and the activities and harvests of the vessel operators that target them. The associated Environmental Assessment to Amendment 8 provided an updated analysis of the impacts of the Federal bottomfish fisheries and management regime on the biological environment around PRIA.

Under Alternative 1A, the PRIA fisheries would continue to be managed under the Bottomfish FMP's current framework, regulations, and management strategies, and subject to adaptive management under the Bottomfish FMP. No changes would occur to the regulations affecting the

PRIA fisheries under this alternative. The biological impacts of the current bottomfish fisheries within the PRIA would continue as discussed in Section 3.5.5.8 and as previously analyzed in the 2005 EIS (June 17, 2005; 70 FR 35275), as updated for select areas in subsequent NEPA documents (see Table 3-15). Implementation of future management plan amendments or regulatory amendments to the Bottomfish FMP that may affect the PRIA will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Biological Impacts on Precious Corals

There are no known precious coral fisheries operating in the EEZ of the PRIA (0 to 200 miles offshore). An estimate of MSY for precious coral around the PRIA has not been determined; however, an OY of 1,000 kg (all precious coral species combined) has been set for Permit Area XP-PI, which encompasses the EEZ waters around the PRIA. A Federal permit is required to participate in precious coral fisheries in the EEZ that encompass PRIA and the annual harvest for Permit Area XP-PI is 1,000 kg (all precious coral species combined). There is no limit to the number of permits that may be issued.

Amendment 6 (71 53605; September 12, 2006) to the Precious Corals FMP established new permitting and reporting requirements for vessel operators targeting precious coral in the EEZ (0 to 200 miles offshore) of the PRIA. The intent of the amendment was to improve the understanding of the ecology of these species and the activities and harvests of the vessel operators that target them. No Federal permits for precious coral harvesting in the PRIA have been issued to date. The associated Environmental Assessment to Amendment 6 provided an updated analysis of the impacts of the potential precious coral fisheries and management regime on the biological environment around the PRIA.

Under Alternative 1A, the PRIA precious coral fisheries would continue to be managed under the Precious Coral FMP's current framework and regulations. No changes would occur to the existing regulations affecting the PRIA precious coral fisheries under this alternative. Based on the lack of participation and harvest trend in this Federal permit fishery, it is anticipated that the future impacts of the precious coral fisheries under the Precious Corals FMP within the PRIA would continue to be limited or insignificant.

Participation in the precious coral fisheries within the EEZ of the PRIA requires a Federal permit and logbook, which will be cooperatively monitored by NMFS and the Council. Under Alternative 1A, the status and trends of precious coral species would continue to be evaluated annually. Implementation of future management plan amendments or regulatory amendments to the Precious Corals FMP that may affect the PRIA will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Coral Reef Ecosystem

There are no known coral reef fisheries operating in the EEZ of the PRIA (0 to 200 miles offshore). A Federal permit is required to participate in the coral reef fisheries for all coral reef Potentially Harvested Coral Reef Taxa, and for Currently Harvested Coral Reef Taxa in low-use marine protected areas (Johnston Atoll, Palmyra Atoll, and Wake Island). There is no limit to the number of permits that may be issued; however, applications are evaluated on a case-by-case basis and fishing activities and harvests may be restricted as a permit condition. No Federal permits have been issued to date. An estimate of MSY for the Federal coral reef fisheries within the PRIA has not been determined.

Besides permitting requirements, the 2004 Coral Reef Ecosystems FMP established a coral reef ecosystem regulatory area, marine protected areas, permit reporting requirements, no-anchoring zones, gear restrictions, and a framework regulatory process. In 2002, an EIS (May 10, 2002 67 FR 31801) was prepared for the Coral Reef Ecosystems FMP. There have been no amendments to this FMP to date (see Table 3-17). Based on the lack of participation and the associated harvest trend in this Federal permit fishery, it is anticipated that the future impacts of the fisheries under the Coral Reef Ecosystem FMP, within the PRIA, would continue to be limited.

Under Alternative 1A, the status and trends of coral reef species would continue to be evaluated annually. Implementation of future management plan amendments or regulatory amendments to the Coral Reef Ecosystem FMP that may affect the PRIA will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Biological Impacts on Crustaceans

A Federal permit is required to participate in the lobster fisheries in the EEZ that encompass PRIA. In the past, a few fishermen have expressed interest in fishing for lobsters within the PRIA, and at least two have attempted it. As discussed in Section 3.5.5.8, in 1999, one vessel was unsuccessful no lobsters were caught. In addition, the vessel targeted deep-water shrimp and red crab at 300 to 800 meters around Palmyra Atoll and Kingman Reef. Reportedly, the catch-per-unit-effort was was considered a good catch rate. A Federal permit is not required to participate in the deep-water shrimp fisheries of the PRIA. An estimate of MSY for any of the Federal crustacean fisheries within the PRIA has not been determined.

Amendment 12 (September 12, 2006; 71 53605) to the Crustaceans FMP established permitting and reporting requirements for vessel operators engaged in fishing for lobsters in the EEZ (0 to 200 miles offshore)of the PRIA. The intent of the amendment was to improve the understanding of the ecology of these species and the activities and harvests of the vessel operators that target them. However, no Federal permit for lobster fishing in the PRIA has been issued since 1999. The associated Environmental Assessment to Amendment 12 provided an updated analysis of the impacts of the Federal crustacean fisheries and management regime on the biological environment around PRIA.

Participation in the lobster fisheries within the EEZ of the PRIA requires a Federal permit and reporting, which will be cooperatively monitored by NMFS and the Council. Based on the historically low participation level and associated harvest trend in this Federal permit fishery, it is anticipated that the future biological impacts of the PRIA crustacean fisheries under the Crustaceans FMP Archipelago would continue to limited or insignificant. Under Alternative 1A, the status and trends of crustacean species would continue to be evaluated annually. Implementation of future management plan amendments or regulatory amendments to the

Crustaceans FMP that may affect the PRIA will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Essential Fish Habitat

As discussed in Section 3.3, EFH and HAPC for the region are designated by the status quo species-based FMPs. For bottomfish and crustaceans, the preferred depth ranges of specific life stages are used to designate EFH. In the case of crustaceans, the designation is further refined based on productivity data. The precious corals designation combines depth and bottom type as indicators, but it is further refined based on the known distribution of the most productive areas for these organisms.

Under Alternative 1A, PRIA fisheries would continue to be managed under existing FMPs. Alternative 1A would not change current Federal fisheries regulations or designations of EFH or HAPC within PRIA. Thus, no changes would occur to the regulations affecting the PRIA fisheries. The impacts of the current activities under existing FMPs on EFH and HAPC within the PRIA would continue as discussed below. These impacts have also been discussed in Section 3.3.

Adverse fishing impacts on these habitat areas may include physical or biological alterations to the substrate and loss of, or injury to, benthic organisms, prey species, and their habitat or other components of the ecosystems. However, the predominant fishing gear types—hook-and-line, longline, troll, and traps, used in the PRIA fisheries cause few fishing-related impacts on the benthic habitat occupied and used by coral reef species, bottomfish, crustaceans, or precious corals. In addition, the current management regime prohibits the use of bottom trawls, bottom-set nets, explosives, and poisons.

The following are potential sources of fishery-related impacts on benthic habitat that may occur during normal fishing operations:

- anchor damage from vessels attempting to maintain position over productive fishing habitat;
- heavy weight and line entanglement occurring during normal hook-and-line fishing operations; and,
- lost gear (leaders, hooks, and weights) by fishing vessels

Most of the physical and biological environment of PRIA is protected by their isolation, FMP regulations, and status as National Wildlife Refuges. Implementation of future management plan amendments or regulatory amendments to the current FMPs that may affect the EFH and HAPC within the PRIA will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Protected Species

Under Alternative 1A, the PRIA fisheries would continue to be managed under the existing five species-based FMPs, no changes would occur to the regulations affecting the fisheries within the PRIA, and no additional impacts on protected species would be expected. The impacts on protected species from the fisheries managed under the FMPs, within the PRIA, would continue as discussed in Section 3.5.5.

As mentioned earlier, there is a concern that invasive marine and terrestrial species may be introduced into sensitive environments by fishing vessels transiting from populated island and grounding on shallow reef areas. Of most concern is the potential for unintentional introduction of rats (*Ratus spp*.) to the remote and largely uninhabited U.S. islands in central and western Pacific, i.e., PRIA that harbor endemic land birds. However, no invasive species introductions due to activity under FMPs have been documented. Additionally, with the current low level of fisheries in the PRIA, this concern is reduced.

When trying to balance the need to reduce protected species take, the need to reduce the take of other non-target species, and the needs of fishing industries, it is important to determine how many individuals the protected species population can afford to lose, before the this take jeopardizes the stability (or in the case of ESA listed species, the recovery) of the species population. For species listed under the ESA, such an analysis is conducted during a Section 7 consultation, and articulated in the resultant biological opinion.

In a March 18, 2002 Biological Opinion, NMFS determined that the PRIA bottomfish fisheries were not likely to adversely affect listed marine mammal and sea turtle populations. A March 7, 2002 informal consultation under the ESA determined that the PRIA coral reef fisheries were not likely to adversely affect threatened or endangered species or their habitat critical habitat. Similarly, a May 24, 1996 Biological Opinion determined that the PRIA crustacean fisheries will not adversely affect threatened or endangered species or their critical habitat. Because of the selective methods used to harvest precious coral, an October 5, 1978 Biological Opinion determined that the PRIA precious coral fishery is no threat to endangered species or their habitat.

Alternative 1A NMFS and the Council will continue to monitor the PRIA fisheries, and where applicable, prevent, reduce, and mitigate impacts on protected species through area closures, and gear and handling requirements. Implementation of future fishery management amendments or regulatory amendments to these FMPs would be reviewed to determine the potential to affect protected species within the PRIA and will be subject to the appropriate NEPA analysis and other statutes such as the ESA or MMPA at the time of their consideration.

Fishery Participants and Communities

There are no communities within the PRIA defined as a fishing community under the MSA. The impacts of the current FMPs on the limited fishery participants within the PRIA would continue as discussed in Section 3.5.5. Over time, a species-based approach to management could fail to raise considerations of the full range of impacts by all fisheries and other activities on the marine ecosystem could result in stock depletion; overfishing; habitat damage and degradation; or loss of marine resources on which fishery participants and communities depend. Implementation of future management plan amendments or regulatory amendments to these FMPs that could impact these fishery participants will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Administration and Enforcement

Federal fisheries within the PRIA would continue to be managed under the current five FMPs. No changes would occur to the regulations affecting the PRIA Federal fisheries under this alternative. The impacts of the current FMPs on the fishery administration and enforcement within the PRIA would continue as discussed in Section 3.6. Implementation of future management plan amendments or regulatory amendments to this FMP affecting the PRIA will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Pelagic

The U.S. pelagic fisheries in the Western Pacific Region are currently managed under the Pelagics FMP, which was established in 1987. A comprehensive analytical review of the impacts of the fisheries under the Pelagics FMP was completed in 2001 (April 6, 2001; 66 FR 18243). Since 2001, the impacts of the Federal actions recommended by the Council in amendments or regulatory amendments to this FMP have been analyzed in associated NEPA documents (see Table 3-19).

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the fisheries operating under the Pelagics FMP.

Physical Environment

Under Alternative 1A pelagic fisheries would continue to be managed under the Pelagic FMP. The Pelagic FMP encompasses all areas of pelagic fishing operations in the waters of the U.S. EEZ or on the high seas. The Pelagic FMP also applies to any U.S. domestic vessel authorized to do the following: (1) Fish for, possess, or transship Pelagic MUS within the waters of the U.S. EEZ of the Western Pacific Region; or (2) Land Pacific Pelagic MUS within the states, territories, commonwealths, or unincorporated U.S. island possessions (i.e., PRIA) of the Western Pacific Region. Alternative 1A would not change the Pelagic FMPs regulations or management measures. Thus, this alternative would not introduce additional impacts beyond those impacts on the biological environment already occurring.

Pelagic species are closely associated with their physical environment. Suitable physical environment for these species depends on gradients in temperature, oxygen, or salinity, all of which are influenced by oceanic conditions on various scales. In the pelagic environment, physical conditions such as isotherm and isohaline boundaries often determine whether the that encompass water mass is suitable for pelagic fish, and many of the species are associated with specific isothermic regions. Additionally, areas of high trophic transfer as found in fronts and eddies are important habitat

The physical structure of the Pacific Ocean is, however, far from static. Large-scale climatological events such as El Niño and La Niña and longer-term fluctuations, termed regime shifts, operating on decadal time scales affect oceanic circulation patterns, upwelling of nutrients and ultimately the productivity of the ecosystem. Such fluctuations may have profound impact on fisheries.

Fisheries may also affect marine ecosystems. Populations of fish and other ecosystem components can be affected by the selectivity, magnitude, timing, location, and methods of fish removals. Fisheries can affect marine ecosystems through vessel disturbance, bycatch or discards, impacts on nutrient cycling, or introduction of exotic species, pollution, and habitat disturbance. The day-to-day operation of a fishing vessel can produce a number of waste products, including oil, sewage, garbage, and lost gear, any of which may have a negative impact on the marine environment. However, no long-term significant impacts on the physical environment from waste products directly related to fishery operations conducted under the Pelagics FMP have been documented.

Additionally, the accidental grounding of fishing vessels can adversely affect marine habitat and coral reefs. Potential impacts of a vessel striking the bottom include physical harm to the marine substrate, and the possible subsequent break-up of the vessel would release fuel and oil that could result in pollution of the marine environment and mortality of marine life. However, groundings of fishing vessels operating in the Western Pacific Region are infrequent. In the occasional cases of vessel groundings in the past, some short-term localized damage to the marine substrate did take place, but no long-term impacts on the surrounding marine environment have been documented.

Biological Environment

The format for this section, the impacts of the pelagic fisheries on the biological environment under Alternative 1A, is slightly different then the format used for the demersal fisheries above. This section starts with a general discussion of the impacts on the biological environment. This general discussion is followed by specific discussions of the impacts of the pelagic fisheries specific to archipelagic region: American Samoa; Mariana (CNMI and Guam will be discussed separately); Hawaii; and the PRIA.

Under Alternative 1A, pelagic fisheries would continue to be managed under the Pelagic FMP. No changes would occur to the regulations affecting the Federal pelagic fisheries under this alternative. The impacts on the biological environment from fisheries managed under the Pelagic FMP would continue as discussed in Section 3.5 and as previously analyzed in NEPA documents for the Pelagics FMP (April 6, 2001; 66 FR 18243), as updated for select areas in subsequent NEPA documents (see Table 3-19).

Pelagic fishing has a long history in the Pacific Ocean. The fisheries operating under the Pelagics FMP target stocks that are Pacific-wide in distribution. However, they account for a very small percentage of the total catch of these pelagic species taken in the Pacific Ocean. For example, bigeye tuna catches by commercial fisheries under the Council's jurisdiction in 2004 amounted to 5,163 metric tonnes (t), or 2.3 percent of the 2004 total Pacific-wide bigeye tuna catch.

Similarly, 2004 yellowfin tuna catches by commercial fisheries under the Council's jurisdiction amounted to 2,383 t or about 0.35 percent of the 2004 total Pacific-wide yellowfin tuna catches, and 0.58 percent of the yellowfin tuna caught in the WCPO. Any changes in catch due to changes in fishery regulations under the Pelagics FMP will be obscured by natural variation and catches made by the much larger non-U.S. sectors of the Pacific fleet targeting pelagic species. Domestic pelagic fisheries are highly dependent on the status of the broad, Pacific-wide condition of the Pelagics MUS stocks.

Under the authority of the MSA, the Council developed and recommended (and the Secretary of Commerce approved) criteria to determine overfishing (fishing mortality) and overfished (stock biomass) conditions for fisheries of the Western Pacific Region. As noted earlier, NMFS determined on June 14, 2004, that overfishing of bigeye tuna was occurring throughout the Pacific Ocean (69 FR 78397). On March 16, 2006, the Council was notified by letter that the Secretary of Commerce had determined that overfishing is occurring on the yellowfin tuna stock in the western and central Pacific Ocean (71 FR 14837). Amendment 14 to the Pelagics FMP is in development and is intended to address this issue. The associated Environmental Assessment for Amendment 14 will provide an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment. A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

Several non-targeted and associated species are caught in the pelagic fisheries of the region. In the Hawaii-based longline fishery, the highest discards are of sharks (blue) and oilfish. Current reporting methods for bycatch include Federal logbooks, information collected from NMFS observer programs and various catch reporting systems that are compiled by the Western Pacific Fishery Information Network (WPacFIN). These data are sufficient to provide estimates of the amount and type of bycatch in fisheries managed under the Pelagics FMP. Currently there are insufficient data for most of these non-targeted species to provide estimates of stock recruitment relationships or biological reference points, but none of these species are believed to be depleted as a result of fisheries managed under the Pelagics FMP.

A discussion of the impacts of the pelagic fisheries on the biological environment specific to the EEZ waters around that surround each of the archipelagos follows.

American Samoa

Commercial ventures for pelagic species in American Samoa are diverse, ranging from small-scale vessels having very limited range to large-scale vessels catching tuna in the waters of the U.S. EEZ and into the high-seas. Total pelagic landings by American Samoa based longline, troll, and handline vessels were approximately 11 million pounds in 2003, with longline landings making up nearly 99 percent of this total.

As discussed in Section 3.5.1.3.2, recent and the anticipated future growth in this fishery has been attributed to the entry of mono-hull vessels larger than 50 feet in length. A Federal limited entry permit is required for participation in the pelagic long-line fisheries in the EEZ surrounding American Samoa (3 to 200 miles offshore). As of August, 2006, a total of 60 American Samoa Longline Limited Entry Permits were issued. American Samoa Longline Limited Entry Permits are good for three years. No Federal permit is required for smaller troll or handline vessels targeting pelagic species in the EEZ of the American Samoa.

Amendment 11 (May 24, 2005; 70 FR 29646) to the Pelagics FMP established a limited entry system for pelagic longline vessels fishing in waters of the waters of the U.S. EEZ around American Samoa. Amendment 11 was intended to establish management measures that would stabilize effort in the fishery to avoid disruptions to community participation and limit opportunity for substantial participation in the fishery by indigenous islanders. An associated environmental assessment for Amendment 11 updated the analysis of the impacts of the fisheries and management regime on the human environment around the American Samoa Archipelago.

As mentioned earlier, NMFS determined that overfishing of bigeye tuna and on yellowfin tuna stock was occurring throughout the Pacific Ocean, which includes the EEZ around American Samoa. Amendment 14 is under review by the Secretary of Commerce and contains management measures intended to address this issue. The associated Environmental Assessment for Amendment 14 provides an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment. A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

Additionally it is noted that the American Samoa longline pelagic fishery in 2006 exceeded the sea turtle annual take limits as established in the February 23, 2004 Biological Opinion. Consequently, consultation under the ESA may be reinitiated by NMFS for the American Samoa longline pelagic fisheries, as well as for Western Pacific troll, pole and line, and handline fisheries, which share the same take limits.

NMFS and the Council are working closely with American Samoa, DMWR on cooperative monitoring and reporting programs that will detect any changes in participation or harvest in the pelagic fisheries in the American Samoa Archipelago.
Under Alternative 1A, the pelagic fisheries would continue to be managed to be adaptively managed under the Pelagics FMP. No changes would occur to the regulations affecting the American Samoa pelagic fisheries under this alternative. The impacts of the current Pelagic FMP on the biological environment would continue as discussed in Section 3.5.1.3.2 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents that may affect this area (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagics FMP affecting the American Samoa Archipelago will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Commonwealth of the Northern Mariana Islands

There are three permits that allow the use of longline to target pelagic species within the EEZ surrounding CNMI, the Hawaii Longline Limited Entry Permit, the Western Pacific Longline General Permit, and the American Samoa Longline Limited Entry Permit. These Federal permits require the owner/operator of the permit to report the location and harvest of all longline sets made under the permit.

The Hawaii Longline Limited Entry Permit: This permit is required to target pelagic species using longine gear in the EEZ waters around Hawaii, or to land or transship longline-caught pelagic species shoreward of the outer boundary of the EEZ waters around Hawaii. It may also be used to fish for (or land) pelagic species using longline gear in EEZ waters around CNMI, Guam, and the PRIA. A maximum of 164 Hawaii Longline Limited Entry Permits may be issued under this limited access program.

The American Samoa Longline Limited Entry Permit: This permit is required to target pelagic species using longline gear in the EEZ waters around American Samoa, or to land those fish caught by longline in the EEZ around American Samoa. Holders of Hawaii Longline Limited Entry Permits and Western Pacific Longline General Permits may land longline-caught fish in American Samoa provided that those fish were not caught in the EEZ waters around American Samoa.

The Western Pacific Longline General Permit: This permit may be used to fish for (or land) pelagic species using longline gear in the EEZ waters around CNMI, Guam, and the PRIA. In 2006 (as of August 1), a total of 34 Western Pacific Longline General Permit were issued. The permits may be renewed annually, and there is no limit of the number of permits that may be issued.

No Federal permit is required for the pelagic fisheries in the EEZ within 3 miles offshore of CNMI or for smaller troll or handline vessels. As mentioned earlier, NMFS determined that overfishing of bigeye tuna and yellowfin tuna stocks were occurring throughout the Pacific Ocean, which includes the EEZ around the CNMI. Amendment 14 is in development and contains management measures intended to address this issue. The associated EAenvironmental assessment for Amendment 14 provides an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment.A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

NMFS and the Council are working closely with CNMI, DFW on cooperative monitoring and reporting programs that will detect any changes in participation in current pelagic fisheries within the EEZ around CNMI (0 to 200 miles offshore) or on the high seas. Under Alternative 1A, the pelagic fisheries within the EEZ of CNMI would continue to be adaptively managed under the Pelagics FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative. The biological impacts of the current Pelagic FMP would continue as discussed in Section 3.5.2.3.2 and as previously analyzed in the 2001 EIS for the Pelagics FMP (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents for affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagics FMP that may affect the biological environment of CNMI will be subject to the appropriate NEPA analysis and other applicable law at the time of their consideration.

Guam

As discussed in Section 3.5.3.3.2, the pelagic fisheries in the EEZ surrounding Guam consist of primarily small, recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish either within local waters, within EEZ waters around Guam or on some occasions in the adjacent U.S. EEZ waters around CNMI. Domestic annual pelagic landings in Guam have varied widely. The 2004 total pelagic landings were approximately 691,366 pounds, an increase of 36 percent for 2003. Of this total, it is estimated that 285,545 pounds were sold for total ex-vessel revenue of $433,911. The number of boats involved in Guam's pelagic fishery has gradually increased from 193 in 1983 to a peak of469 in 1998. There were 401 vessels active in Guam's pelagic fishery in 2004. A Federal permit is required to participate in the pelagic longline fisheries in the EEZ (3 to 200 miles offshore) surrounding Guam.

As described on page 4-39, there are three permits that allow the use of longline to target pelagic species within the EEZ surrounding Guam, the Hawaii Longline Limited Entry Permit, Western Pacific Longline General Permit, and American Samoa Longline Limited Entry Permit. These Federal permits require the owner/operator of the permit to report the location and harvest of all sets made under the permit.

As mentioned earlier, NMFS determined that overfishing of bigeye tuna and on yellowfin tuna stock was occurring throughout the Pacific Ocean, which includes the EEZ waters aroundof Guam. Amendment 14 is under development and contains management measures intended to address this issue. The associated EAenvironmental ssessment for Amendment 14 provides an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment. A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

NMFS and the Council are working closely with the Territory of Guam, DAWR on cooperative monitoring and reporting programs that will detect any changes in participation in current pelagic fisheries within the EEZ of Guam (3 to 200 miles offshore). Under Alternative 1A, the pelagic fisheries within the EEZ surrounding Guam would continue to be adaptively managed under the Pelagics FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative. The impacts of the current Pelagic FMP on the biological environment would continue as discussed in Section 3.5.3.3.2 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagics FMP that may affect Guam will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Hawaii

As discussed in Section 3.5.4.3.2, Hawaii's pelagic fisheries, which include the longline, troll and handline, offshore handline, and the aku boat (pole and line) fisheries are the State's largest and most valuable. The largest component of pelagic catch in 2004 was tuna, and bigeye tuna was the largest component of this commercial tuna catch. Approximately 11 million pounds of pelagic fish were harvested by the Hawaii-based longline fishery (see Figure 3–21). The total number of recreational fishermen in Hawaii is unknown, but there are about 14,300 small vessels in Hawaii, and it is estimated that 6,600 of these vessels may be used for recreational fishing.

A Federal permit is required to participate in the pelagic longline fisheries in the EEZ (3 to 200 miles offshore) of the Hawaiian Archipelago. A maximum of 164 Hawaii Longline Limited Entry Permits may be issued. No Federal permit is required for smaller troll or handline vessels.

As mentioned earlier, NMFS had determined that overfishing of bigeye tuna and on yellowfin tuna stock was occurring throughout the Pacific Ocean, which includes the EEZ of Hawaii. Amendment 14 is under review by the Secretary of Commerce and contains management measures intended to address this issue. The associated EAenvironmental ssessment for Amendment 14 provides an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment. A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

NMFS and the Council are working closely with the State of Hawaii HDAR on cooperative monitoring programs that will detect any changes in participation in current pelagic fisheries within the EEZ of Hawaii (3 to 200 miles offshore) or on the high seas. Under Alternative 1A, the pelagic fisheries within the EEZ of Hawaii would continue to be adaptively managed under the Pelagics FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative. The biological impacts of the current Pelagic FMP would continue as discussed in Section 3.5.4.3.2 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents for affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagic FMP affecting the Hawaiian Archipelago will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Pacific Remote Island Areas

A Federal permit is required to participate in the pelagic longline fisheries in EEZ waters (3 to 200 miles offshore) around the PRIA. As discussed in 3.5.5.8, the Hawaii longline fleet does seasonally fish around some of the PRIA (e.g., Palmyra Atoll).

As described on page 4-39, there are hree Federaltwo permits that allow the use of longline to target pelagic species within the EEZ waters around the PRIA,the Hawaii Longline Limited Entry Permit, the American Samoa Longline Limited Entry Permit, and the Western Pacific Longline General Permit. All permits require the owner/operator of the permit to report the location and harvest of all sets made under the permit via Federal logbooks.

In addition, a Federal permit is also required for troll or handline vessels targeting pelagic specieswithin EEZ waters aroundthe PRIA. No Federal permits were issued in 2000 through 2006 for the PRIA. As of January 26, 2007, three PRIApelagic troll and handline permits dhave been issued, with three more applicationsbeinged by NMFS.

As mentioned earlier, NMFS determined that overfishing of bigeye tuna and on yellowfin tuna stock was occurring throughout the Pacific Ocean, which includes the EEZ aroundthe PRIAof .Amendment 14 is under review by the Secretary of Commerceand contains management measures intended to address this issue. The associated EAenvironmental ssessment for Amendment 14 provides an update of the analysis of the impacts of the pelagic fisheries and management regime on the human environment. A notice of availability for Amendment 14 was published in the Federal Register on February 15, 2007 (72 FR 7385).

Under Alternative 1A, the pelagic fisheries within the EEZ of the PRIA would continue to be managed to be adaptively managed under the Pelagics FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative. Most of the physical and biological environment of PRIA is protected both by their isolation, FMP regulations, and their as status as National Wildlife Refuges. The biological impacts of the current Pelagic FMP would continue as discussed in Section 3.5.5.8 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagic FMP affecting the PRIA will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Essential Fish Habitat

Under Alternative 1A, the pelagic fisheries would continue to be managed under the existing Pelagic FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative. The impacts of the fisheries managed under the Pelagic FMP to EFH or HAPC would continue as discussed in Section 3.3 as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19).

A large amount of information exists on the effects of environmental fluctuations on the productivity and distribution of pelagic species. At the present time, these environmental influences are thought to be the major factor affecting the essential habitat for pelagic species. No data currently exist that indicate that the pelagic fisheries managed under the Pelagics FMP have a discernable effect on the pelagic environment, or the essential habitat for pelagic species, that could be detectable against the background of cyclical large-scale oceanographic events that drive the pelagic ecosystem.

EFH is considered those waters and substrate necessary to a species or species group or complex, for spawning, breeding, feeding, or growth to maturity. As discussed in Section 3.3, the designated habitat of pelagic species is the open-ocean water column, and managed fisheries employ variants of mid-water seine nets and hook-and-line gear that has a low incidence of gear loss. As a result, there is little impact to EFH from fisheries managed under the Pelagics FMP. Although certain amounts of gear loss may be a hazard to some species due to entanglement, there is a limited direct impact on pelagic habitat. Implementation of future management plan amendments or regulatory amendments to the Pelagic FMP affecting the EFH or HAPC will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration

Protected Species

Under Alternative 1A the pelagic fisheries would continue to be managed under the Pelagic FMP. No changes would occur to the existing regulations affecting the pelagic fisheries under this alternative.

As discussed in Section 3.5, all Pacific sea turtles are designated under the ESA as either threatened or endangered. These species of sea turtle are highly migratory, or have a highly migratory phase in their life history, and therefore, are susceptible to being incidentally caught by fisheries operating in the Pacific Ocean. Cetaceans listed as endangered under the ESA and that have been observed in the Western Pacific Region include the following: the humpback whale, sperm whale, blue whale, fin whale, and sei whale. In addition, one endangered pinniped, the Hawaiian monk seal, occurs in the region. As discussed on page ???, regulations under the Pelagics FMP require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species.

When trying to balance the need to reduce interactions with protected species take with the needs of fishing industries, it is important to determine how many individuals the protected species population can afford to lose, before the interactionstake jeopardizes the continued existence of endangered species . For species listed under the ESA, such an analysis is conducted during a Section 7 consultation, and articulated in the resultant biological opinion. Recent biological opinions for the pelagic fisheries are listed below.

On November 18, 2002, the U.S. Fish and Wildlife Service issued na ESA biological opinion on the potential impacts of the entire Hawaii-based domestic longline fishery on the short-tailed albatross. The opinion concluded that the fishery is not likely to jeopardize the continued existence of the short-tailed albatross.

NMFS issued a ESA biological opinion on February 23, 2004, following a consultation under Section 7 of the ESA on the ongoing operation of the Western Pacific Region's pelagic fisheries as managed under the Pelagics FMP. With terms and conditions, the opinion concluded that the fisheries were not likely to jeopardize the continued existence of any threatened or endangered species under jurisdiction of NMFS or destroy or adversely modify critical habitat that had been designated for them. However, the American Samoa longline pelagic fisheries in 2006 exceed annual sea turtle take limit as established in the February 23, 2004 Biological Opinion. Consequently, consultation under the ESA will be reinitiated by NMFS for pelagic fisheries ofthe American Samoa.

On October 8, 2004, the U.S. Fish and Wildlife Service issued an ESA biological opinion on the potential impacts of the shallow-set sector of the Hawaii-based pelagic longline fishery on the short-tailed albatross. The opinion concluded that the shallow-set sector is not likely to jeopardize the continued existence of the short-tailed albatross.

On October 4, 2005, NMFS issued a ESA biological opinion on the ongoing operations of the deep-set sector of the Hawaii-based longline fishery. The opinion concluded that the deep-set sector was not likely to jeopardize the continued existence of humpback whales, or green, leatherback, loggerhead, or olive ridley sea turtles in the area.

Alternative 1A would continue pelagic fishing operations in compliance with existing ESA biological opinions, and the current level of interactions with protected species would not be expected to change. Implementation of future management plan amendments or regulatory amendments to this FMP will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Fishery Participants and Communities

Each of the inhabited Hawaiian Islands (Niihau, Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii) has been defined as a fishing community under the MSA. Also defined as fishing communities are American Samoa, Guam, and the CNMI. Under Alternative 1A, the region's pelagicfisheries would continue to be managed under the Pelagics FMP. No changes would occur to the regulations affecting the fisheries under this alternative. The impacts of the Pelagics FMP on the fishery participants and communities within the region would continue as discussed in Section 3.5 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagics FMP affecting the fishery participants and communities of the region will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

Administration and Enforcement

In the Western Pacific Region, the management of ocean and coastal activities is conducted by a number of agencies and organizations at the Federal, state, county, and village levels. These groups administer programs and initiatives that address often overlapping and sometimes conflicting ocean and coastal issues. Management of pelagic fisheries is complicated because it targets highly migratory species that often travel through jurisdictional boundaries.

Numerous research and data collection projects and programs have been undertaken in the Western Pacific Region and have resulted in the collection of huge volumes of potentially valuable detailed bathymetric and biological data, among other data. Some of this information has been processed and analyzed; however, much has proven difficult to utilize and integrate due to differences in collection methodologies coupled with a lack of metadata or documentation of how the data were collected and coded. This has resulted in incompatible datasets as well as data that are virtually inaccessible to anyone except the primary researchers.

Under Alternative 1A, the abovementioned concerns would continue. The fisheries targeting pelagic species would continue to be managed under the Pelagics FMP. No changes would occur to the existing regulations affecting these pelagic fisheries. The impacts of the Pelagic FMP on the fishery administration and enforcement within the region would continue as discussed in Section 3.6 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). Implementation of future management plan amendments or regulatory amendments to the Pelagics FMP affecting the fishery administration and enforcement within the region will be subject to the appropriate NEPA analysis and other applicable laws at the time of their consideration.

4.1.2 Alternative 1B, Implement One FEP

Under Alternative 1B, the demersal fisheries in the Mariana Archipelago (Guam and CNMI) would be managed under one FEP, the Mariana FEP. The pelagic fisheries within the Mariana Archipelago and the Federal fisheries in the remaining areas of the Western Pacific Region would continue to be managed under the existing five species-based FMPs. Under Alternative 1B, existing regulations relevant to the demersal fisheries within the Mariana Archipelago would be reorganized into ecosystem-based regulations specific to that area. Although the regulations would be reorganized under Alternative 1B, no substantive changes would occur to current fishing regulations.

American Samoa Archipelago

The following sections discuss the potential impacts of Alternative 1B on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the American Samoa Archipelago.

Physical Environment

Under Alternative 1B, the fisheries in the American Samoa Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries. When compared to Alternative 1A establishing the Mariana FEP under this alternative will not alter the impacts on the physical environment by any fisheries in the American Samoa Archipelago operating under these FMPs. Thus, the impacts of Alternative 1B to the American Samoa Archipelago physical environment would be similar to Alternative 1A, the No Action Alternative.

Biological Environment

Under Alternative 1B, the Federal fisheries in the American Samoa Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impacts of Alternative 1B to the American Samoa Archipelago biological environment would be similar to Alternative 1A, the No Action Alternative.

Essential Fish Habitat

In comparison to Alternative 1A implementing Alternative 1B would not be expected to cause any additional adverse impacts on EFH or HAPC for species in the American Samoa Archipelago. Implementation of the Mariana FEP, under Alternative 1B would not be expected to affect the fishing operations or harvest of any fisheries in the American Samoa Archipelago;

rather it would simply reorganize the four species-based FMPs for demersal fisheries into a geographically-defined ecosystem plan for this one area, the Mariana Archipelago. This FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey in the American Samoa Archipelago. Implementing Alternative 1B would not result in a change in fishing gear or strategy in the American Samoa Archipelago, therefore, EFH and HAPC would maintain the same level of impacts as described for Alternative 1A.

Protected Species

Under Alternative 1B, impacts on protected species would continue in the American Samoa Archipelago as described in Alternative 1A and in Section 3.5.1.2. Listed species would continue to be given protection in accordance with the MSA, MMPA, ESA, and other applicable laws. Under Alternative 1B, the fisheries in the American Samoa Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impacts of Alternative 1B to the protected species in the American Samoa Archipelago would be similar to Alternative 1A, the No Action Alternative.

Fishery Participants and Communities

Under Alternative 1B, the fisheries in the American Samoa Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impact of Alternative 1B to fishery participants and communities in the American Samoa Archipelago would be similar to Alternative 1A, the No Action Alternative.

Administration and Enforcement

Under Alternative 1B, the Federal fisheries in the American Samoa Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Under Alternative 1B, scientists and managers would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities, on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations.

Many of these managers and scientists involved with the Mariana FEP will likely be involved in the fisheries associated with the American Samoa Archipelago. However, the impacts of Alternative 1B on managers and scientists are not expected to be significant as they are increasingly taking into account ecosystem characteristics and functions when making research and management recommendations and decisions. The impacts on enforcement under this alternative are also not expected to be significant as no substantive changes to current fishing regulations, boundaries, or fishing operations would occur in the American Samoa Archipelago.

Mariana Archipelago

The following sections discuss the potential impacts of Alternative 1B on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Mariana Archipelago.

Physical Environment

Under Alternative 1B, the demersal fisheries within the Mariana Archipelago, currently managed by the species-based FMPs, would be managed under the proposed Mariana FEP. The pelagic fisheries within the Mariana Archipelago and the domestic pelagic fisheries outside the waters of the U.S. EEZ of the Mariana Archipelago would continue to be managed under the existing Pelagics FMP. However, the boundaries of the proposed FEP are not physically apparent. The boundaries under either the current FMPs or the proposed FEP are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. In the short-term, establishing the Mariana FEP under this alternative will not alter the impacts on the physical environment by any fisheries in the Mariana Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach willto improve our understanding and conservation of the physical environment.

Alternative 1B also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1B. Thus, with regard to the physical environment, there are no substantial differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Mariana Archipelago.

Biological Environment

Implementation of the Mariana FEP to manage Federal demersal fisheries in the Mariana Archipelago will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based FEP for demersal fisheries within the Mariana Archipelago is not expected to affect the population of target and non-target stocks nor the fishing operations or harvest of any Federal fisheries operating under the current species-based FMPs. Thus, the impacts of the Mariana FEP for Federal demersal fisheries would be similar to Alternative 1A. The status and trends of target and non-target species within the Mariana Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1B would also replace the current FMPs regulation structure for demersal fisheries within the Mariana Archipelago with a FEP regulation structure. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve the management of these resources. The implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis at that time.

Essential Fish Habitat

When compared to Alternative 1A, Alternative 1B, would not cause additional impacts on EFH or HAPC for species in the Mariana Archipelago. Implementation of the Mariana FEP for demersal fisheries would not be expected to affect the fishing operations or harvest of any Federal fisheries within the Mariana Archipelago; rather it would simply reorganize the current species-based FMPs for demersal fisheries into a geographically-defined ecosystem management plan. Furthermore, similar to the No Action Alternative, the implementation of the Mariana FEP would not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed Mariana FEP. The current management regime, under the FMPs protects habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1B would not result in a change in fishing gear or management measures, therefore, impacts to EFH and HAPC would be similar to Alternative 1A and maintain the same level of impacts as Alternative 1A.

Protected Species

The implementation of the archipelagic-based Mariana FEP under this alternative would not affect the fishing operations or catches of any fisheries operating under the current FMPs. Under Alternative 1A current FMP regulations require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing, previous ESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any ESA-listed species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in substantive s to fishing regulations, itchange will maintainthe same level of protection and impacts to protected species as the No Action Alternative. In addition, it will e currentcontinuation data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1B would receive consideration of impacts on protected species as appropriate in accordance with the ESA, MMPA, and other applicable laws.

Fishery Participants and Communities

Alternative 1B would replace the current FMPs for Mariana demersal fisheries with an archipelagic-based Mariana FEP. No substantial change to the current regulations or fisheries would occur under the proposed Mariana FEP. However, one of the objectives of the Mariana FEP is to recognize and increase inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (such as the improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the Mariana FEP under this alternative will be beneficial as over time it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an FEP for demersal fisheries within the Mariana Archipelago only. The remainder of the Western Pacific Region would continue to operate under existing species-based FMPs, as would the pelagic fisheries based in the Mariana Archipelago. This alternative would cause some confusion to Mariana Archipelago fisheries participants and others as the they switch to ecosystem management for Mariana demersal fisheries and remain with a species-based FMP for the pelagic fisheries.For example, those fishing regulations applicable to the Mariana Archipelago demersal fisheries would be grouped together in one subpart of the Code of Federal Regulations (CFR) while those applicable to other areas would remain in their respective species-based CFR subparts.

Administration and Enforcement

Under Alternative 1B, no substantive changes would occur to the regulations affecting the Federal fisheries within the Mariana Archipelago. However, under Alternative 1B, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP and would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1B.

Impacts of Alternative 1B on enforcement and management agencies are not expected to be adverse as the fishery boundaries, fishery operations, and associated regulations would not change. However, in the long-term, under Alternative 1B, voluntary compliance with regulations could be enhancedincreased as fishery participants become more involved in the fishery management process. Additionally, the dincrease inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, wcould improve the management of the fisheries.

Hawaiian Archipelago

The following sections discuss the potential impacts of Alternative 1B on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Hawaiian Archipelago.

Physical Environment

Under Alternative 1B, the fisheries in the Hawaiian Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations or management strategy affecting these Federal fisheries. Thus, the impacts of Alternative 1B to the Hawaiian Archipelago physical environment would be similar to Alternative 1A, the No Action Alternative.

Biological Environment

Under Alternative 1B, the Federal fisheries in the Hawaiian Archipelago would continue to be managed under the five species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impacts of Alternative 1B to the Hawaiian Archipelago physical environment would be similar to Alternative 1A, the No Action Alternative. As in Alternative 1A, all stock status and trends would continue to be evaluated annually, with changes to the management of these fisheries considered as new information becomes available. Also as in Alternative 1A, regardless of the geographic categorization of stocks, issues of local depletion could also be considered for management response as necessary.

Essential Fish Habitat

In comparison to Alternative 1A, approving and implementing Alternative 1B would not be expected to cause any additional adverse impacts on EFH or HAPC for species in the Hawaiian Archipelago. Implementation of the Mariana FEP, under Alternative 1B would not affect the fishing operations or harvest of any Federal fisheries in the Hawaiian Archipelago; rather it would simply reorganize the species-based FMPs for demersal fisheries into a geographically-defined ecosystem plan for one area, the Mariana Archipelago. This alternative would not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey in the Hawaiian Archipelago. Implementing Alternative 1B would not result in any substantive change in fishing regulations forthe Federal fisheries in the Hawaiian Archipelago, therefore, EFH and HAPC would maintain the same level of impacts as Alternative 1A.

Protected Species

Under Alternative 1B, the Federal fisheries in the Hawaiian Archipelago would continue to be managed under the species-based FMPs. No changes would occur to exsitingregulations thatrequire fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Under Alternative 1B, impacts on protected species would be similar to Alternative 1A. Under Alternative 1B, listed species would continue to be given protection in accordance with the MSA, MMPA, ESA, and other applicable laws. Thus, the impacts of Alternative 1B to the protected species in the Hawaiian Archipelago would be similar to Alternative 1A, the No Action Alternative.

Fishery Participants and Communities

Each of the inhabited Hawaiian Islands (Niihau, Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii) has been defined as a fishing community under the MSA. Under Alternative 1B, the Federal fisheries in the Hawaiian Archipelago would continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. us, thesThe impact of Alternative 1B to fishery participants and communities in the Hawaiian Archipelago would be similar to Alternative 1A, the No Action Alternative.

Administration and Enforcement

Under Alternative 1B, the Federal fisheries in the Hawaiian Archipelago would continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Under Alternative 1B, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Scientists and managers would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Many of these managers and scientists and involved with the Mariana FEP will likely be involved in the Federal fisheries associated with the Hawaiian Archipelago. However, the impacts of Alternative 1B on managers and scientists are not expected to be significant as they are increasingly taking into account ecosystem characteristics and functions when making research and management recommendations and decisions. The impacts on enforcement under this alternative are also not expected to be adverse as no changes to current fishing regulations, boundaries, or fishing operations and associated regulations for the Federal fisheries would occur in the Hawaiian Archipelago.

PRIA

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the PRIA.

Physical Environment

Under Alternative 1B, the Federal fisheries in the PRIAwould continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries. Thus, the impacts of Alternative 1B to thephysical environment of the PRIA would be similar to Alternative 1A, the No Action Alternative.

Biological Environment

Under Alternative 1B, the Federal fisheries in the PRIA would continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impacts of Alternative 1B to the PRIA'sHawaiian Archipelago physical environment would be similar to Alternative 1A, the No Action Alternative. As in Alternative 1A, all stock status and trends would continue to be evaluated annually, with changes to the management of these fisheries considered as new information becomes available.

Essential Fish Habitat

In comparison to Alternative 1A, implementing Alternative 1B would not be expected to cause any additional impacts on EFH or HAPC for species in the PRIA. Implementation of the Mariana FEP, under Alternative 1B, would not be expected to affect the fishing operations or catches of any fisheries in the PRIA; rather it would simply reorganize the species-based FMPs for demersal fisheries into a geographically-defined ecosystem plan for this one area, the Mariana Archipelago. This one FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey in the PRIA. Implementing Alternative 1B would not result in any substantive change in fishing regulations in the PRIA, therefore, EFH and HAPC would maintain the same level of protection as under Alternative 1A.

Protected Species

Under Alternative 1B, the Federal fisheries in the PRIA would continue to be managed under the species-based FMPs. No changes would occur to existing regulations that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Under Alternative 1B, impacts on protected species in the PRIA would be similar to Alternative 1A. Under Alternative 1B, listed species would continue to be given protection in accordance with the MSA, MMPA, ESA, and other applicable laws.

Fishery Participants and Communities

There are no communities within the PRIA that vehas been defined as a fishing community under the MSA. Under Alternative 1B, the fisheries in the PRIA would continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Thus, the impact of Alternative 1B to fishery participants in the PRIA would be similar to Alternative 1A, the No Action Alternative.

Administration and Enforcement

Under Alternative 1B, the fisheries in the PRIA would continue to be managed under the species-based FMPs. No changes would occur to the regulations affecting these fisheries under this alternative. Under Alternative 1B, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Many of these managers and scientists involved with the Mariana FEP will likely be involved in the Federal fisheries associated with the PRIA. However, the impacts of Alternative 1B on managers and scientists are not expected to be adverse as they are increasingly taking into account ecosystem characteristics and functions when making research and management recommendations and decisions. The impacts on enforcement under this alternative are also not expected to be adverse as no substantive changes to current fishing regulations, boundaries, or fishing operations would occur in the PRIA.

Pelagic

The following sections discuss the potential impacts of Alternative 1B on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the fisheries operating under the existing Pelagics FMP.

Under Alternative 1B, the Federal demersal fisheries in the Mariana Archipelago would be managed under one FEP, the Mariana FEP. The pelagic fisheries based in the Mariana Archipelago would continue to be managed under the existing Pelagic FMP. Thus, spatially, the pelagic fisheries within the EEZ of the Mariana Archipelago would continue to overlap with the demersal fisheries under the proposed Mariana ArchipelagoFEP.

Physical Environment

Under Alternative 1B, the pelagic fisheries in the Mariana Archipelago would continue to be managed under the Pelagic FMP. No changes would occur to the regulations or management measures affecting the pelagic fisheries. When compared to Alternative 1A, establishing the Mariana FEP for demersal fisheries under this alternative will not alter the impacts on the physical environment by any Federal pelagic fisheries operating in the Mariana Archipelago or on the high-seas. Thus, the impacts of the Federal pelagic fisheries Alternative 1B to the Mariana Archipelago physical environment would be similar to Alternative 1A, the No Action Alternative.

Biological Environment

Implementation of the Mariana FEP for the demersal fisheries within the Mariana Archipelago will not affect the fishing operations or harvest of any pelagic fisheries operating under the current Pelagic FMP. Thus, the impacts of operating the pelagic fisheries under Alternative 1B would be similar to Alternative 1A and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). The status and trends of target and non-target species will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1B would also replace the current species-based regulation structure for the demersal fisheries with a regulation structure of an archipelagic-based FEP. No substantive changes are proposed under Alternative 1B to the regulations or to the demersal fisheries through this structural reorganization. Thus, with regard to the biological environment for pelagic species, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources. However, implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis and other applicable laws at that time.

Essential Fish Habitat

When compared to the Alternative 1A, No Action Alternative, Alternative 1B is not expected to cause any additional impacts on EFH or HAPC for species currently managed under the Pelagics FMP. Furthermore, this FEP for demersal fisheries within the Mariana Archipelago is not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey. This alternative will not result in ny substantivesa change in fishing regulations, therefore, under this alternative the EFH and HAPC for the pelagic fisheries will maintain the same level of impacts as under the No Action Alternative.

Protected Species

The implementation of the archipelagic-based FEP for demersal fisheries within the Mariana Archipelago would not changed existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Thus, under Alternative 1B impacts be similar to the No Action alternative and impacts will continue to protected species as discussed in Section 3.5 and as previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19).Existing ESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any ESA-listed species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in substantive changes to fishing regulations, it will maintain the same level of protection and impacts to protected species as the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1B would receive consideration of impacts on protected species as appropriate in accordance with the ESA, MMPA, and other applicable laws.

Fishery Participants and Communities

Replacing the current demersal species-based FMPs within the Mariana Archipelago with a FEP will not change regulations under the current Pelagics FMP. However, an objective of the FEP approach is the explicit recognition and increased inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to Alternative 1A, the No Action Alternative, the implementation of the one FEP for demersal fisheries under this alternative is anticipated to positively impact fishery participants and communities in the Mariana Archipelago. The long-term impacts of implementing this one FEP will also be positive as it willmay integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an FEP for demersal fisheries for within the Mariana Archipelagoone only. The remainder of the Western Pacific Region would continue to operate under existing species-based FMPs, as would the pelagic fisheries based in the Mariana Archipelago. Tthathis alternative would cause some confusion to participants in the fisheries as they switch to ecosystem management for the Marianademersal fisheries and remain with a species-based FMP for the pelagic fisheries.For example, those fishing regulations applicable to the Mariana Archipelago demersal fisheries would be grouped together in one subpart of the Code of Federal Regulations (CFR) while those applicable to other areas would remain in their respective species-based CFR subparts.

Administration and Enforcement

Under Alternative 1B, the pelagic fisheries throughout the region would continue to be managed under the species-based Pelagics FMP. No changes would occur to the regulations affecting the pelagic fisheries under this alternative Under Alternative 1B, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1B. The impacts on enforcement under this alternative are not expected to be adverse as no substantive changes to current fishing regulations, boundaries, or fishing operations would occur for the pelagic fisheries.

4.1.3 Alternative 1C, Implement Four FEPs

Under Alternative 1C, existing FMPs would be replaced by fourFEPs that include EEZ waters around each archipelagic area; the Pelagic FMP would be retained but would apply the domestic pelagic vesselsfisheries operating on the surrounding high seas. Thus, invidiualFEPs would be implemented for the Mariana, Hawaii, American Samoa Archipelagos, and the PRIA. The boundary of each FEP would encompass all Federal waters from 3 to 200 miles offshore from the seaward boundary for each of the Western Pacific Region's archipelagic areas, except CNMI and the PRIA. For those areas, the FEPs would encompass waters0 to 200 miles offshore. Within the FEP boundaries, both the demersal and pelagic fisheries would be managed under the proposed FEPs (Table 2–4). The management of the domestic pacific pelagic fisheries operating outside one of the Western Pacific Region's archipelagic areas, as defined in Table 2–3, would remain under the Pelagics FMP; however, the Pelagics FMP would be renamed the Pacific Pelagic FMP. Existing regulations relating to the current FMPs would be reorganized to reflect the boundaries under each FEP. Although the regulations would be reorganized under Alternative 1C, no substantive changes would occur to current fishing regulations.

American Samoa Archipelago

The following sections discuss the potential impacts of Alternative 1C on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the American Samoa Archipelago.

Physical Environment

Under Alternative 1C, all fisheries, both demersal and pelagic species, within the American Samoa Archipelago, currently managed by the five species-based FMPs, would be managed under the proposed American Samoa FEP. The domestic pelagic fisheries operating outside the waters of the U.S. EEZ would be managed under the Pacific Pelagic FMP. However, these boundaries are not physically apparent. The boundaries under FMPs or proposed FEP are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1C also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1C. Thus, with regard to the impacts on the physical environment of the American Samoa Archipelago, in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the American Samoa FEP to manage fisheries in the American Samoa Archipelago, in combination with the Pacific Pelagics FMP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based American Samoa FEP under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the American Samoa FEP on the biological environment would be similar to Alternative 1A. The status and trends of target and non-target species within the American Samoa Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1C would replace the current species-based FMPs regulation structure with a FEP regulation structure for the American Samoa Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization under Alternative 1C. Thus, with regard to the biological environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis at that time.

Essential Fish Habitat

When compared to Alternative 1A, implementing Alternative 1C would not be expected to cause any additional adverse impacts on EFH or HAPC for species in the American Samoa FEP. Implementation of the FEP would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into one geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the American Samoa FEP would not likely lead to any substantialadditional physical or biological alterations to the oceanic and coastal habitat, or result in detrimental alterations to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed American Samoa FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1C would not result in any change to fishing regulations, therefore, EFH and HAPC would maintain the same level of impactsas describe for Alternative 1A.

Protected Species

The implementation of the archipelagic-based American Samoa FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Under Alternative 1A, existing ESA biological have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify their critical habitat.

Since this alternative will not result in any substantive change to fishing regulations in fishing gear or strategy, this alternative will maintain the same level of protection for protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) within the American Samoa Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated . Ffuture management actions under Alternative 1C would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1C would replace the current FMPs with an archipelagic-based American Samoa FEP. No substantial change to the current regulations or fisheries would occur under the proposed FEP. However, one of the objectives of the American Samoa FEP is increased recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the American Samoa FEP under this alternative will positively impact fishery participants and communities in the American Samoa Archipelago. The anticipated long-term impacts of implementing the American Samoa FEP will also be positive as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an American Samoa FEP, which would include both demersal and pelagic species. The domestic pelagic fisheries operating in the high seas of the Western Pacific Region would continue to operate under existing species-based Pelagics FMP.

As noted earlier, pelagic species are highly migratory. It is anticipated that this alternative would cause some confusion to participants targeting these highly migratory species as they switch from the high seas Pacific Pelagics FMP to the proposed archipelagic-based FEP. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEP and the domestic pelagic fisheries on the high seas. Thus, Alternative 1C poses a potential negative impact on fishery participants targeting pelagic species under the American Samoa FEP and the Pacific Pelagics FMP.

Administration and Enforcement

Under Alternative 1C, no substantive changes would occur to the regulations affecting the fisheries within the American Samoa Archipelago. However, under Alternative 1C, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed American Samoa FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the American Samoa Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1C.

Alternative 1C could produce adverse affects on enforcement agencies if future regulations developed for the pelagic fisheries become inconsistent, or overly specific, between the proposed American Samoa FEP and the domestic pelagic fisheries operating on the high seas, managed under the Pacific Pelagic FMP.

Mariana Archipelago

The following sections discuss the potential impacts of Alternative 1C on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Mariana Archipelago.

Physical Environment

Under Alternative 1C, all fisheries, both demersal and pelagic species, within the Mariana Archipelago, currently managed by the five species-based FMPs, would be managed under the proposed Mariana FEP. The domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagic FMP. However, these boundaries are not physically apparent. The boundaries under FMPs or proposed FEP are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1C also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1C. Thus, with regard to the physical environment to the Mariana Archipelago, in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the Mariana FEP, in combination with the Pacific Pelagics FMP, will have potential impacts on target and non-target species. However, implementation of the archipelagic-based Mariana FEP under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of approving and implementing the Mariana FEP would be similar to Alternative 1A. The status and trends of target and non-target species within the Mariana Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1C would replace the current species-based FMP regulation structure with a FEP regulation structure for the Mariana Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization under Alternative 1C. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would improve management of these resources. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to NEPA and other applicable laws.

Essential Fish Habitat

When compared to Alternative 1A iimplementing Alternative 1C would not be expected to cause impacts on EFH or HAPC for species in the Mariana FEP. Implementation of the FEP would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into one geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the Mariana FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed Mariana FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1C would not result in any substantive change to fishing regulations, therefore, EFH and HAPC would maintain the same level of impactsprotection as described for Alternative 1A.

Protected Species

The implementation of the archipelagic-based Mariana FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Under

Alternative 1A, existing ESA biological opinions imposed have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in any substantial change to fishing regulations it will maintain the same level of protection for protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Ffuture management actions under Alternative 1C would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1C would replace the current FMPs with an archipelagic-based Mariana FEP. No substantial change to the current regulations or fisheries would occur under the proposed FEP. However, one of the objectives of the Mariana FEP is to increase recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the Mariana FEP under this alternative will positively impact fishery participants and communities in the Mariana Archipelago. The anticipated long-term impacts of implementing the Mariana FEP will also be positive as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an Mariana FEP, which would include both demersal and pelagic species. The domestic pelagic fisheries operating in the high seas of the Western Pacific Region would continue to operate under existing species-based Pelagics FMP.

As noted earlier, pelagic species are highly migratory. It is anticipated that this alternative would cause some confusion to participants targeting these highly migratory species as they switch from the high seas Pacific Pelagics FMP to the proposed archipelagic-based FEP. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEP and the domestic pelagic fisheries on the high seas. Thus, Alternative 1C poses a potential negative impact on fishery participants targeting pelagic species under the Mariana FEP and the Pacific Pelagics FMP.

Administration and Enforcement

Under Alternative 1C, no substantive changes would occur to the regulations affecting the fisheries within the Mariana Archipelago. However, under Alternative 1C, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, respectively; this current heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1C.

Alternative 1C could produce adverse affects on enforcement agencies if future regulations developed for the pelagic fisheries become inconsistent, or overly specific, between the proposed Mariana FEP and the domestic pelagic fisheries on the high seas, managed under the Pacific Pelagic FMP.

Hawaii Archipelago

The following sections discuss the potential impacts of Alternative 1C on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Hawaiian Archipelago.

Physical Environment

Under Alternative 1C, all fisheries, both demersal and pelagic species, within the Hawaiian Archipelago, currently managed by the five species-based FMPs, would be managed under the proposed Hawaii FEP. The domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagic FMP. However, these boundaries are not physically apparent. The boundaries under FMPs or proposed FEP are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1C also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1C. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Hawaiian Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the Hawaii FEP to manage fisheries in the Hawaiian Archipelago, in combination with the Pacific Pelagics FMP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based Hawaii FEP under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of approving and implementing the Hawaii FEP would be similar to Alternative 1A. The status and trends of target and non-target species within the Hawaiian Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1C would replace the current species-based FMP regulation structure with a FEP regulation structure for the Hawaiian Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization under Alternative 1C. Thus, with regard to the biological environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis at that time.

Essential Fish Habitat

When compared to Alternative 1A, implementing Alternative 1C would not be expected to cause impacts on EFH or HAPC for species in the Hawaii FEP. Implementation of the FEP would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into one geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the Hawaii FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed Hawaii FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1C would not result in any substantive changed to fishing regulations, therefore, EFH and HAPC would maintain the same level of impacts as described for Alternative 1A.

Protected Species

The implementation of the archipelagic-based Hawaii FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in nys to fishing regulations, ita change will maintain the same level of protection and impacts for protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) within the Hawaiian Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Ffuture management actions under Alternative 1C would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1C would replace the current FMPs with an archipelagic-based Hawaii FEP. No substantial change to the current regulations or fisheries would occur under the proposed FEP. However, one of the objectives of the Hawaii FEP is to increase recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the Hawaii FEP under this alternative will positively impact fishery participants and communities in the Hawaiian Archipelago. The anticipated long-term impacts of implementing the Hawaii FEP will also be positive as it may integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an Hawaii FEP, which would include both demersal and pelagic species. The domestic pelagic fisheries operating in the high seas of the Western Pacific Region would continue to operate under existing species-based Pelagics FMP.

As noted earlier, pelagic species are highly migratory. It is anticipated that this alternative would cause some confusion to participants targeting these highly migratory species as they switch from the high seas Pacific Pelagics FMP to the proposed archipelagic-based FEP. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEP and the domestic pelagic fisheries on the high seas. Thus, Alternative 1C poses a potential negative impact on fishery participants targeting pelagic species under the Hawaii FEP and the Pacific Pelagics FMP.

Administration and Enforcement

Under Alternative 1C, no substantive changes would occur to the regulations affecting the fisheries within the Hawaiian Archipelago. However, under Alternative 1C, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Hawaii FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Hawaiian Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, respectively; this current heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1C.

Alternative 1C could produce adverse affects on enforcement agencies if future regulations developed for the pelagic fisheries become inconsistent, or overly specific, between the proposed Hawaii FEP and the domestic pelagic fisheries on the high seas, managed under the Pacific Pelagic FMP.

PRIA

The following sections discuss the potential impacts of Alternative 1C on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the PRIA.

Physical Environment

Under Alternative 1C, all fisheries, both demersal and pelagic species, within the PRIA, currently managed by the five species-based FMPs, would be managed under the proposed PRIA FEP. The domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagic FMP. However, these boundaries are not physically apparent. The boundaries under FMPs or proposed FEP are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1C also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1C. Thus, with regard to the physical environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the PRIA. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would be expected to improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the PRIA FEP to manage fisheries in the PRIA, in combination with the Pacific Pelagics FMP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based PRIA FEP under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of approving and implementing the PRIA FEP would be similar to Alternative 1A. The status and trends of target and non-target species within the PRIA will continue to be evaluated annually using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1C would replace the current species-based FMP regulation structure with a FEP regulation structure for the PRIA. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization under Alternative 1C. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would improve management of these resources. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis at that time.

Essential Fish Habitat

When compared to Alternative 1A iimplementing Alternative 1C would not be expected to impact EFH or HAPC for species in the PRIA FEP. Implementation of the FEP would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into one geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the PRIA FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed PRIA FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1C would not result in any substantive change in fishing regulations, therefore, EFH and HAPC would maintain the same level of impacts as the No Action alternative.

Protected Species

The implementation of the archipelagic-based PRIA FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in substantive s to fishing regulations,a change this alternative will maintain the same level of protection and impactsfor protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) within the PRIA fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Ffuture management actions under Alternative 1C would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1C would replace the current FMPs with archipelagic-based PRIA FEP. No substantial change to the current regulations or fisheries would occur under the proposed FEP. However, one of the objectives of the PRIA FEP is to recognition and increased inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. There are identified fishing communities with the PRIA under MSA.

When compared to the No Action Alternative, the implementation of the PRIA FEP under this alternative is anticipated to positively impact fishery participants in the PRIA. The anticipated long-term impacts of implementing the PRIA FEP will also be positive as it may integrate scientific information and human needs in a manner that increases the involvement of participants in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create an PRIA FEP, which would include both demersal and pelagic species. The domestic pelagic fisheries operating in the high seas of the Western Pacific Region would continue to operate under existing species-based Pelagics FMP.

As noted earlier, pelagic species are highly migratory. It is anticipated that this alternative would cause some confusion to participants targeting these highly migratory species as they switch from the high seas Pacific Pelagics FMP to the proposed archipelagic-based FEP. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEP and the domestic pelagic fisheries on the high seas. Thus, Alternative 1C poses a potential negative impact on fishery participants targeting pelagic species under the PRIA FEP and the Pacific Pelagics FMP.

Administration and Enforcement

Under Alternative 1C, no substantive changes would occur to the regulations affecting the fisheries within the PRIA. However, under Alternative 1C, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed PRIA FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the PRIA, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1C.

Alternative 1C could produce adverse affects on enforcement agencies if future regulations developed for the pelagic fisheries become inconsistent, or overly specific, between the proposed PRIA FEP and the domestic pelagic fisheries on the high seas, managed under the Pacific Pelagic FMP.

Pelagic

The following sections discuss the potential impacts of Alternative 1C on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the fisheries operating under the current Pelagics FMP.

Physical Environment

Under Alternative 1C, all fisheries, both demersal and pelagic species, would be managed by the proposed archipelagic-based FEPs. The domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagic FMP. When compared to the No Action Alternative, Alternative 1A as a baseline, replacing the species-based FMPs with the four archipelagic-based FEPs and one Pacific Pelagic FMP will not impact the physical environment of marine ecosystems under any of the Action Alternatives. The boundaries are not physically apparent as established under either the current FMPs or boundaries established under the proposed archipelagic-based FEPs in this alternative. The boundaries under species-based FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. No substantive changes to current fishing regulations or operations would occur in any of the alternatives. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the archipelagic-based FEPs, for both demersal and pelagic species, and the one Pacific Pelagic FMP will have potential positive and negative impacts on targeted pelagic species and non-target species. However, implementation of Alternative 1C is not expected to affect the fishing operations or catches of any fisheries operating under the current Pelagic FMP. Thus, the impacts of operating the pelagic fisheries under Alternative 1C would be similar to Alternative 1A, which has been previously analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). The status and trends of target and non-target species will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1C would also replace the current structure of the regulations under the species-based Pelagic FMP with a regulation structure of four archipelagic-based FEPs and a Pacific Pelagic FMP. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to NEPA and other applicable laws at that time.

Essential Fish Habitat

When compared to the No Action Alternative, none of the action alternatives are expected to impact EFH or HAPC for species managed currently under the Pelagics FMP. Furthermore, the four archipelagic-based FEPs, as proposed under this alternative, are not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey. This alternative will not result in any substantive change in fishing regulations, therefore, under this alternative the EFH and HAPC will maintain the same level of impacts as under the No Action Alternative.

Protected Species

The implementation of the archipelagic-based FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a change in fishing gear or strategy, this alternative will maintain the same level of protection and impacts for protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) for pelagic fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Future management actions under Alternative 1C would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1C would replace the current FMPs with four archipelagic-based FEPs and one Pacific Pelagic FMP. No substantial change to the current regulations or fisheries would occur under the proposed FEPs. However, one of the sobjective of each of the archipelagic-based FEPs is the increased recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the archipelagic-based FEP under this alternative is anticipated to positively impact fishery participants and communities in the region. The anticipated long-term impacts of implementing the FEPs will also be positive as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create a four archipelagic-based FEPs, which would include both demersal and pelagic species. The domestic pelagic fisheries operating in the high seas of the Western Pacific Region would continue to operate under a Pacific Pelagic FMP.

As noted earlier, pelagic species are highly migratory. It is anticipated that this alternative would cause some confusion to participants targeting these highly migratory species as fishermen switch from the high seas Pacific Pelagics FMP to the proposed archipelagic-based FEPs. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEPs and the domestic pelagic fisheries on the high seas. Thus, Alternative 1C poses a potential negative impact on fishery participants targeting pelagic species.

Administration and Enforcement

Under Alternative 1C, no substantive changes would occur to the regulations affecting the pelagic fisheries. However, under Alternative 1C, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed FEPs. Managers and scientists would be asked to increasingly consider fishery interactions within the Hawaiian Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would also be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1C.

Pelagic species are highly migratory species. Alternative 1C could produce adverse affects on enforcement agencies if future regulations developed for the pelagic fisheries become inconsistent, or overly specific, between the proposed archipelagic-based FEP and the domestic pelagic fisheries on the high seas, managed under the Pacific Pelagic FMP.

4.1.4 Alternative 1D - Implement Five FEPs (Preferred)

Under Alternative 1D , the Preferred Alternative the boundaries for the four archipelagic ecosystems, as described in Alternative 1C, would be defined and four FEPs for demersal fisheries would be approved and implemented. Additionally, a fifth FEP, the Pelagics FEP, would also be approved and implemented. The Pelagics FEP would include the marine resources associated with pelagic species within all U.S. EEZs and the management of the U.S. domestic pelagic fisheries on the high seas of the Western Pacific Region. Alternative 1C and Alternative 1D are very similar, with the following exceptions: (1) Alternative 1D would establish a Pelagics FEP, which would replace the current Pelagics FMP, and (2) under Alternative 1D, the management of the pelagic fisheries within the boundaries of the four archipelagic-based FEPs would remain with the Pelagics FEP.

The boundary of the Pelagics FEP would overlap with the boundaries of the four FEPs for demersal fisheries; however, the Pelagics FEP would specifically manage those resources and habitats associated with the pelagic ecosystem (see Table 2–5). In addition, under Alternative 1D, existing regulations relating to the current FMPs would be reorganized to reflect the boundaries of the FEPs (see Table 2–6). Although the existing fishery regulations would be reorganized, no substantive changes would occur to them.

The preliminary draft FEPs, as proposed under Alternative 1D, are available from the Council's website at www.wpcouncil.org or by mail[60] from the Council. Additionally, a Compact Disc containing electronic copies of the preliminary draft FEPs are included with this EIS.

American Samoa Archipelago

The following sections discuss the potential impacts of Alternative 1D on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the American Samoa Archipelago.

Physical Environment

Under Alternative 1D, the demersal fisheries within the American Samoa Archipelago, currently managed by the four demersal species-based FMPs, would be managed under the proposed American Samoa FEP. The pelagic fisheries within the American Samoa Archipelago and the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1D also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1D. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the American Samoa Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

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Biological Environment

Implementation of the American Samoa FEP, in combination with the Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based FEP for demersal fisheries within the American Samoa Archipelago under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the demersal American Samoa FEP and the associated Pelagics FEP would be isimular to Alternative 1A, the No Action Alternative. The status and trends of target and non-target species within the American Samoa Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1D would also replace the current species-based FMP regulation structure for demersal fisheries with a FEP regulation structure within the American Samoa Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species will improve the management of these resources. However, the implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to the appropriate NEPA analysis at that time.

Essential Fish Habitat

When compared to Alternative 1A iimplementing Alternative 1D, would not be expected to impact EFH or HAPC for species in the American Samoa FEP. Implementation of the American Samoa FEP would not be expected to affect the fishing operations or catches of any fisheries within the American Samoa Archipelago; rather it would simply reorganize the current demersal species-based FMPs into a geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the American Samoa FEP illwould not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed American Samoa FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1D would not result in substantive stochange in fishing regulations, therefore, EFH and HAPC would maintain the same level of impacts as described for Alternative 1A.

Protected Species

The implementation of the archipelagic-based American Samoa FEP under this is not anticipated would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in substantive changes to fishing regulations, it will maintain the same level of impacts tofor protected species as under the No Action Alternative. In addition, it will continue current data collection programs (e.g., logbooks, observers) for pelagic fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Ffuture management actions under Alternative 1D would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1D would replace the current FMPs with an archipelagic-based American Samoa FEP. No substantial change to the current regulations or fisheries would occur under the proposed American Samoa FEP. However, one of the objectives of the American Samoa FEP is to increaserecognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the American Samoa FEP under this alternative is anticipated to be beneficial as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. When compared to the other Action Alternatives, it is anticipated that this alternative would cause the least amount of confusion to participants in the fisheries, as the entire Western Pacific Region will switch from FMPs to placed-based FEPs, with no substantial changes in the regulations.

Administration and Enforcement

Under Alternative 1D, no substantive changes would occur to the regulations affecting the fisheries within the American Samoa Archipelago. However, under Alternative 1D, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed American Samoa FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the American Samoa Archipelago, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, respectively, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1D.

With regard to the fisheries within the American Samoa Archipelago in the short-term, impacts of Alternative 1D, on enforcement and management agencies are not expected to be adverse as the fishery boundaries, fishery operations, and regulations would not change. However, in the long-term, under Alternative 1D, compliance with regulation could be increased in the communities of Hawaii as the participants voluntary become more involved in fishery management. Additionally, the increase inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, would improve the success of the management of the fisheries.

Mariana Archipelago

The following sections discuss the potential impacts of Alternative 1D on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Mariana Archipelago.

Physical Environment

Under Alternative 1D, the demersal fisheries within the Mariana Archipelago, currently managed by the four demersal species-based FMPs, would be managed under the proposed Mariana FEP. The pelagic fisheries within the Mariana Archipelago and the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1D also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1D. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Mariana Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the Mariana FEP to manage fisheries in the Mariana Archipelago, in combination with the Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based FEP for demersal species within the Mariana Archipelago under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. The status and trends of target and non-target species within the Mariana Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1D would replace the current species-based FMP regulation structure for demersal fisheries with a FEP regulation structure for the Mariana Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve the management of these resources. However, the implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject NEPA and other applicable laws at that time.

Essential Fish Habitat

When compared to Alternative 1A iimplementing Alternative 1D, would not be expected to impact EFH or HAPC for species in the Mariana Archipelago. Implementation of the Mariana FEP would not be expected to affect the fishing operations or catches of any fisheries within the Mariana Archipelago; rather it would simply reorganize the current demersal species-based FMPs into a geographically-defined ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the Mariana Archipelago FEP will not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed American Samoa FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1D would not result in substantive change in fishing regulations, therefore, EFH and HAPC would maintain the same level of impacts as described for Alternative 1A.

Protected Species

The implementation of the archipelagic-based Mariana FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. ExistingESA biological opinions have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a change in fishing gear or strategy, this alternative will maintain the same level of impacts to ESA listed species as under the No Action Alternative. Implementing the Mariana FEP will allow for the continuation of data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS. Future management actions under Alternative 1D would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1D would replace the current FMPs with an archipelagic-based Mariana FEP. No substantial change to the current regulations or fisheries would occur under the proposed Mariana FEP. However, one of the objectives of the Mariana FEP is to increase recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, the implementation of the Mariana FEP under this alternative is anticipated to be beneficial as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. When compared to the other Action Alternatives, it is anticipated that this alternative would cause the least amount of confusion to participants in the fisheries, as the entire Western Pacific Region will switch from FMPs to placed-based FEPs, with no substantial changes in the regulations.

Administration and Enforcement

Under Alternative 1D, no substantive changes would occur to the regulations affecting the fisheries within the Mariana Archipelago. However, under Alternative 1D, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Mariana FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to yfisheries' ecosystems would continue under Alternative 1D.

With regard to the fisheries within the Mariana Archipelago in the short-term, impacts of Alternative 1D, on enforcement agencies are not expected to be adverse as the fishery boundaries, fishery operations, and management and regulations would not change. However, in the long-term, under Alternative 1D, compliance with regulation could be increased in the communities of Hawaii as the participants voluntary become more involved in fishery management. Additionally, the increase inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, would improve fisheries management.

Hawaiian Archipelago

The following sections discuss the potential impacts of Alternative 1D on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Hawaiian Archipelago.

Physical Environment

Under Alternative 1D, the demersal fisheries within the Hawaiian Archipelago, currently managed by the four demersal species-based FMPs, would be managed under the proposed Hawaii FEP. The pelagic fisheries within the Hawaiian Archipelago and the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1D also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1D. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Hawaiian Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would be expected to improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the Hawaii FEP to manage fisheries in the Hawaiian Archipelago, in combination with the Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based FEP for demersal species within the Hawaiian Archipelago under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the demersal Hawaii FEP and the associated Pelagics FEP would be similar to Alternative 1A. The status and trends of target and non-target species within the Hawaiian Archipelago will continue to be evaluated as in the current Annual Report to Congress series using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1D would also replace the current species-based FMP regulatory structure for demersal fisheries with a FEP oryregulation structure for the Hawaiian Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, in regards to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No

Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would improve the management of these resources. However, the implementation of ecosystem science, principles, and management actions through future amendments or regulatory amendments to this FEP will be subject NEPA and other applicable laws at that time.

Essential Fish Habitat

Similar to Alternative 1A implementing Alternative 1D would notcause adverse impacts on EFH or HAPC for species in the Hawaiian Archipelago. Implementation of the Hawaii FEP would not affect the fishing operations or catches of any fisheries within the Hawaiian Archipelago; rather it would simply reorganize the current demersal species-based FMPs into a geographically-defined ecosystem management plan. Furthermore, similar to the No Action Alternative, the implementation of the Hawaii FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed Hawaii FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1D would not result in ny substantives to fishing regulationsa change, therefore, EFH and HAPC would maintain the same level of impacts as the No Action alternative.

Protected Species

The implementation of the archipelagic-based Hawaii FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a change in fishing gear or strategy, this alternative will maintain the same level of protection for protected species as under the No Action Alternative. In addition, implementing the Hawaii FEP will allow for the continuation of data collection programs (e.g., logbooks, observers) within the Hawaiian Archipelago fisheries for which interactions with protected species can be monitored by NMFS. Future management actions under Alternative 1D would consider impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1D would replace the current FMPs for demersal with an archipelagic-based Hawaii FEP. No substantial change to the current regulations or fisheries would occur under the proposed Hawaii FEP. However, one of the objectives of the Hawaii FEP is to increase recognition and inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. Similar to the No Action Alternative, the implementation of the Hawaii FEP under this alternative is anticipated to be beneficial as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. When compared to the other Action Alternatives, it is anticipated that this alternative would cause the least amount of confusion to participants in the fisheries, as the entire Western Pacific Region will switch from FMPs to placed-based FEPs, with no substantial changes in the regulations.

Administration and Enforcement

Under Alternative 1D, no substantive changes would occur to the regulations affecting the fisheries within the Hawaiian Archipelago. However, under Alternative 1D, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Hawaii FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the Hawaiian Archipelago, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries’ ecosystems would probably remain unchanged under Alternative 1D.

With regard to the fisheries within the Hawaiian Archipelago in the short-term, impacts of Alternative 1D, on enforcement agencies are not expected to be significant as the fishery boundaries, fishery operations, and regulations would not change. However, in the long-term, under Alternative 1D, compliance with regulation could be increased in the communities of Hawaii as the participants voluntary become more involved in fishery management. Additionally, the increase inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, would improve fisheries tmanagement.

PRIA

The following sections discuss the potential impacts of Alternative 1D on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the PRIA.

Physical Environment

Under Alternative 1D, the demersal fisheries within the PRIA, currently managed by the four demersal species-based FMPs, would be managed under the proposed PRIA FEP. The pelagic fisheries within the PRIA and the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. Alternative 1D also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations; however, no substantive changes to current fishing regulations would occur in Alternative 1D. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the PRIA. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the PRIA FEP to manage fisheries in the PRIA, in combination with the Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of the archipelagic-based FEP for demersal fisheries within the PRIA under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. The status and trends of target and non-target species within the PRIA will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1D would replace the current species-based FMP regulation structure for demersal fisheries with a FEP regulation structure for the PRIA. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve the management of these resources. However, the implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to NEPA and other applicable law.

Essential Fish Habitat

Similar to Alternative 1A, Alternative 1D would not be expected to cause adverse impacts on EFH or HAPC for species in the PRIA FEP. Implementation of the PRIA FEP would not be expected to affect the fishing operations or catches of any fisheries within the PRIA; rather it would simply reorganize the current demersal species-based FMPs into a geographically-defined ecosystem management plan. Furthermore, similar to the No Action Alternative, the PRIA FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed PRIA FEP. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1D would not result in any substantive change to fishing regulations; therefore, EFH and HAPC would maintain the same level of protection as currently under the FMPs.

Protected Species

The implementation of the archipelagic-based PRIA FEP under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a change in fishing gear or strategy, this alternative will maintain the same level of protection for protected species as under the No Action Alternative. In addition, implementing the PRIA FEP will allow for the continuation of data collection programs (e.g., logbooks, observers) within the PRIA fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Future management actions under Alternative 1D would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1D would replace the current FMPs for demersal fisheries with an archipelagic-based PRIA FEP. No substantial change to the current regulations or fisheries would occur under the proposed PRIA FEP. There are no fishing communities as defined under MSA within the PRIA.

When compared to the No Action Alternative, the implementation of the PRIA FEP under this alternative is anticipated to be beneficial as it may integrate scientific information and human needs in a manner that increases the involvement participants in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. When compared to the other Action Alternatives, it is anticipated that this alternative would cause the least amount of confusion to participants in the fisheries, as the entire Western Pacific Region will switch from FMPs to placed-based FEPs, with no substantial changes in the regulations.

Administration and Enforcement

Under Alternative 1D, no substantive changes would occur to the regulations affecting the fisheries within the PRIA. However, under Alternative 1D, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed PRIA FEP. Managers and scientists would be asked to increasingly consider fishery interactions within the PRIA, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1D.

With regard to the fisheries within the PRIA in the short-term, impacts of Alternative 1D, on enforcement agencies are not expected to be significant as the fishery boundaries, fishery operations, and regulations would not change. However, in the long-term, under Alternative 1D, compliance with regulations could be increased as PRIA fisheryparticipants become more involved in fishery management. Additionally, the increase inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, could improve the success of the management of the fisheries.

Pelagic

The following sections discuss the potential impacts of Alternative 1D on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the fisheries operating under the current Pelagics FMP.

Physical Environment

Under Alternative 1D, the demersal fisheries would be managed by the four proposed archipelagic-based FEPs. The pelagic fisheries within the boundaries of these archipelagic-based FEPs and the domestic pelagic fisheries operating outside the waters of the U.S. EEZ would be managed under the Pelagics FEP. When compared to the No Action Alternative, as a baseline, replacing the five species-based FMPs with the five FEPs will not impact the physical environment of marine ecosystems under any of the Action Alternatives. The boundaries are not physically apparent as established under either the current FMPs or boundaries established under the proposed FEPs in this alternative. The boundaries under species-based FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. No substantive changes to current fishing regulations or operations would occur. Thus, with regard to the physical environment for the pelagic fisheries in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five FEPs will have potential positive and negative impacts on targeted pelagic species and non-target species. However, implementation of Alternative 1D is not expected to affect the fishing operations or catches of any fisheries operating under the current Pelagic FMP. No substantive changes to the regulations or the fisheries are proposed under Alternative 1D. Thus, the impacts of operating the pelagic fisheries under Alternative 1D would be similar to Alternative 1A, which has previously been analyzed in the 2001 EIS (April 6, 2001; 66 FR 18243), as updated in subsequent NEPA documents of affected areas (see Table 3-19). The status and trends of target and non-target species will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Thus, in regards to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species illwould improve the management of the pelagic resources. However, implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to the proposed Pelagics FEP will be subject NEPA and other applicable law.

Essential Fish Habitat

Similar to the No Action Alternative, Alternative 1D is not expected to impact EFH or HAPC for species managed currently under the Pelagics FMP. Furthermore, the five FEPs, as proposed under this alternative, are not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey. Alternative 1D will not result in a change in fishing gear or strategy, therefore, under this alternative the EFH and HAPC will maintain the same level of protection as under the No Action Alternative.

Protected Species

The implementation of the archipelagic-based FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. ExistingESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a substantive change to fishing regulations, this alternative will maintain the same level of protection and impacts to protected species as under the No Action Alternative. In addition, implementing the FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1D would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

Alternative 1D would replace the current five species-based FMPs with five FEPs. No substantial change to the current regulations or fisheries would occur under the proposed FEPs. However, one of the objectives of the Pelagics FEP is to recognition and increased inclusion of local expertise in the management and conservation of marine resources, which may consequently help reduce the effects of some exogenous factors (e.g., improperly placed marine protected areas) on fishery participants and communities. When compared to the No Action Alternative, implementing the Pelagics FEP will be beneficial as it may integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

Additionally, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward placed-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. When compared to the other Action Alternatives, it is anticipated that this alternative would cause the least amount of confusion to participants in the fisheries, as the entire Western Pacific Region will switch from FMPs to placed-based FEPs, with no substantial changes in the regulations.

Administration and Enforcement

Under Alternative 1D, no substantive changes would occur to the regulations affecting the pelagic fisheries. However, under Alternative 1D, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed Pelagics FEP. Managers and scientists would be asked to increasingly consider fishery interactions with other species, as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would also be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to yfisheries' ecosystems would probably remain unchanged under Alternative 1D.

With regard to the pelagic fisheries in the short-term, impacts of Alternative 1D, on enforcement and management agencies are not expected to be significant as the pelagic fisheries boundaries, fishery operations, and regulations would not change. Under Alternative 1D, in the long-term, compliance with regulation could be increased as communities and participants voluntary become more involved in fishery management. Additionally, the increase inclusion of local expertise and their knowledge in the conservation of the marine resources, encouraged by an ecosystem-based approach, would improve the success of the management of the fisheries.

4.1.5 Alternative 1E

Under Alternative 1E, major biogeographic zones for each island jurisdiction and all marine resources and habitats associated with those not necessarily contiguous zones would be delineated as distinct ecosystems and the fisheries associated with them would be managed under a separate FEP. Specifically, within each archipelago the coral reef ecosystem, the deep-reef benthic ecosystem, the seamount ecosystem, and the pelagic environment would be delineated as separate and distinct ecosystems and managed under separate FEPs.

For example, in the Hawaiian Archipelago, five biogeographic-based FEPs would be established: the Hawaii Coral Reef; the Hawaii Bank and Seamount the Hawaii Deep Reef Slope the Hawaii Deep Ocean Floor; and the Hawaii Pelagics. Under Alternative 1E, existing fishery regulations relating to the current FMPs would be reorganized to reflect the boundaries of these FEPs (Table 2-7). Although the regulations would be reorganized, no substantive changes would occur to current fishing regulations.

American Samoa Archipelago

The following sections discuss the potential impacts of Alternative 1E on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the American Samoa Archipelago.

Physical Environment

Under Alternative 1E, there would be five biogeographic-based FEPs approved and implemented for the American Samoa Archipelago, these would include: the American Samoa Coral Reef FEP; the American Samoa Bank and Seamount FEP, the American Samoa Deep Reef Slope FEP; the American Samoa Deep Ocean Floor FEP, and the American Samoa Pelagics FEP (see Table 2-7). In addition, the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment.

Alternative 1E would also reorganize the existing species-based FMP regulations into biogeographic-based FEP regulations. However, no substantive changes to current fishing regulations would occur in Alternative 1E. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the American Samoa Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five biogeographic-based FEPs to manage fisheries in the American Samoa Archipelago, in combination with the Pacific Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of these biogeographic-based FEPs for the American Samoa Archipelago is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the five biogeographic-based American Samoa FEPs and the associated Pacific Pelagics FEP on the biological environment of the American Samoa Archipelago would be similar to Alternative 1A. The status and trends of target and non-target species within the American Samoa Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1E would also replace the current species-based FMP regulation structure with a biogeographic-based FEP regulation structure for the American Samoa Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources.

However, the smaller ecosystems, semi-unique units, could result in management of the biological environment that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject NEPA and other applicable law at that time.

Essential Fish Habitat

When compared to Alternative 1A, the No Action Alternative, Alternative 1E would not cause any adverse impacts on EFH or HAPC for species in the American Samoa Archipelago.

Implementation of the five biogeographic-based FEPs would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into a biogeographic-based ecosystem management plan. Furthermore, similar to the No Action Alternative, the implementation of the five biogeographic-based FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause few fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed five biogeographic-based American Samoa FEPs. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1E would not result in a change in fishing gear or strategy, therefore, EFH and HAPC would maintain the same level of protection as currently under the FMPs.

Protected Species

The implementation of the biogeographic-based American Samoa FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in ny substantive a change in fishing regulations, this alternative will maintain the same level of protection and impacts to protected species as under the No Action Alternative. In addition, implementing the biogeographic-based American Samoa FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) within the American Samoa Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated through area closures. Future management actions under Alternative 1E would receive consideration of impacts on protected species as appropriate in accordance with ESA and regulations.

Fishery Participants and Communities

When compared to the No Action Alternative, the implementation of the five biogeographic-based American Samoa FEPs is anticipated to positively impact fishery participants and communities in the American Samoa Archipelago. The anticipated long-term impacts of implementing the biogeographic-based American Samoa FEPs will also be beneficial as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create five biogeographic-based American Samoa FEPs. In addition, the domestic pelagic fisheries operating in the high seas of the Western Pacific Region would operate under a Pacific Pelagics FEP.

Under this alternative, fishery participants would be responsible for determining which of these biogeographic-based FEP regulations pertain to the areas in which their fishing operations occur. If a fishing operation spans a number of biogeography-based FEPs that encompass American Samoa Archipelago, the participant would need to be familiar with regulations (e.g., specifying gear or bait type, targeting, or allowable catch) that may differ for each of these biogeographic-based FEPs.

Alternative 1E would be the most confusing of all of Component 1'sthe Alternatives to fishery participants and would increase their regulatory burden. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed biogeographic-based FEP and the domestic pelagic fisheries on the high seas as participants target these highly migratory species.

Administration and Enforcement

Under Alternative 1E, no substantive changes would occur to the regulations affecting the fisheries within the American Samoa Archipelago. However, under Alternative 1E, managers and scientists would need to adapt to the biogeographic-based and multispecies nature of the proposed five American Samoa FEPs. Managers and scientists would be asked to increasingly consider fishery interactions within the American Samoa Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would probably remain unchanged under Alternative 1D.

With regard to enforcement, whereas current fishery regulations for fishing operations in the American Samoa Archipelago would remain unchanged, future regulations would have the potential for being complicated. Enforcement and management agencies would need to adapt to regulating five biogeographic-based FEPs within the American Samoa Archipelago, and consider the consistency and practicality of these regulations, as participants often will be subject to multiple regulations. For instance, pelagic species are highly migratory and would be managed and regulated under the Hawaii Pelagics, Guam Pelagics, CNMI Pelagics, Mariana Pelagics, American Samoa Pelagics, and Pacific Pelagics FEPs. Enforcement agencies would potentially be burdened to adapt to the multiplicity of regulations that pertain to pelagic species. The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Furthermore, this alternative would create 26 FEPs, of which 5 FEPs would be within the American Samoa Archipelago. Each FEP would have separate regulations, which would require separate amendments whenever regulations are modified. Additionally, each FEP would require annual stock assessments. When compared to the other alternatives, including the No Action Alternative, the additional cost to administration to manage such a system would be high.

Mariana Archipelago

The following sections discuss the potential impacts of Alternative 1E on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Mariana Archipelago.

Physical Environment

Under Alternative 1E, there would be five biogeographic-based FEPs approved and implemented for the Mariana Archipelago, these would include: the Mariana Coral Reef FEP; the Mariana Bank and Seamount FEP, the Mariana Deep Reef Slope FEP; the Mariana Deep Ocean Floor FEP, and the Mariana Pelagics FEP (see Table 2-7). In addition, the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment.

Alternative 1E would also reorganize the existing species-based FMP regulations into biogeographic-based FEP regulations. However, no substantive changes to current fishing regulations would occur in Alternative 1E. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Mariana Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five biogeographic-based FEPs to manage fisheries in the Mariana Archipelago, in combination with the Pacific Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of these biogeographic-based FEPs for the Mariana Archipelago is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the five biogeographic-based Mariana FEPs and the associated Pacific Pelagics FEP on the biological environment would be similar to Alternative 1A. The status and trends of target and non-target species within the Mariana Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1E would also replace the current species-based FMP regulation structure with a biogeographic-based FEP regulation structure for the Mariana Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would be expected to improve management of these resources. However, the smaller ecosystems, semi-unique units, could result in management of the biological environment that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to NEPA and other applicable law at that time.

Essential Fish Habitat

When compared to Alternative 1A implementing Alternative 1E would not be expected to cause adverse impacts on EFH or HAPC for species in the Mariana Archipelago. Implementation of the five biogeographic-based FEPs would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into a biogeographic-based ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the five biogeographic-based FEP would not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause negligible fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed five biogeographic-based Mariana FEPs. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1E would not result in a change in fishing gear or strategy, therefore, EFH and HAPC would maintain the same level of protection as currently under the FMPs.

Protected Species

The implementation of the biogeographic-based Mariana FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in a change in fishing regulations, this alternative will maintain the same level of protection and impacts to protected species as under the No Action

Alternative. In addition, implementing the biogeographic-based Mariana FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) within the Mariana Archipelago fisheries for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1E would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

When compared to the No Action Alternative, the implementation of the five biogeographic-based Mariana FEPs is anticipated to positively impact fishery participants and communities in the Mariana Archipelago. The anticipated long-term impacts of implementing the biogeographic-based Mariana FEPs will also be beneficial as it will integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create five biogeographic-based Mariana FEPs. In addition, the domestic pelagic fisheries operating in the high seas of the Western Pacific Region would operate under a Pacific Pelagics FEP.

Under this alternative fishery participants would be responsible for determining which of these biogeographic-based FEP regulations pertain to the areas in which their fishing operations occur. If a fishing operation spans a number of biogeography-based FEPs that encompass Mariana Archipelago, the participant would need to be familiar with regulations (e.g., specifying gear or bait type, targeting, or allowable catch) that may differ for each of these biogeographic-based FEPs.

Alternative 1E would be the most confusing of all of Component 1's Alternatives to fishery participants and would increase their regulatory burden. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed biogeographic-based FEP and the domestic pelagic fisheries on the high seas as participants target these highly migratory species.

Administration and Enforcement

Under Alternative 1E, no substantive changes would occur to the regulations affecting the fisheries within the Mariana Archipelago. However, under Alternative 1E, managers and scientists would need to adapt to the biogeographic-based and multispecies nature of the proposed five Mariana FEPs. Managers and scientists would be asked to increasingly consider fishery interactions within the Mariana Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to yfisheries' ecosystems would remain unchanged under Alternative 1E.

With regard to enforcement, whereas current fishery regulations for fishing operations in the Mariana Archipelago would remain unchanged, future regulations would have the potential for being complicated. Enforcement and management agencies would need to adapt to regulating five biogeographic-based FEPs within the Mariana Archipelago, and consider the consistency and practicality of these regulations, as participants often will be subject to multiple regulations. For instance, pelagic species are highly migratory and would be managed and regulated under the Hawaii Pelagics, Guam Pelagics, CNMI Pelagics, Mariana Pelagics, American Samoa Pelagics, and Pacific Pelagics FEPs. Enforcement agencies would potentially be burdened to adapt to the multiplicity of regulations that pertain to pelagic species. The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Furthermore, this alternative would create 26 FEPs, of which 5 FEPs would be within the Mariana Archipelago. Each FEP would have separate regulations, which would require separate amendments whenever regulations are modified. Additionally, each FEP would require annual stock assessments. When compared to the other alternatives, including the No Action Alternative, the additional cost to administration to manage such a system would be high.

Hawaiian Archipelago

The following sections discuss the potential impacts of Alternative 1E on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the Hawaiian Archipelago.

Physical Environment

Under Alternative 1E, there would be five biogeographic-based FEPs approved and implemented for the Hawaiian Archipelago, these would include: the Hawaii Coral Reef FEP; the Hawaii Bank and Seamount FEP, the Hawaii Deep Reef Slope FEP; the Hawaii Deep Ocean Floor FEP, and the Hawaii Pelagics FEP (see Table 2-7). In addition, the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagics FEP consistence with international agreements. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment.

Alternative 1E would also reorganize the existing species-based FMP regulations into biogeographic-based FEP regulations. However, no substantive changes to current fishing regulations would occur in Alternative 1E. Thus, with regard to the physical environment in the short-term, there are no significant differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the Hawaiian Archipelago. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach will improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five biogeographic-based FEPs to manage fisheries in the Hawaiian Archipelago, in combination with the Pacific Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of these biogeographic-based FEPs for the Hawaiian Archipelago is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the five biogeographic-based Hawaii FEPs and the associated Pacific Pelagics FEP on the biological environment of the Hawaiian Archipelago would be similar to Alternative 1A. The status and trends of target and non-target species within the Hawaiian Archipelago will continue to be evaluated annually using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1E would also replace the current species-based FMP regulation structure with a biogeographic-based FEP regulation structure for the Hawaiian Archipelago. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species willto improve management of these resources. However, the smaller ecosystems, semi-unique units, could result in management of the biological environment that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject to NEPA and other applicable law at that time.

Essential Fish Habitat

When compared to Alternative 1A implementing Alternative 1E would not be expected to cause adverse impacts on EFH or HAPC for species in the Hawaiian Archipelago. Implementation of the five biogeographic-based FEPs would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into a biogeographic-based ecosystem management plan. Furthermore, similar to the No Action Alternative, the implementation of the five biogeographic-based FEP would not likely lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause negligible fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed five biogeographic-based Hawaii FEPs. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1E would not result in a change in fishing gear or strategy, therefore, EFH and HAPC would maintain the same level of protection as currently under the FMPs.

Protected Species

The implementation of the biogeographic-based Hawaii FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. ExistingESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in any substantive a change in fishing regulations, this alternative will maintain the same level of protection and impacts to protected species as under the No Action Alternative. In addition, implementing the biogeographic-based Hawaii FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) within the Hawaiian Archipelago efishereis for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1E would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

When compared to the No Action Alternative, the implementation of the five biogeographic-based Hawaii FEPs is anticipated to positively impact fishery participants and communities in the Hawaiian Archipelago. The anticipated long-term impacts of implementing the biogeographic-based Hawaii FEPs will also be beneficial as it may integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create five biogeographic-based Hawaii FEPs. In addition, the domestic pelagic fisheries operating in the high seas of the Western Pacific Region would operate under a Pacific Pelagics FEP.

Under this alternative fishery participants would be responsible for determining which of these biogeographic-based FEP regulations pertain to the areas in which their fishing operations occur. If a fishing operation spans a number of biogeography-based FEPs that encompass Hawaiian Archipelago, the participant would need to be familiar with regulations (e.g., specifying gear or bait type, targeting, or allowable catch) that may differ for each of these biogeographic-based FEPs.

Alternative 1E would be the most confusing of all of Component 1's aAlternatives to fishery participants and would increase their regulatory burden. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed biogeographic-based FEP and the domestic pelagic fisheries on the high seas as participants target these highly migratory species.

Administration and Enforcement

Under Alternative 1E, no substantive changes would occur to the regulations affecting the fisheries within the Hawaiian Archipelago. However, under Alternative 1E, managers and scientists would need to adapt to the biogeographic-based and multispecies nature of the proposed five Hawaii FEPs. Managers and scientists would be asked to increasingly consider fishery interactions within the Hawaiian Archipelago, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fishery ecosystems would remain unchanged under Alternative 1E.

With regard to enforcement, whereas current fishery regulations for fishing operations in the Hawaiian Archipelago would remain unchanged, future regulations would have the potential for being complicated. Enforcement and management agencies would need to adapt to regulating five biogeographic-based FEPs within the Hawaiian Archipelago, and consider the consistency and practicality of these regulations, as participants often will be subject to multiple regulations. For instance, pelagic species are highly migratory and would be managed and regulated under the Hawaii Pelagics, Guam Pelagics, CNMI Pelagics, Mariana Pelagics, American Samoa Pelagics, and Pacific Pelagics FEPs. Enforcement agencies would potentially be burdened to adapt to the multiplicity of regulations that pertain to pelagic species. The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Furthermore, this alternative would create 26 FEPs, of which 5 FEPs would be within the Hawaiian Archipelago. Each FEP would have separate regulations, which would require separate amendments whenever regulations are modified. Additionally, each FEP would require annual stock assessments. When compared to the other alternatives, including the No Action Alternative, the additional cost to administration to manage such a system would be high.

PRIA

The following sections discuss the potential impacts of Alternative 1E on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the PRIA.

Physical Environment

Under Alternative 1E, there would be five biogeographic-based FEPs approved and implemented for the PRIA: the PRIA Coral Reef FEP; the PRIA Bank and Seamount FEP, the PRIA Deep Reef Slope FEP; the PRIA Deep Ocean Floor FEP, and the PRIA Pelagics FEP (see Table 2-7). In addition, the domestic pelagic fisheries outside the waters of the U.S. EEZ would be managed under the Pacific Pelagics FEP. However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current FMPs or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment.

Alternative 1E would also reorganize the existing species-based FMP regulations into biogeographic-based FEP regulations. However, no substantive changes to current fishing regulations would occur in Alternative 1E. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the PRIA. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five biogeographic-based FEPs to manage fisheries in the PRIA, in combination with the Pacific Pelagics FEP, will have potential positive and negative impacts on target and non-target species. However, implementation of these biogeographic-based FEPs for the PRIA is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the five biogeographic-based PRIA FEPs and the associated Pacific Pelagics FEP on the biological environment of the PRIAwould be similar to Alternative 1A. The status and trends of target and non-target species within the PRIA will continue to be evaluated annually using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes.

Alternative 1E would also replace the current species-based FMP regulation structure with a biogeographic-based FEP regulation structure for the PRIA. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would improve management of these resources. However, the smaller ecosystems, semi-unique units, could result in management of the biological environment that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Implementation of ecosystem science, principles, and management actions through future management plan amendments or regulatory amendments to this FEP will be subject NEPA and other applicable law at that time.

Essential Fish Habitat

When compared to Alternative 1A implementing Alternative 1E would not cause adverse impacts on EFH or HAPC for species in the PRIA. Implementation of the five biogeographic-based FEPs would not be expected to affect the fishing operations or catches of any fisheries; rather it would simply reorganize the current species-based FMPs into a biogeographic-based ecosystem management plan. Furthermore, when compared to the No Action Alternative, the implementation of the five biogeographic-based FEP would not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey.

The predominant fishing gear types (hook-and-line, troll, traps) used in the Western Pacific Region cause negligible fishing-related impacts on the benthic habitat of bottomfish, crustaceans, coral reefs, and precious corals in the proposed five biogeographic-based PRIA FEPs. The current management regime, under the FMPs, protect habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons. Implementing Alternative 1E would not result in a change in fishing gear or strategy, therefore, EFH and HAPC would maintain the same level of impacts as the No Action alternative.

Protected Species

The implementation of the biogeographic-based PRIA FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. ExistingESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result ny substantivesa change in ing regulations fishing, this alternative will maintain the same level of protection and impacts to protected species as under the No Action Alternative. In addition, implementing the biogeographic-based PRIA FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) for fisheries operating in the PRIA for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1E would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

When compared to the No Action Alternative, the implementation of the five biogeographic-based PRIA FEPs is anticipated to positively impact fishery participants in the PRIA. There is no fishing communities defined under MSA for the PRIA. The anticipated long-term impacts of implementing the biogeographic-based PRIA FEPs will also be beneficial as it may integrate scientific information and human needs in a manner that increases the involvement of participants in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create five biogeographic-based PRIA FEPs. In addition, the domestic pelagic fisheries operating in the high seas of the Western Pacific Region would operate under a Pacific Pelagics FEP.

Under this alternative fishery participants would be responsible for determining which of these biogeographic-based FEP regulations pertain to the areas in which their fishing operations occur. If a fishing operation spans a number of biogeography-based FEPs that encompass PRIA, the participant would need to be familiar with regulations (e.g., specifying gear or bait type, targeting, or allowable catch) that may differ for each of these biogeographic-based FEPs.

Alternative 1E would be the most confusing of all of Component 1'saAlternatives to fishery participants and would increase their regulatory burden. This would especially be true if regulations for the pelagic fisheries become inconsistent, or overly specific, between the proposed biogeographic-based FEP and the domestic pelagic fisheries on the high seas as participants target these highly migratory species.

Administration and Enforcement

Under Alternative 1E, no substantive changes would occur to the regulations affecting the fisheries within the PRIA. However, under Alternative 1E, managers and scientists would need to adapt to the biogeographic-based and multispecies nature of the proposed five PRIA FEPs. Managers and scientists would be asked to increasingly consider fishery interactions within the PRIA, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fisheries' ecosystems would remain unchanged under Alternative 1E.

With regard to enforcement, whereas current fishery regulations for fishing operations in the PRIA would remain unchanged, future regulations would have the potential for being complicated. Enforcement and management agencies would need to adapt to regulating five biogeographic-based FEPs within the PRIA and consider the consistency and practicality of these regulations, as participants often will be subject to multiple regulations. For instance, pelagic species are highly migratory and would be managed and regulated under the Hawaii Pelagics, Guam Pelagics, CNMI Pelagics, Mariana Pelagics, American Samoa Pelagics, and Pacific Pelagics FEPs. Enforcement agencies would potentially be burdened to adapt to the multiplicity of regulations that pertain to pelagic species. The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger archipelagic or pelagic environment. Furthermore, this alternative would create 26 FEPs, of which 5 FEPs would be within the PRIA. Each FEP would have separate regulations, which would require separate amendments whenever regulations are modified. Additionally, each FEP would require annual stock assessments. When compared to the other alternatives, including the No Action Alternative, the additional cost to administration to manage such a system would be high.

Pelagic

The following sections discuss the potential impacts of Alternative 1A on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration, specific to the fisheries operating under the current Pelagics FMP.

Physical Environment

Under Alternative 1E, there would be five FEPs approved and implemented to manage the pelagic fisheries: the Hawaii Pelagics; Guam Pelagics; CNMI Pelagics; Mariana Pelagics; American Samoa Pelagics; and Pacific Pelagics FEPs (see Table 2-7). However, the boundaries of the proposed FEPs are not physically apparent. The boundaries under either the current Pelagics FMP or the proposed FEPs are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment.

Alternative 1E would also reorganize the existing species-based FMP regulations into these FEP regulations. However, no substantive changes to current fishing regulations would occur in Alternative 1E. Thus, with regard to the physical environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative to the pelagic environment. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment.

Biological Environment

Implementation of the five FEPs to manage the pelagic fisheries in the Western Pacific Region will have potential positive and negative impacts on target and non-target species. However, implementation of these FEPs under this alternative is not expected to affect the fishing operations or catches of any fisheries operating under the current FMPs. Thus, the impacts of the five FEPs would be similar to Alternative 1A. The status and trends of target and non-target species will continue to be evaluated annually using existing criteria and thresholds for defining "overfishing" and "overfished" conditions as currently applied to individual stocks or stock complexes.

Alternative 1E would also replace the current species-based FMP oryregulation structure with biogeographic-based FEP regulations. No substantive changes are proposed to the regulations or to the fisheries through this structural reorganization. Thus, with regard to the biological environment in the short-term, there are no differences between the direct and indirect impacts of this alternative and the impacts of the No Action Alternative. Since implementing this alternative would not alter the regulatory nature of the current pelagic fisheries, the impacts of this alternative would be similar to Alternative 1A. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would improve our understanding and conservation of the physical environment. However, the smaller ecosystems, semi-unique units, could result in management of the biological environment that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger pelagic environment.

Essential Fish Habitat

When compared to Alternative 1A implementing Alternative 1E, would not be expected to cause adverse impacts on EFH or HAPC for pelagic species. Implementation of the five FEPs for pelagic species would not be expected to affect the fishing operations or catches of in any current pelagic fishery; rather it would simply reorganize the current Pelagic FMP into five FEPs. Furthermore, when compared to the No Action Alternative, the implementation of the five FEPs would not lead to substantial physical or biological alterations to the oceanic and coastal habitat, or result in any alteration to waters and substrate necessary for spawning, breeding, feeding, and growth of harvested species or their prey. Implementing Alternative 1E would not result in a change in fishing gear or strategy, therefore, EFH and HAPC would maintain the same level of protection as currently under the Pelagic FMP.

Protected Species

The implementation of the biogeographic-based FEPs under this alternative would not change existing regulations including those that require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Existing ESA biological opinions imposed terms and conditions to reduce and mitigate interactions with protected species and have concluded that the fisheries operating under the current FMPs are not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat that has been designated for them.

Since this alternative will not result in ny substantivea change in fishing regulations, this alternative will maintain the same level of protection and impacts to protected species as under the No Action Alternative. In addition, implementing the biogeographic-based FEPs will allow for the continuation of data collection programs (e.g., logbooks, observers) for which interactions with protected species can be monitored by NMFS, and where applicable, prevented, reduced, or mitigated. Finally, future management actions under Alternative 1E would receive consideration of impacts on protected species as appropriate in accordance with applicable laws and regulations.

Fishery Participants and Communities

When compared to the No Action Alternative, the implementation of the five FEPs for pelagic species under this alternative is anticipated to positively impact fishery participants and communities in the Hawaiian Archipelago. The anticipated long-term impacts of implementing the FEPs will also be positive as it may integrate scientific information and human needs in a manner that increases the involvement of local communities in the management and conservation of marine resources.

However, as mentioned in Chapter 1, a consideration of the Federal Action is that this shift toward ecosystem-based FEPs should be done in a manner that is understandable to fishery participants and with minimal regulatory burden. This alternative would create five FEPs for pelagic species. Under this alternative fishery participants would be responsible for determining which of these five FEPs for pelagic species regulations pertain to the areas in which their fishing operations occur. This would add an unnecessary burden to the pelagic fishermen targeting these highly migratory species. This would especially be true if regulations for the pelagic fisheries in the future become inconsistent, or overly specific, between the proposed archipelagic-based FEPs for pelagic species and the domestic pelagic fisheries on the high seas.

Administration and Enforcement

Under Alternative 1E, no substantive changes would occur to the regulations affecting the pelagic fisheries within the Western Pacific Region. However, under Alternative 1E, scientists would be asked to increasingly consider fishery interactions with other species, as well as the impacts of nonfishery activities on the marine environment. Management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, and this heightened attention to fishery ecosystems would probably remain unchanged under Alternative 1E.

With regard to enforcement, whereas current fishery regulations for pelagic fishing operations would remain unchanged, future regulations would have the potential for being complicated. Enforcement and management agencies would need to adapt to regulating for five FEPs for pelagic species, and consider the consistency and practicality of these regulations, as participants often will be subject to multiple regulations. Under Alternative 1E, pelagic species would be managed and regulated under the Hawaii Pelagics, Guam Pelagics, CNMI Pelagics, Mariana Pelagics, American Samoa Pelagics, and Pacific Pelagics FEPs. Enforcement agencies would potentially be burdened to adapt to the multiplicity of regulations that pertain to pelagic species. The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within in the larger pelagic environment. Furthermore, this alternative would create 26 FEPs, of which 5 FEPs would be associated with the pelagic fisheries. Each FEP would have separate regulations, which would require separate amendments whenever regulations are modified. Additionally, each FEP would require annual stock assessments. When compared to the other alternatives, including the No Action Alternative, the additional cost to administration to manage such a system would be high.

4.2 Component 2: Species to Be Managed Under Fishery Ecosystem Plans

Component 2 is regulatory in nature and considered part of the Federal Action in this document. Component 2 is contingent upon selecting one of the action alternatives under Component 1. For each alterative under Component 2 the potential impacts on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration are discussed.

4.2.1 Alternative 2A: No Action—Do Not Change the Current MUS Lists

Physical Environment

Under Alternative 2A, the current lists of MUS contained in the four existing demersal FMPs would be combined and used in each of the demersal FEPs. Tthe species currently managed under the Pelagics FMP would not change and that MUS list would apply to the Pelagics FEP. The MUS lists currently contained in the existing FMPs include those species that are caught in quantities sufficient to warrant management or specific monitoring by NMFS and the Council. Species caught in lesser amounts are also monitored; however, they are not generally included in the annual evaluations for stocks that are currently required for MUS under the MSA. The primary impact of inclusion of species in an MUS list is that the species (i.e., the fishery targeting that species) can be directly managed. Impacts on the physical environment of fisheries on non-MUS species are regulated through NMFS's list of allowable gears for each fishery. In the short term, current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. In the long term, management changes would continue to be considered via the MSA process or through changes to NMFS's list of allowable gears.

Biological Environment

Impacts on target and nontarget stocks under Alternative 2A would be anticipated to be the same as those described in Chapter 3. Again, the MUS lists currently contained in the Council's existing FMPs are based on those species that are caught in quantities sufficient to warrant management or specific monitoring and that the primary impact of inclusion of species in an MUS list is that the species (i.e., the fishery targeting that species) can be directly managed. Under this alternative, changes to the MUS list would continue to be considered as a part of the existing adaptive approach to management.

Essential Fish Habitat

Under Alternative 2A, the existing fishery regulations would remain unchanged, and designations of EFH and HAPC in the Western Pacific Region. Impacts of current fisheries' activities on EFH and HAPC would be similar to those described in Chapter 3 andtheNAAa no action alternative. Under Alternative 2A, EFH and HAPC designations would not be affected because the current list of MUS would remain unchanged.

Protected Species

In the short term, impacts on protected species would be anticipated to be the same as those described in Chapter 3. Current regulations and MUS lists would remain unchanged, fisheries would be adaptively managed under the MSA, and full consideration to impacts on protected species would continue to be given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws. In the long term, consideration of expanded MUS lists could result in increased monitoring and management of resources of importance to protected species.

Impacts on Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. The inclusion of some demersal MUS in FEPs for areas in which they are not actually present could be confusing to fishery participants, local communities, and other stakeholders.

Administration and Enforcement

This alternative would not have any immediate impacts on management, administration, or enforcement, which would continue as described in Chapter 3. Because not all MUS are present throughout the region, this alternative would result in the inclusion of some species that are not actually present in some FEP areas. Although unlikely to have any management impacts, their inclusion could be confusing to fishery scientists, managers, and enforcement personnel. In addition, as discussed previously, current MSA requirements specify that annual evaluations be prepared for stocks managed by the Council. It is not clear how these evaluations would account for the inclusion of species that are not present within a given FEP area.

4.2.2 Alternative 2B: Define FEP MUS as Those Existing MUS That Are Known to Occur Within Each FEP Boundary (Preferred)

Physical Environment

Under Alternative 2B, those MUS currently listed under the existing five FMPs and known to occur within each selected FEP area would be combined to form the MUS list for each FEP. In the short term, impacts on the physical environment would be anticipated to be the same as those described for Alternative 2A and in Chapter 3, as the removal from the MUS list of species not physically present does not change the effectiveness of existing management measures for a given area, current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. In the long term, management changes would continue to be considered via the MSA process, which would now apply to fisheries targeting the refined MUS list or through changes to NMFS's list of allowable gears.

Biological Environment

Impacts on target and nontarget stocks under Alternative 2B would be anticipated to be the same as those described in Alternative 2A and Chapter 3. Again, the removal from the MUS list of species not physically present does not change the effectiveness of existing management measures for a given area. Under this alternative, changes to the MUS list would continue to be considered as a part of the existing adaptive approach to management under the MSA.

Essential Fish Habitat

Under Alternative 2B, the existing fishery regulations would remain unchanged, and designations of EFH or HAPC in the Western Pacific Region. Impacts of current fisheries' activities on EFH and HAPC would be similar to a no action alternative. Under Alternative 2B, EFH and HAPC designations would not be affected because the current list of MUS known to be present in the current FMPs would remain unchanged.

Protected Species

Impacts on protected species would be anticipated to be the same as those described under Alternative 2A and in Chapter 3, as the removal from the MUS list of species not physically present does not change the effectiveness of existing management measures for a given area. Current regulations would remain unchanged, fisheries would be adaptively managed, and full consideration to impacts on protected species would continue to be given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, it would eliminate the confusion that could result from the inclusion on the MUS list of species not physically present in a given FEP area.

Administration and Enforcement

This alternative would slightly reduce impacts on management, administration, and enforcement as compared with Alternative 2A because it would avoid the confusion that could result from the inclusion on the MUS list of species not physically present and eliminate the issue of how to address them in the annual evaluations required under the MSA.

4.2.3 Alternative 2C: Define FEP MUS as the Existing MUS Plus Incidentally Caught and Associated Species That Are Known to Occur Within Each FEP Boundary

Physical Environment

Under Alternative 2C, each FEP would include as MUS those target, incidentally caught, and associated species (species that occupy the same or similar niche such as prey competitors or habitat competitors) that are known to occur within each FEP boundary. In the short term, impacts on the physical environment would be anticipated to be the same as those described for Alternative 2A and in Chapter 3, as the removal from the MUS lists of species not physically present does not change the effectiveness of existing management measures for a given area, current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. In the long term, management changes would continue to be considered via the MSA process, which would now apply to fisheries targeting the expanded MUS list or through changes to NMFS's list of allowable gears.

Biological Environment

Because fishery managers' direct management authority is limited to operations affecting listed MUS, this alternative would allow fishery operations to be more easily constrained if found to impact any fishery-related species known to occur within the FEP boundary. However, because incidentally caught and associated species are not currently subject to significant harvest levels and the impact on them of reducing (or increasing) harvests of target species is unknown, it is uncertain at this time what fishery management actions would be appropriate for their management.

Essential Fish Habitat

Under Alternative 2C, the existing fishery regulations would remain unchanged, s wouldand designations of EFH or HAPC in the Western Pacific Region. Impacts of current fisheries' activities on EFH and HAPC would be similar to a no action alternative. Under Alternative 2C, EFH and HAPC designations would not be affected because the current list of MUS known to be present would remain unchanged. Also, those species incidentally caught would also be listed as MUS under Alternative 2C; however, potential additions to the listed MUS are not expected to adversely affect the EFH or HAPC under currently managed areas.

Protected Species

Impacts on protected species would be anticipated to be the same as those described under Alternative 2A and in Chapter 3, as the removal from the MUS list of species not physically present does not change the effectiveness of existing management measures for a given area. The addition of incidentally caught and associated species to the MUS lists would not be anticipated to have any impact on protected species as they are not the target of fishery operations and are not harvested in significant numbers. Current regulations would remain unchanged, fisheries would continue to be adaptively managed, and full consideration to impacts on protected species would continue to be given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, it would eliminate the confusion that could result from the inclusion of species not physically present in a given FEP area.

Administration and Enforcement

This alternative would increase impacts on management, administration, and enforcement as compared with Alternative 2A because it would add species to the MUS lists that would require monitoring and annual evaluation. The number of additional species would vary depending on the location and the definition of FEP boundaries; however, there could potentially be several thousand species.

4.2.4 Alternative 2D: Define FEP MUS as the Existing MUS Plus Incidentally Caught and Associated Species That Are Believed to Potentially Occur Within Each FEP Boundary

Physical Environment

Under Alternative 2D, each FEP would include as MUS those target, incidentally caught, and associated species (species that occupy the same or similar niche such as prey competitors or habitat competitors) that are believed to potentially occur within each FEP boundary. In the short term, impacts on the physical environment would be anticipated to be the same as those described for Alternative 2A and in Chapter 3, as the removal of MUS of species not physically present does not change the effectiveness of existing management measures for a given area, current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. In the long term, management changes would continue to be considered via the MSA process, which would now apply to fisheries targeting the expanded MUS list or through changes to NMFS's list of allowable gears.

Biological Environment

Because fishery managers' direct management authority is limited to operations affecting listed MUS, this alternative would allow fishery operations to be more easily constrained if found to affect any fishery-associated species believed to potentially occur in each FEP boundary. However, because incidentally caught and associated species are not currently subject to significant harvest levels and the impact on them of reducing (or increasing) harvests of target species is unknown, additional research would be needed in many cases to determine what fishery management actions would be appropriate for their management.

Essential Fish Habitat

Under Alternative 2D, the existing fishery regulations would remain unchanged, and designations of EFH or HAPC in the Western Pacific Region. Impacts of current fisheries' activities on EFH and HAPC would be similar to A 2Aalternative. Under Alternative 2D, EFH and HAPC designations would be adaptively managed according to the existing definitions for the current MUS believed to potentially occur, incidentally caught, and associated species believe to potentially occur within each FEP boundary.

Protected Species

Impacts on protected species would be anticipated to be the same as those described under Alternative 2A and in Chapter 3, as the removal of MUS of species not physically present does not change the effectiveness of existing management measures for a given area. The addition of incidentally caught and associated species to the MUS lists would not be anticipated to have any impact on protected species as these species are not the target of fishery operations and are not harvested in significant numbers. Current regulations would remain unchanged, fisheries would continue to be adaptively managed, and full consideration to impacts on protected species would continue to be given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, it may cause somethe confusion if there are an extraneous number of species "believed" to within given FEP area.

Administration and Enforcement

This alternative would significantly increase impacts on management, administration, and enforcement as compared with Alternative 2A because it would add species to the MUS lists that would require monitoring and annual evaluation. The number of additional species would vary depending on the location and the definition of FEP boundaries; however, there could potentially be several thousand species.

4.3 Component 3: Council Advisory Process

The Council's current advisory process follows the MSA and includes the general public, fishery participants and support sectors, social and biological scientists, and local and Federal resource managers in the development of Federal fishery management recommendations. The existing structure for these advisory bodies is based on a combination of species and stakeholder interest groupings. Given the place-based nature of ecosystem management, several alternatives for modifying the existing structure toward a more geographic orientation are considered in under Component 3.

Components 3 is nonregulatory (i.e., has no regulatory effect) and is included in this EIS to assist the Council in identifying an appropriate advisory process under an ecosystem-based fishery management structure. For each alterative under Component 3 the potential impacts on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration are discussed.

4.3.1 Alternative 3A: No Action—Do Not Change the Current Advisory Structure

Physical Environment

Under Alternative 3A, the Council's current advisory structure would not change to one reflecting the geographical orientation of ecosystem management and the need for increased participation by land-based interests. The Council would continue to utilize its existing species-basedPlan Teams, Advisory Panels, Standing Committees, and theSSC to provide scientific and management recommendations to the Council. This alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. In the long term, management changes would continue to be considered via the MSA process or through changes to NMFS's list of allowable gears.

Biological Environment

Under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3.

Essential Fish Habitat

Under Alternative 3A, impacts on essential fish habitat would remain as described in Chapter 3. FHEssential and HAPC would continue to be designated and adaptively managed under the MSA process.

Protected Species

Under Alternative 3A, impacts on protected species would remain as described in Chapter 3. Fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance with all applicable laws.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, the misalignment of species-based Plan Teams and place-based FEPs could result in some confusion for those who participate in the fishery management process.

Administration and Enforcement

Impacts on management and administration could be significant under Alternative 3A, depending on the FEP boundaries selected. If archipelagic or other place-based FEP boundaries were implemented, an ecosystem-based approach would require that the existing species-based Plan Teams meet together to discuss each FEP's ecosystem and the impacts of all active fisheries on each ecosystem. Given that there are currently five Plan Teams and potentially five or more FEPs, the cost of these large meetings in time and money could be high. In addition, this alternative would result in a misalignment between the species-based Plan Teams and Standing Committees and the place-based FEPs that could result in fragmented stock assessments, annual reports, and management recommendations. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place.

4.3.2 Alternative 3B: Add a Single FEP Plan Team to the Current Advisory Structure

Physical Environment

Under this alternative, the existing Advisory Panels, species-based Plan Teams, SSC, and Standing Committees would be maintained, and one new FEP Plan Team would be established to monitor the development and implementation of FEP(s) for the Western Pacific Region. In the short term, this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via or through changes to NMFS's list of allowable gears. In the long term, the addition of an FEP Plan Team that would oversee all of the FEPs would improve our understanding and management of fishery impacts on the physical environment; however, it is not clear whether a single plan team could effectively monitor all FEPs to completely achieve this result.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. In the long term, the addition of an FEP Plan Team that would oversee all of the FEPs would improve our understanding and management of fishery impacts on target and nontarget stocks; however, it is not clear whether a single plan team could effectively monitor all FEPs to completelyachieve this result.

Essential Fish Habitat

Under Alternative 3B, impacts on essential fish habitat would remain as described in Chapter 3. FH and HAPCEssential would continue to be designated and adaptively managed under the existing regulations.

Protected Species

Under Alternative 3B, short-term impacts on protected species would remain as described in Chapter 3. In the long term, fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance all applicable law. In the long term, the addition of an FEP Plan Team that would oversee all of the FEPs would be anticipated to improve our understanding and management of fishery impacts on protected species; however, it is not clear whether a single plan team could effectively monitor all FEPs to completely achieve this result.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, the addition of a single FEP Plan Team could either clarify the FEP management process for those who wish to participate in it or could lead to confusion by overlaying the existing species-based Plan Teams and creating unclear lines of communication.

Administration and Enforcement

Impacts on management and administration would be anticipated to be moderate under Alternative 3B. In the short term, the establishment and implementation of a single additional FEP Plan Team would not represent a major cost. In the long term, the addition of an FEP Plan Team that would oversee all of the FEPs would be anticipated to improve our understanding and management of fisheries in the Western Pacific Region; however, it is not clear whether a single plan team could effectively monitor all FEPs to achieve this result. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place.

4.3.3 Alternative 3C: Replace the Current FMP Advisory Panels, Plan Teams, and Five Standing Committees With FEP Advisory Panels, FEP Plan Teams, and FEP Standing Committees

Physical Environment

Under Alternative 3C, the existing Advisory Panels, FMP Plan Teams, and five Standing Committees (Pelagics, Crustaceans, Bottomfish and Seamount Groundfish, Precious Corals, and Ecosystems and Habitat) would be replaced with FEPAdvisory Panels and FEP Plan Teams based on each FEP's boundaries (e.g., a Hawaii FEP Plan Team, a Mariana Archipelago Advisory Panel). The single SSC would continue to function as at present. The FEP Advisory Panels, Plan Teams, and Standing Committees would assume all of the duties and responsibilities of the existing groups, including the review of fisheries catch-and-effort data and the preliminary development of appropriate management measures based on ecosystem principles.

Each FEP Plan Team would develop annual reports for all fisheries within the FEP boundaries for which they are responsible, and all groups would provide advice to the Council as under the current process described in Alternative 3A and Chapter 3. In the short term, this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via fishery regulations or through changes to NMFS's list of allowable gears. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would be anticipated to significantly improve our understanding and management of fishery impacts on the physical environment through the holistic consideration of all impacts within a given area by each FEP advisory group.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Alternative

3A and Chapter 3. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would improve our understanding and management of fishery impacts on target and nontarget species through the holistic consideration of all impacts within a given area by each FEP advisory group.

Protected Species

Under Alternative 3C, short-term impacts on protected species would remain as described in Alternative 3A and Chapter 3. In the long term, fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance with all applicable law. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would improve our understanding and management of fishery impacts on protected species through the holistic consideration of all impacts within a given area by each FEP advisory group.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, the implementation of a place-based advisory structure that is aligned with the FEPs would be anticipated to enhance opportunities for participation in the management process by fishery participants and communities as there would be clearly defined advisory groups with responsibility for each FEP area with which to interact. The alignment of the advisory groups with the geographic locations of fisheries and communities would also be anticipated to increase the sense of shared ownership and investment in the management of marine resources by both residents and managers as FEP advisory bodies would now be assigned to a place rather than a species or interest group.

Administration and Enforcement

Impacts on management and administration would be anticipated to be adversesignificant under Alternative 3C. The transition to a place-based advisory structure would entail significant and ongoing costs, as to be successful each FEP Plan Team would need to include members with local expertise in each of the five species groups managed by the Council. Because of the remoteness of the Pacific Islands region and with relatively few major universities or other research institutions, finding sufficient numbers of members to participate in each of the FEP Plan Teams would be anticipated to be difficult and would likely require recruitment from other areas. These recruits may or may not have training or knowledge of local conditions, and their participation would entail significant travel time and costs. If the FEP Plan Teams comprised only the limited number of available local experts (i.e., current FMP Plan Team members), each member would likely have to serve on numerous FEP Plan Teams. This would represent a significant increase in their responsibilities and time commitments. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place.

4.3.4 Alternative 3D: Replace the Current FMP Advisory Panels, Plan Teams, and Five Standing Committees With FEP Advisory Panels, FEP Standing Committees, and Two FEP Plan Teams (Preferred)

Physical Environment

As in Alternative 3C, this alternative would replace the existing Advisory Panels and five of the Standing Committees with FEP Advisory Panels and FEP Standing Committees. However, this alternative would replace the existing five FMP Plan Teams with a single Demersal FEP Plan Team and a single Pelagic FEP Plan Team that would each be responsible for overseeing the development and implementation of all demersal and pelagic FEPs, respectively. All groups would provide advice to the Council as under the current process described in Chapter 3. In the short term this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via the MSA or through changes to NMFS's list of allowable gears. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would improve our understanding and management of fishery impacts on the physical environment through the holistic consideration of all impacts within a given area by each FEP advisory group.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would improve our understanding and management of fishery impacts on target and nontarget species through the holistic consideration of all impacts within a given area by each FEP advisory group.

Essential Fish Habitat

Under Alternative 3D, impacts on essential fish habitat would remain as described in Chapter 3. FHEssential and HAPC would continue to be designated and adaptively managed under the MSA.

Protected Species

Under Alternative 3D, short-term impacts on protected species would remain as described in Chapter 3. In the long term, fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance with applicable law. In the long term, the change to a place-based advisory structure that is aligned with the FEPs would improve our understanding and management of fishery impacts on protected species through the holistic consideration of all impacts within a given area by each FEP advisory group.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. The increased alignment of the advisory groups with interrelated fisheries would also be anticipated to increase the sense of shared ownership and investment in the management of marine resources by both residents and managers as FEP advisory bodies would now be tasked with a broad range of fisheries (e.g., all demersal fisheries) rather than a single species or interest group.

Administration and Enforcement

Impacts on management and administration arenot anticipated to be substantial under Alternative 3D; however, the short-term transition to a place-based advisory structure would entail some costs. This alterative would result in the combination ofcurrent demersal Plan Teams (Bottomfish, Crustaceans, Precious Corals, and Coral Reef Ecosystems) to makebe up the singleDemersal Plan Team that would be responsible for all FEPs for demersal fisheries. The current Pelagics FMP Plan Team would become the Pelagics FEP Plan Team with no changes. Long-term positive impacts are expected under this alternative as additional costs are anticipated to be minimal and could even be reduced as the Council staff would only have to staff and brief two Plan Teams on current issues as opposed to the existing five. In addition, the utilization of the same FEP Plan Team across all demersal FEPs would be anticipated to increase the transfer of experience and knowledge between FEP areas while maintaining the holistic consideration of all impacts within a given area. Similarly, the continued utilization of a single Pelagics Plan Team would be anticipated to maintain the current broad and integrated approach to the management of migratory species that range across the Western Pacific Region. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place.

4.4 Component 4: Regional Coordination

In the Western Pacific Region, management of ocean and coastal activities is administered by a number of agencies at the Federal, state, county, and village level. Many individual agencies administer programs and initiatives that address sometimes overlapping ocean and coastal components. A primary reason for including regional coordination as a component for consideration in the establishment of FEPs is its ability to address nonfishing impacts on marine ecosystems.

Component 4 is nonregulatory (i.e., has no regulatory effect) and included in this EIS to assist the Council in identifying appropriate coordination activities under an ecosystem-based fishery management structure. For each alterative under Component 4 the potential impacts on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration are discussed.

4.4.1 Alternative 4A: No Action—Do Not Establish Ocean Council Type Groups

Physical Environment

Under this alternative, the Council would not establish or support additional Ocean Council type groups (composed of multiple agencies, community groups, NGOs, and private business) but would continue to provide information regarding the impacts of land-based and nonfishing activities through its membership on the existing Hawaii Ocean and Coastal Committee and as requested on an ad hoc basis. This alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. However, not considering the full range of impacts of nonfishing activities on marine ecosystems could result in habitat damage or loss of marine resources. Management changes would continue to be considered via the MSA process or through changes to NMFS's list of allowable gears.

Biological Environment

Under Alternative 4A, current regulations would be unchanged, and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. However, not considering the full range of impacts of nonfishing activities on marine ecosystems could result in habitat damage or loss of marine resources.

Essential Fish Habitat

Under Alternative 4A, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

Under this alternative, impacts on protected species would remain as described in Chapter 3. Fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance with other applicable laws.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. However, not considering the full range of impacts of nonfishing activities on marine ecosystems could result in stock depletion, habitat damage, and the degradation or loss of marine resources on which fishery participants and communities depend.

Administration and Enforcement

This alternative would not have any impacts on management, administration, or enforcement, which would continue as described in Chapter 3.

4.4.2 Alternative 4B: Establish Regional Ecosystem Council Committees (Preferred)

Physical Environment

Under this alternative, the Council would establish Regional Ecosystem Advisory Committees made up of executive levelrepresentatives from Federal, state, and local government agencies; businesses; and nongovernmental organizations that have responsibility or interest in land-based and nonfishing activities that potentially affect the marine environment. Committee membership would be by invitation and would provide a mechanism for the Council and member agencies to share information on programs and activities and to coordinate management efforts or resources to address nonfishing-related issues that could affect ocean and coastal resources within and beyond the jurisdiction of the Council. These committees would be considered advisory panels under the MSA.Committee meetings would coincide with regularly scheduled Council meetings, and recommendations made by the committee to the Council would be advisory, as would recommendations made by the Council to member agencies. In the short term, this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via the MSA orthrough changes to NMFS's list of allowable gears. In the long term, the establishment of Regional Ecosystem Committees would enhance the Council's ability to coordinate with member management agencies to address non–fishing-related issues that could impact the physical environment.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. In the long term, the establishment of Regional Ecosystem Committees would enhance the Council's ability to coordinate with member management agencies to address nonfishing-related issues that could beneficially impact target and nontarget stocks.

Essential Fish Habitat

Under Alternative 4B, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

Under Alternative 4B, short-term impacts on protected species would remain as described in Chapter 3. In the long term, fisheries would be adaptively managed under the FEPs, with full consideration to impacts on protected species given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws. In the long term, the establishment of Regional Ecosystem Committees would enhance the Council's ability to coordinate with member management agencies to address nonfishing-related issues that could impact protected species.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. The establishment of Regional Ecosystem Committees would provide additional venues for engagement in the management process and may attract new participants who would bring additional expertise and local perspectives to that process, thus further improving the status and management of marine fisheries.

Administration and Enforcement

Impacts on management and administration would be anticipated to be significant under Alternative 4B. The creation of one or more Regional Ecosystem Committees would entail some ongoing travel and time costs related to hosting and staffing committee meetings. These would vary according to the size and number of the committees. More significantly, the establishment of Regional Ecosystem Committees would enhance the Council's ability to coordinate with member management agencies in efforts to address nonfishing-related issues and would improve our understanding and management of fisheries in the Western Pacific Region. There may be jurisdictional (local vs. Federal governance) issues that may arise; however, it would be the Council's role to provide clarification on mandated responsibilities for committee participants to preclude jurisdictional contentions. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place.

4.4.3 Alternative 4C: Participate in and Support Ocean Council Type Groups

Physical Environment

Under this alternative, the Council would not establish any new committees or other groups but would instead participate in and support the establishment of Ocean Council type groups established by the governor of each inhabited island area served by the Council (i.e., American Samoa, Guam, Hawaii, and the CNMI). Such a group has been established by the Governor of Hawaii (the Hawaii Ocean and Coastal Committee) and is made up primarily of local and county agencies with oversight of development, ocean recreation, tourism, and natural resource management. In the short term, this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via the MSA or through changes to NMFS's list of allowable gears. In the long term, participation in Ocean Council type groups throughout the Western Pacific Region would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact the physical environment. However, it is uncertain if or when the region's non-

Hawaii governors would establish such Ocean Council type groups. If they are not established, the non-Hawaii regions will not see these benefits under this alternative.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. In the long term, participation in Ocean Council type groups throughout the Western Pacific Region would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact target and nontarget stocks. However, it is uncertain if or when the region's non-Hawaii governors would establish such Ocean Council type groups. If they are not established, the non-Hawaii regions will not see these benefits under this alternative.

Essential Fish Habitat

Under Alternative 4C, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

Under Alternative 4C, short-term impacts on protected species would remain as described in Chapter 3. In the long term, fisheries would be adaptively managed under the MSA, with full consideration to impacts on protected species given in accordance with the MSA, MMPA, ESA, NEPA, and other applicable laws. In the long term, participation in Ocean Council type groups throughout the Western Pacific Region would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact protected species. However, it is uncertain if or when the region's non-Hawaii governors would establish such Ocean Council type groups. If they are not established, the non-Hawaii regions will not see these benefits under this alternative.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. Support and participation by the Council in Ocean Council type groups throughout the Western Pacific Region could encourage their development in the non-Hawaii areas. If successful, this would provide additional venues for engagement in the management process and may attract new participants who would bring additional expertise and local perspectives to that process, thus further improving the status and management of marine fisheries.

Administration and Enforcement

Impacts on management and administration would be anticipated to be moderate to uncertain under Alternative 4C. Involvement in Ocean Council type groups would entail some travel and time costs related to group meetings. These would vary according to the number of groups and meetings, but would generally be low as the meetings would not be hosted or staffed by the Council or NOAA. In the long term, participation in Ocean Council type groups would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues in a manner that would improve the status and management of marine fisheries. However, it is uncertain if or when the region's governors (excluding Hawaii) would establish such Ocean Council type groups. If they are not established, these areas will not see these benefits under this alternative. Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place under this alternative.

4.4.4 Alternative 4D: Establish Independent Regional Ecosystem Councils

Physical Environment

Under this alternative, the Council, NOAA, and NMFS would establish and administer independent Regional Ecosystem Councils to supplement the existing decision-making process. These Regional Ecosystem Councils would be made up of executive level representatives from Federal, state, and local government agencies businesses; and nongovernmental organizations that have responsibility or interest in land-based and nonfishing activities that potentially affect the marine environment. In the short term, this alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered via the MSA or through changes to NMFS's list of allowable gears. In the long term, participation in independent Regional Ecosystem Councils would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact the physical environment. However, it is uncertain if or when NOAA and NMFS would establish such Regional Ecosystem Councils. If they are not established, the short-termimpacts of this alternative will be the same as those described for Alternative 4A, but over the long-term, the failure to consider the full range of impacts of nonfishing activities on marine ecosystems could result in degradation of the physical environment.

Biological Environment

In the short term under this alternative, current regulations would be unchanged and impacts on target and nontarget stocks would be anticipated to be the same as those described in Chapter 3. In the long term, participation in independent Regional Ecosystem Councils would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact target and nontarget stocks. However, it is uncertain if or when NOAA and NMFS would establish such Regional Ecosystem Councils. If they are not established, the impacts of this alternative will be the same as those described for Alternative 4A.

Essential Fish Habitat

Under Alternative 4D, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

Under Alternative 4D, short-term impacts on protected species would remain as described in Chapter 3. In the long term, fisheries would be adaptively managed under the MSA with full consideration to impacts on protected species given in accordance with the all other applicable law. In the long term, participation in independent Regional Ecosystem Councils would enhance the Council's ability to positively influence and coordinate management efforts or resources to address nonfishing-related issues that could impact protected species. However, it is uncertain if or when NOAA and NMFS would establish such Regional Ecosystem Councils. If they are not established, the impacts of this alternative will be the same as those described for Alternative 4A.

Fishery Participants and Communities

This alternative would not have any direct impacts on fishery participants or communities as it would not change current fishery regulations. Support and participation by the Council in independent Regional Ecosystem Councils could facilitate development of such groups. If successful, this would provide additional venues for engagement in the management process and may attract new participants who would bring additional expertise and local perspectives to that process, thus further improving the status and management of marine fisheries. However, it is uncertain if or when NOAA and NMFS would establish such Regional Ecosystem Councils, if they are not established over time, the failure to consider the full range of impacts of nonfishing activities on marine ecosystems could result in stock depletion, habitat damage, and the degradation or loss of marine resources on which fishery participants and communities depend.

Administration and Enforcement

Impacts on management and administration would be anticipated to be moderate to uncertain under Alternative 4D. Involvement in independent Regional Ecosystem Councils would entail some travel and time costs related to group meetings. These would vary according to the number of groups and meetings. In the long term, participation in independent Regional Ecosystem Councils would enhance the Council's ability to positively influence and coordinate management efforts or resources to address non–fishing-related issues that could impact the physical environment. However, it is uncertain if or when NOAA and NMFS would establish such Regional Ecosystem Councils. If they are not established, the impacts of this alternative will be the same as those described for Alternative 4A (no action). Impacts on enforcement would be anticipated to be unchanged as current regulations would remain in place under this alternative.

4.5 Component 5: International Coordination

As discussed in Chapter 2, the Council is an active participant in the development and implementation of international agreements regarding marine resources. The Council also participates in and promotes the formation of regional and international arrangements for assessing and conserving all marine resources throughout their range, including the ecosystems and habitats that they depend on. As marine ecosystems are generally considered "open" systems, and large-scale impacts can be observed within smaller units, international coordination will be a necessary component of successful implementation of an ecosystem-based approach within the Western Pacific Region.

Component 5 is nonregulatory (i.e., has no regulatory effect) and included in this EIS to assist the Council in identifying an appropriate coordination activities under an ecosystem-based fishery management structure. The alternatives under Component 5 represent a range of nonregulatory actions that the Council has considered in relation to its participation in discussions and meetings that are international in scope. For each alterative under Component 5 the potential impacts on the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration are discussed.

4.5.1 Alternative 5A—No Action

Physical Environment

Under this alternative, the Council would continue to participate in international management fora such as the Western and Central Pacific Fisheries Commission as well as workshops and seminars (e.g., International Fishers Forums). This alternative would not have any impact on the physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered under the MSA.

Biological Environment

The Council's current level of participation and involvement in international management fora positively impacts target and nontarget species through shared stock management coordination among nations. In 2000, for example, the Council played an integral role in the development of the Multilateral High Level Conference to establish the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Central and Western Pacific Region. The Western and Central Pacific Fisheries Commission, as well as the Inter-American Tropical Tuna Commission, meet annually and the Council plays a critical role in advising the U.S. delegation at these meetings on issues relating to the conservation and management of highly migratory pelagic stocks that occur in the Western Pacific Region. Issues considered at such meetings include stock assessments, data and information collections, and enforcement. Under Alternative 5A, the Council would continue its involvement in these fora.

Essential Fish Habitat

Under Alternative 5A, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

The Council's continued participation in international management fora under Alternative 5A is anticipated to positively impact protected species. Currently, the Council actively participates in international meetings and workshops aimed at reducing bycatch of protected species in fisheries. For example, the Council has played an integral role in each of the International Fishers' Forums (2000, 2002, and 2005) that bring together fishers from all over the world to discuss and share methods on ways to reduce protected species bycatch. Through cooperative research and conservation efforts, the Council also participates in international programs aimed at reducing sea turtle interactions with fisheries through gear modifications (e.g., circle hooks) as well as supporting sea turtle conservation bywith local communities (e.g., Papua New Guinea) to protect sea turtle nesting sites.

Fisheries Participants and Communities

The Council's current level of participation in international management fora beneficially impacts fisheries participants and communities by representing Western Pacific Region fisheries participants and communities that may be affected by international management decisions. The Council's international work on protected species bycatch reduction and conservation also beneficially impacts fishery participants by exporting effective gear methods to other fishing nations to help the recovery of threatened and endangered species populations. Iincreased levels of these populations indirectly benefits fishery participants and communities that would otherwise be affected by regulations/closures of fisheries because of interactions with protected species with critically low populations. The Council represents various constituencies (i.e., commercial, recreational, and subsistence sectors), and Council meetings provide a mechanism for the general public to be involved in fishery management decisions. Therefore, the Council's participation in international fora also benefits fishery participants and communities by keeping them aware of international management issues (e.g., stock assessments, gear methods) that may affect them locally. These benefits would continue under this alternative.

Administration and Enforcement

The Council's current level of participation in international management fora requires staff time to help plan international meetings, write papers, and travel to and from various locations. The amount of resources or staff time dedicated to international management fora make up a small percentage of the resources or staff time dedicated to domestic fishery issues. These costs would remain unchanged under this alternative.

4.5.2 Alternative 5B—Increase Level of Participation in International Management Fora and Establish Meetings/Workshops With Neighboring Nations of Western Pacific Region Island Areas (Preferred)

Physical Environment

This alternative is not expected to impact the physical environment as destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes as a result of informational exchange or requirements from international commissions would continue to be considered under the MSA, as appropriate.

Biological Environment

Increasing the Council's participation and involvement in international management fora and establishing meetings/workshops with neighboring nations is expected to positively impact target and nontarget species through informational exchange regarding shared stock management and coordination among nations.

Essential Fish Habitat

Under Alternative 5B, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

Increasing the Council's participation and involvement in international management fora and establishing meetings/workshops with neighboring nations is expected to positively impact protected species through informational exchange and shared strategies on reducing interactions between fisheries and protected species. The Council has already initiated programs to export to various countries gear methods that have been successful in reducing protected species interactions (e.g., circle hooks in theEcuador small boat longline fleet). The Council is also working with community groups to establish and improve on sea turtle conservation efforts (e.g., Papua New Guinea leatherback sea turtle nesting beach conservation). Similarly, establishing meetings and workshops between neighboring island nations in the Western Pacific Region will positively impact protected species through the sharing of information regarding the management of protected species that are in both the U.S. EEZ and the neighboring EEZs.

Fishery Participants and Communities

Alternative 5B's increased level of Council participation in international management fora and the establishment of meetings/workshops with neighboring nations would beneficially impact fisheries participants and communities by keeping them aware of international management issues (e.g., stock assessments, gear methods) as well as the current status of fisheries in neighboring nations.

Administration and Enforcement

This alternative is anticipated to impact management and administration by increasing Council staff time to prepare reports, coordinate meetings, and travel to and from meeting locations. Aadministrative costs would increase under this alternative to pay for meeting travel. Coordination of meetings/workshops between Western Pacific Region island areas and neighboring nations would also likely involve staff time. Enforcement costs are not expected to increase over current levels.

4.5.3 Alternative 5C—Do Not Participate in International Management Fora and Establish Meetings/Workshops with Neighboring Nations of Western Pacific Region Island Areas

Physical Environment

Under this alternative, the Council would stop participating in international management fora such as the Western and Central Pacific Fisheries Commission and the Inter-America Tropical Tuna Commission, and would stop holding, sponsoring, or participating in international workshops and meetings (e.g., International Fishers Forums). This alternative would not directly impact the Western Pacific Region's physical environment as current regulations would be unchanged, destructive gear types would continue to be prohibited, and definitions of EFH and HAPC would remain as described in Table 3–1. Management changes would continue to be considered under the MSA. However, efforts by the Council to educate other nations and fishermen as to the importance of prohibiting the use of destructive gear types or fishing methods such as dynamite, bleach, and poisons would cease under this alternative.

Biological Environment

Alternative 5C could have negative impacts on target and nontarget species, as ending the Council's input to and participation in international management fora, meetings, and workshops would represent a reduction in the information and management recommendations available to these groups. The Council represents a wide range of fishery managers, scientists, and participants with many years of experience and expertise. The loss of their participation could result in suboptimal management, conservation, and science regimes that would lead to negative impacts on target and nontarget species.

Essential Fish Habitat

Under Alternative 5C, impacts on essential fish habitat would remain as described in Chapter 3. Essential fish habitat and habitat areas of concerns would continue to be designated and adaptively managed under the MSA.

Protected Species

This alternative could have negative impacts on protected species. The Council represents a wide range of fishery managers, scientists, and participants with many years of experience and expertise. The loss of the Council's input to and participation in international management fora, meetings, and workshops (e.g., International Fishers' Forums) would reduce the information and management recommendations available to these groups. That loss could result in suboptimal management, conservation, and iencescientific regimes that would lead to negative impacts on protected species.

Fisheries Participants and Communities

This alternative would reduce the Council's ability to represent or engage fishery participants in international management fora, meetings, and workshops. It would also reduce the availability of information generated from these meetings that is currently provided by the Council to fishery participants and communities, as well as to the general public. In addition, the cessation of the Council's international work on protected species bycatch reduction and conservation would negatively impact protected species, which in turn could lead to additional fishery regulations or closures.

Administration and Enforcement

This alternative would reduce administrative costs for travel and associated staff time requirements. On the other hand, management, administration, and enforcement costs would all potentially increase as the loss of the Council's input could result in suboptimal management, conservation, and science regimes that would lead to increased costs due to a loss of efficiency or cost-effectiveness in the domestic implementation of these regimes.

4.6 Economic Effects

4.6.1 Baseline to Determine Economic Effects

The no-action alternatives were used as a baseline for the discussion of economic impacts resulting from the replacement of species-based fishery management under the current FMPs with ecosystems management under the proposed FEPs. All no-action alternatives described above would yield no change from those economic impacts that would occur under the current fishery management regime, i.e. the status quo.

4.6.2 Direct Economic Impacts to the Fishing Sector

Only the alternatives under Components 1 and 2 could have regulatory effect resulting in economic gains or losses to directed fisheries. The short term economic impacts of this rule on the directed fisheries, based on the preferred alternatives 1D and 2B are zero since there would be no new restrictions or additional requirements in terms of regulatory compliance. The permitting and reporting requirements that currently exist under the FMPs are species/archipelago-based and would continue unaltered under the FEPs management regime. There would be no short term requirements to revise fisheries regulations associated with MUS since the FEPs would incorporate identical MUS as are found in the current FMPs. The longer-term economic impacts to directed fisheries are indeterminate. Those impacts would depend on specific management measures implemented for the various FEPs. However, the requirements for fisheries management under the currently reauthorized MSA would continue to be a dominant factor affecting the economics of all directed fisheries associated with the various MUS. In addition to the MSA, the Endangered Species Act and Marine Mammal Protection Act could also affect the economic returns from the directed fisheries depending upon fishing restrictions. A good example of ESA influence on directed fisheries is the turtle cap that has been put on the shallow-set Hawaiian longline fishery.

The implementation of either Alternatives 1B or 1C would also result in zero impact in the short term. However, the implementation of Alternative 1E, which would implement several FEPs associated with each biogeographic and pelagic zone, could result in the requirement for fish harvesting vessels to obtain new permits and perform associated recordkeeping for harvesting MUS resulting in additional compliance costs for those affected entities. This alternative could result in additional regulations and not a simple reorganization of the regulations as would the preferred. The implementation of alternatives 2C or 2D could also directly and indirectly result in additional requirements in terms of an expansion of management responsibilities for designated ecosystems and the resulting economic impacts of increased management.

4.6.3 Indirect Economic Effects

In the short term, there would be no indirect economic impacts to the economy from implementation of the preferred alternatives. However, implementation of Alternatives 1E, 2C, or 2D could result in additional economic impacts to other sectors of the economy indirectly attributable to additional economic impacts to the directed fisheries. There could also be a commensurate increase in Government costs depending upon the type and scope of management measures required under these non-preferred alternatives. In the longer term, indirect economic impacts resulting from changes in directed fishing activity and other ecosystem services resulting from revisions to FEPs are indeterminate. Those long-term impacts would depend upon specific management measures, and how those measures would impact the directed fisheries, the ecosystem, and other sectors of the economy.

4.6.4 Economic Impacts of Required Institutional Changes

Components 3, 4, and 5 and associated alternatives represent initial institutional changes required as part of the reorganized management structure. These changes would result in reorganized plan teams and a revised committee structure all related to Council functions. Most of these requirements could be met with existing staff and resources. However, there may be additional costs in meeting the obligations set out in this rule. Conceivably, additional staff or consulting services may be required to assure that forthcoming FEPs are consistent with applicable statues and executive orders. There would be no additional costs to NMFS at this time since available staff would be adequate to meet the requirements presented by this rule.

4.6.5 Overall Economic Effects

Economic impacts from implementation of this rule would be minimal reflecting only minor additional costs associated with institutional changes required to implement the new management structure. The potential impacts of longer term institutional requirements are discussed below.

4.6.6 Future Economic Considerations

By initiating FEPs, the Council has taken the first step toward the greater goal of comprehensive ecosystem management by developing a more efficient vehicle which could be utilized to enumerate distinctions between fisheries specific management and the holistic approach identified with ecosystems management. Recognizing that the reorganization of the management structure is only an initial step toward ecosystems management, many proponents of ecosystem-based approaches to marine resource management envision future management regimes with ecosystems as the central management focus as opposed to a narrower focus on individual fisheries. Under this scenario, the economic impact to an ecosystem from regulation could be measured by estimating the changes in the aggregate value of the various components or services, including directed commercial fisheries, associated with specific rulemaking.

If the FEP leads to better management and uses of the marine resources, then there might be long term direct and indirect benefit to the fisheries. Meanwhile, there would be costs associated with required institutional changes for any possible changes in regulations. However, measurements of these benefits are a complex task. While the value of directed fisheries may be measured in dollars per pound or the potential to earn dollars per pound, many ecosystem indicators or factors are not readily measurable. For instance, there are use values associated with swimming, surfing, recreational fisheries, etc. that are quite difficult to measure even with available data. There are also non-use (existence) values associated with the protection of endangered species and option and quasi-option values associated with the preservation of natural habitats. In addition to the requirements to develop more precise and timely models to monitor and predict social and economic value produced by a given ecosystem, there would also be a need to enhance our understanding of marine and coastal systems to develop predictive models that depend on endogenous ecological relationships between and among the indicators or factors present in the ecosystem.

Furthermore, there would also be issues with developing and implementing the appropriate institutional organizations required to manage marine-based ecosystems. As a starting point, adequate ecosystems management would most likely require agreements among those institutions--- federal, state, or local, that currently hold management authorities over some portion of the marine or human environment. However, management by agreement could create inefficiencies associated with timeliness of regulations and costs of repetitive use of identical resources especially labor.

Nonetheless, it is also clear that while laying the foundation for future ecosystems management by implementing FEPs may not result in immediate changes to net benefits, there will be a requirement to estimate net benefits in the form of net present values for each suite of management measures implemented under the FEPs based on changes to the values of ecosystems as well as individual fisheries.

4.6.7 Summary

No foreseeable economic gains or losses to direct fisheries will result under the preferred alternatives 1D and 2B since the development of FEPs will not impose any new restrictions or additional requirements in terms of regulatory compliance. Short term economic impacts based on alternatives 1B, 1C, 1D and 2B can be regarded as zero for reasons discussed in the direct and indirect economic impact sections above. No Action alternatives 1A, 2A, 3A, 4A and 5A, by definition, would require no changes to current regulations or management regimes and therefore can also be regarded as having zero economic impacts on the economy.

However, NMFS recognizes that the pursuit of a more holistic approach to ecosystems management for the US Western Pacific Region may affect the long-term net benefits at the institutional level once the FEPs are implemented. Net benefits of ecosystem management are indeterminate at present, and it could take years or even decades before impacts could be truly measured. It would seem on the surface that optimal economic returns from an ecosystem would be more likely if the ecosystem were managed by one institution. However, some economists argue that decentralization of present institutions to community-type management would eliminate the requirement to attempt a one-size-fits-all solution that lacks the flexibility to manage ecosystems efficiently recognizing that each ecosystem is unique and contains its own dynamics. No matter which institutional organization prevails in the future, it is clear that there will be social costs associated with institutional reorganization. In theory, institutional transaction costs may even be lowered if decentralized, cooperative ecosystem management structures evolve within the Western Pacific Region.

Short-term economic impacts resulting from this particular action under the preferred alternatives may be negligible in terms of net national benefits. Longer-term impacts are indeterminate although stability and sustainability of ecosystems is currently seen as the platform for long term benefits both socially and economically.

4.7 Environmental Justice

On February 11, 1994, President William Clinton issued Executive Order 12898 (E.O. 12898), "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." E.O. 12898 provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." E.O. 12898 also provides for agencies to collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, or wildlife. That agency action may also affect subsistence patterns of consumption and indicate the potential for disproportionately high and adverse human health or environmental effects on low-income populations, and minority populations. A memorandum by President Clinton, which accompanied E.O. 12898, made it clear that environmental justice should be considered when conducting NEPA analyses by stating the following: "Each Federal agency should analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA."[61]

As described in Chapter 3, the inhabited island areas of the Western Pacific Region are home to indigenous peoples of Samoan, Chamorro, Carolinian, and Hawaiian ancestry. In addition, each inhabited island of the Western Pacific Region has been defined as a fishing community. As described in Chapter 3, the economic conditions of the Western Pacific Region are such that there is relativelylittle diversification within economies, with tourism being the most important contributor. However, mMany indigenous, as well as nonindigenous people of Western Pacific

[61] Memorandum from the president to the Heads of Departments and Agencies. Comprehensive Presidential Documents No. 279 (February 11, 1994).

Region islands, depend on healthy ecosystems for subsistence as well as for social and economic benefits.

In addition to indigenous populations, various fisheries in the Western Pacific Region have participants representing a variety of ethnicities that would fall under the minority provisions of the Executive Order. For example, the Hawaii-based longline fleet includes sizable proportions of Korean-Americans and Vietnamese-Americans, as well as individuals from a variety of other ethnicities. Previous FMPs and research have identified environmental justice issues among such members of the fleet. Subsequent monitoring of these fishermen and their families was conducted to describe the range of social and cultural effects at the individual, family, community, and industry levels (Allen and Gough 2006).

The Federal actions contemplated in this EIS are designed to enhance fisheries management by considering the implications of fisheries management within an ecosystem context. As Chapters 1 and 4 describe, an ecosystem-based approach to fisheries management involves shifting from species management to place-based management. In doing so, the role within fisheries management of indigenous peoples, fishery participants, and community members will be strengthened. Traditional and accumulated knowledge of local island fishermen is especially rich (Johannes 1981), and the Council's transition to an ecosystem and place-based approach is designed to access their understanding of the marine environment. For these reasons, none of the actions considered in this EIS are expected to adversely affect minority or low-income populations; on the contrary, the actions considered are designed to facilitate and strengthen the role of such groups within fishery management decisions.

4.8 Cumulative Effects

NEPA requires that the potential cumulative effects of a proposed action, as well as the cumulative effects of the alternatives to the proposed action, be analyzed in an EIS. Cumulative effects are defined as those combined effects on the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless what Federal or nonfederal agency or person undertakes such other actions (40 CFR 150.8.7). The following cumulative effects analysis is organized by the following issues: the physical environment, biological environment, essential fish habitat, protected species, fishery participants and communities, and enforcement and administration.

The geographic scope of this analysis is the Western Pacific Region. For the purposes of this analysis, past management actions refer to previous Council/NMFS actions. External factors or actions consider non Council/NMFS actions. This analysis is limited to anthropogenic impacts and does not take into account ecosystem variability (e.g., Pacific Decadal Oscillation) , which significantly influences the distribution and abundance of marine species and their habitat.

4.8.1 Physical Environment

Past Council/NMFS Actions

The existing Western Pacific FMPs prohibit the use of destructive fishing methods (e.g., bottom trawl nets, explosives, fish poisons, etc). In 1999, the Council designated essential fish habitat (EFH) and habitat areas of particular concern (HAPC) for each management unit species (64 FR 19068). In accordance with the MSA, the Council and NMFS must ensure that any activities do not adversely affect, to the extent possible, EFH of HAPC for any MUS. By prohibiting destructive fishing methods and the ensuring that activities do not adversely affect EFH and HAPC, negative impacts on the physical environment from authorized fishing activities are negligible.

Reasonably Foreseeable Council/NMFS Actions

There are no reasonably foreseeable Council/NMFS actions that will significantly affect the physical environment or EFH or HAPC for any Western Pacific MUS.

External Factors/Actions Potentially Impacting the Physical Environment

External factors potentially impacting the physical environment include land-based pollution and runoff, harbor dredging, ocean drilling and mining, ocean dumping, shipping activities, marine debris including derelict fishing gear, mariculture, military exercises, as well as research vessel activities. The effects of such factors are observable in site specific areas and are highly variable within the Western Pacific Region. With the exception of land based pollution and runoff as well as harbor dredging, the impacts of these factors on the physical habitat are believed to be negligible.

Potential Effects of the Alternatives on Physical Environment

Alternatives for FEP Boundaries

As described in Section 4.1, the delineation of fishery management boundaries does not impact the physical environment of marine ecosystems. The boundaries established under the FMPs (Alternative 1A) or proposed for theunder FEPs (Alternatives 1B, 1C, and 1D) do not exist as tangible boundaries, but are strictly geographic representations designated on maps and do not directly involve placing anything structural in the water or physical environment. The continuation of FMPs or the implementation of FEPs, which in essence manage marine resources by controlling fishing impacts (human activities), regulates the use of vessels as well as specific gear types. While potential impacts on the physical environment exist under normal fishing vessel operations—groundings resulting in spilled fuel/oil, garbage and wastes, and habitat damage through anchoring—the occurrence of such events are rare and the vessels authorized to fish under FMP permits must comply with national and international maritime law (e.g., U.S. Clean Water Act, MARPOL[62]). The implementation of the FEPs (Alternatives 1B, 1C, and 1D) would maintain the regulations that prohibit destructive fishing practices and non-selective gear types.

Alternatives for Species Managed Under FEPs

The current lists of MUS under existing FMPs (Alternative 2A) do not impact the physical environment, nor would the designation of MUS lists specific to place-based FEPs (Alternatives 2B, 2C, and 2D) have any impact on the physical environment.

Alternatives for Council Advisory Structure

Alternatives to modify the Council advisory structure to be in line with FEPs would have no direct impacts on the physical environment.

Alternatives for Regional Coordination

Regional coordination on ecosystem issues between the Council, Federal, state, and local agencies as well as nongovernment groups could potentially have positive impacts on the physical environment because of enhanced communication and understanding between agencies and stakeholder groups.

Alternatives for International Coordination

Increasing the Council's level of participation in international management fora in partnership and coordination with NMFS, as well as establishing meetings between neighboring nations could have positive impacts on the physical environment because of enhanced communication and understanding between agencies and stakeholder groups

[62] International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978.

Potential Cumulative Effects on the Physical Environment

The potential cumulative effects on the physical environment from the designation of: 1) FEP management boundaries, 2) species managed under each FEP, 3) Council advisory structure, 4) regional coordination, and 5) international coordination, are anticipated to be positive. The designation of place-based FEPs coupled with appropriate Council advisory groups and regional and international coordination mechanisms are expected to have long term positive effects on the physical environment. The cumulative effects resulting from the operation of fishing vessels when combined with exogenous factors that potentially impact the physical environment, such as land-based pollution and runoff, ocean drilling and mining, shipping activities, marine debris including derelict fishing gear, mariculture, military exercises, as well as research vessel activities, are not anticipated to result in significant or adverse effects on the physical environment of the Western Pacific Region.

4.8.2 Biological Environment

Past Council/NMFS Actions

As described in Chapter 1, FMPs have been established and implemented for coral reef ecosystems, bottomfish and seamount groundfish, precious corals, crustaceans, and pelagics. The FMPs require permits and catch reporting for the majority of managed fisheries. Annual stock assessments are conducted by NMFS for target species and escatch of nontarget species are monitored by NMFS through catch reports as well as data collected by fishery observers. Fishing effort and capacity for several fisheries have been regulated through limited access programs as well as maximum vessel length regulations. Ffishing methods such as trawls and drift nets which indiscriminately capture marine organisms are prohibited in the Western Pacific Region.

Reasonably Foreseeable Future Council/NMFS Actions

The MSA fishery management process is inheritably anadaptive management process. As needs for management actions arise, appropriate measures will be developed by the Council and, as approved by the Secretary of Commerce, implemented by NMFS. The shift towards ecosystem fisheries management will likely include actions that will consider the dynamic variability of ocean ecosystems and may include the use of physical or biological indicators. As greater scientific information becomes available, future management actions may also include xpandingenhancing MUS lists to include food web linkages such as predator-prey relationships.

External Factors/Actions Potentially Impacting Biological Environment

The external factors or actions that have impacted, may be impacting, or may have impacts in the future include habitat degradation from land-based pollution and runoff, dredging of harbors and other coastal areas, ocean tourism activities, ocean drilling and mining, shipping activities, research vessel activities, marine debris, and derelict fishing gear (i.e., ghost fishing). The effects of the human activities listed above are largely unquantifiable and unknown; however, habitat degradation due to land run-off is believed to be adverselyaffect the biological environment.

Potential Effects of the Alternatives on the Biological Environment

Alternatives for Approving and Implementing FEPs

As described in Section 4.1, the continuation of existing management measures and FMP boundaries (Alternative 1A) or the boundaries ofs delineation FEP (Alternatives 1B, 1C, and 1D) would not have any direct effects on the biological environment as these boundaries are simply geographic representations on maps. However, the continuation of FMPs or implementation ofFEPs to manage fisheries would have potential positive impacts on target and nontarget species. Although FMPs and FEPs would allow the harvest of target and nontarget species, positive impacts on the biological environmentspecies from FMPs or FEPs under all the alternatives would result from data collection (e.g., logbooks, observers) as well as controls on fishing gears and fishing effort (e.g., limited entry, maximum vessel lengths, closed areas) that otherwise would not be in place.

Under all of the alternatives, the status and trends of target and nontarget species would continue to be evaluated using existing criteria and thresholds for defining “overfishing” and “overfished” conditions as currently applied to individual stocks or stock complexes. Under the FEP alternatives (Alternatives 1B, 1C, 1D), management of the existing stock complexes would be unchanged; however, as more information becomes available regarding intraspecies and interspecies linkages within FEP areas increased consideration of fishery interactions and nonfishery impacts on the biological environment would improve management of these resources.

Alternatives for Species Managed Under FEPs

MUS lists currently contained under existing FMPs include those species that are caught in quantities sufficient to warrant management or specific monitoring, and the primary impact of inclusion of species is that the species (i.e.,the fishery targeting that species) can be directly managed. Continued reliance on existing MUS list (Alternative 2A) would have no impact on the biological environment s all major species and species groups are included in those lists. Alternative 2B would not affect the biological environment as the MUS lists would include those current MUS known to be present within each FEP area. Alternatives 2C and 2D, however, would add incidentally caught species that are not currently MUS. Although information is collected on nontarget species through data collection programs (i.e.,mandatory logbooks, voluntary creel surveys), the inclusion of these species on MUS lists would require that MSY, EFH, and HAPC be designated for each new MUS, and their harvests included in annual reports. For this reason, adding new species to the MUS lists could result in positive impacts on those species because of increased monitoring, stock assessments, and potentially new management measures. However, because these species are not targeted or harvested in appreciable quantities, nor have they been identified as keystone species, the necessity of related management measures is difficult to ascertain.

Alternatives for Council Advisory Structure

Alternatives to continue or modify the Council's current advisory structure would have no direct impacts on the biological environmentspecies as these would be administrative changes only. Indirect positive effects would occur from Alternative 3D as the Council's advisory structure will be appropriately aligned under a place-based approach and increased emphasis would be placed on local management issues regarding the biological environment.

Alternatives for Regional Coordination

A lack of regional coordination (Alternative 4A) on ecosystem issues between the Council, Federal, state, and local agencies as well as nonbusiness and nongovernment groups would potentially have negative impacts on the biological environment because of poor communication and understanding between agencies and stakeholder groups. On the other hand, increased regional coordination (Alternatives 4B, 4C, and 4D) would enhance communication and understanding amongst agencies and stakeholder groups, thereby having positive impacts on the biological environment.

Alternatives for International Coordination

Continued (Alternative 5A) or increased (Alternative 5B) Council participation in international management fora as well as establishing meetings between neighboring nations would potentially have positive impacts on the biological environmentspecies because of the enhanced communication and understanding between agencies and stakeholder groups that could result. Decreased or no (Alternative 5C) Council participation would have negative impacts on the biological environmentspecies as communication between domestic and international fishery managers would be difficult.

Potential Cumulative Effects on the Biological Environment

None of the alternatives considered within the five components would result in negative cumulative effects on the biological environment. The implementation of FMPs and FEPs allow managers to control fishery harvests, establish data collection programs, and evaluate stocks on an annual basis. The cumulative effects of implementing FEP, reorganizing MUS lists, modifying the Council's advisory structure, enhancing regional coordination, and increasing international coordination, when added to the effect of exogenous factors, are not anticipated to result in adverse affects to the biological environment. In fact the contrary is anticipated to occur under the preferred alternatives, that is, positive cumulative effects for target and nontarget species is expected due to the shift towards place-based fisheries ecosystem management that enhances understanding and results in improved management of marine ecosystems.

4.8.3 Essential Fish Habitat

Past Council/NMFS Actions

As described in Chapter 1, FMPs have been established andimplemented for coral reef ecosystems, bottomfish and seamount groundfish, precious corals, crustaceans, and pelagics. The FMPs require permits and catch reporting for the majority of managed fisheries. Annual stock assessments are conducted by NMFS for target species and catch of nontarget species are monitored through catch reports as well as data collected by fishery observers. Fishing effort and capacity for several fisheries have been regulated through limited access programs as well as maximum vessel length regulations. Destructive fishing methods such as bottomtrawls, poisons, and explosives which may damage EFH and HAPC are prohibited in the Western Pacific Region.

Reasonably Foreseeable Future Council/NMFS Actions

The MSA fishery management process is inheritably anadaptive management process. As needs for management actions arise, appropriate measures will be developed by the Council and, as approved by the Secretary of Commerce, implemented by NMFS. The shift towards ecosystem fisheries management will likely include actions that will consider the dynamic variability of ocean ecosystems and may include the use of physical or biological indicators.

External Factors/Actions Potentially Impacting EFH

The external factors or actions that have impacted, may be impacting, or may have impacts in the future include habitat degradation from land-based pollution and runoff, dredging of harbors and other coastal areas, ocean tourism activities, ocean drilling and mining, shipping activities, research vessel activities, marine debris, and derelict fishing gear (i.e., ghost fishing). The effects of the human activities listed above are largely unquantifiable and unknown; however, habitat degradation due to runoff is believed to adversely affect nearshore EFH andor HAPC.

Potential Effects of the Alternatives on EFH

Alternatives for Approving and Implementing FEPs

As described in Section 4.1, the continuation of existing management measures and FMP boundaries (Alternative 1A) or the delineation FEP boundaries (Alternatives 1B, 1C, and 1D) would not have any direct effects on EFH or HAPC as these boundaries are simply geographic representations on maps.

Alternatives for Species Managed Under FEPs

MUS lists currently contained under existing FMPs include those species that are caught in quantities sufficient to warrant management or specific monitoring, and the primary impact of inclusion of species is that the species (i.e.,the fishery targeting that species) can be directly managed. Continued reliance on existing MUS list (Alternative 2A) would have no impact on EFH or HAPC as all major species and species groups are included in those lists.

Alternatives for Council Advisory Process

Alternatives to continue or modify the Council's current advisory structure would have no direct impacts on EFH or HAPC as these would be administrative changes. Indirect positive effects would occur from Alternative 3D as the Council's advisory structure would be appropriately aligned under a place-based approach and increased emphasis would be placed on local management issues regarding EFH and HAPC.

Alternatives for Regional Coordination

A lack of regional coordination (Alternative 4A) on ecosystem issues between the Council, Federal, state, and local agencies as well as nonbusiness and nongovernment groups would potentially have negative impacts on EFH and HAPC because of poor communication and understanding between agencies and stakeholder groups. On the other hand, increased regional coordination (Alternatives 4B, 4C, and 4D) would enhance communication and understanding amongst agencies and stakeholder groups, thereby having positive impacts on EFH and HAPC.

Alternatives for International Coordination

Continued (Alternative 5A) or increased (Alternative 5B) Council participation in international management fora as well as establishing meetings between neighboring nations would potentially have positive impacts on EFH or HAPC because of enhanced communication and understanding between agencies and stakeholder groups. Decreased or no (Alternative 5C) Council participation would potentially have negative impacts on EFH and HAPC as communication between domestic and international fishery managers would be difficult.

Potential Cumulative Effects on EFH and HAPC

None of the alternatives considered within the five components would result in negative cumulative effects on EFH or HAPC. The implementation of FMPs and FEPs allow managers to control fishery harvests, establish data collection programs, and evaluate stocks on an annual basis. The cumulative effects of implementingsestablishing FEP, reorganizing MUS lists, modifying the Council's advisory structure, enhancing regional coordination, and increasing international coordination, when added to the effect of exogenous factors, are not anticipated to result in adverse affects to EFH or HAPC. In fact the contrary is anticipated, that under the preferred alternatives, positive cumulative effects for EFH and HAPC is expected due to the shift towards place-based fisheries ecosystem management that enhances understanding and improved management of marine ecosystems.

4.8.4 Protected Species

Past Council/NMFS Actions Impacting Sea Turtles

As discussed in Section 3.4.1, all fisheries managed under the existing FMPs have undergone reviews for their impacts on protected species. All sea turtles in the Western Pacific Region are either listed as threatened or endangered under the ESA. Biological ohave beenOpinions are prepared by NMFS under Section 7 of the ESA to determine whether or not fisheries are likely to jeopardize the continued existence of any ESA-listed species. No fisheries managed by the Council under the existing FMPs have been found likely to jeopardize the continued existence or critical habitat of any sea turtle populations in the Western Pacific Region.

The Hawaii-based longline fishery interacts with sea turtles, and the Council and NMFS have taken measures to significantly reduce sea turtle interactions in that fishery. In 2004, NMFS implemented Council-recommended regulations to require the use of circle hooks and mackerel-type bait in the Hawaii-based longline shallow-set sector. These measures have significantly reduced sea turtle interactions. Additionally, hard slimit of 16 leatherback interactions and 17 loggerhead interactions, and mandatory 100 percent observer coverage were implemented for this sector. Under the hard limits, the shallow-set sector is closed immediately when either hard limit is reached. If neither is reached, the shallow-set sector is closed annually after the completion of the total allowable sets (2,120) .In March 2006, the shallow-set sector of the longline fleet reached the hard limit for loggerhead sea turtle interactions and was closed for the remainder of the calendar year. In addition, all Hawaii-based longline vessels must carry and use mitigation gear to properly release sea turtles as well as attend annual protected species workshops. More detailed discussions on the impacts of Council managed fisheries on sea turtles can be found in the additional NEPA and ESA eanalysis listed Section 3.4.1.

Reasonably Foreseeable Future Council/NMFS Actions Impacting Sea Turtles

Through data collected from observer programs and other sources, the Council and NMFS will continue to monitor interactions between fisheries and sea turtles. NMFS will continue to evaluate sea turtle populations under the ESA and will require mitigation measures as appropriate. The Council and NMFS will continue to conduct sea turtle conservation activities both domestically and internationally. The Council will continue to support sea turtle nesting beach conservation (e.g., Papua New Guinea, Japan) as well continue to help coordinate International Fishers Forums with the objective of reducing bycatch in fisheries.

External Factors/Actions Potentially Impacting Sea Turtles

The Recovery Plans for Pacific sea turtles (NMFS and FWS, 1998a, 1998b, 1998c, 1998d, 1998e, 1998f) describe over 26 factors that impact sea turtles which can be generalize into five categories:

- direct take of eggs and female adult turtles at nesting sites;
- degradation of nesting habitat;
- pollution of marine habitat (including marine debris);
- vessel collisions; and
- incidental capture in fisheries not managed by the Council.

Despite efforts by government agencies, nongovernment organizations, and community groups to mitigate the effects of several of the external factors, the prognosis for the future survival and recovery of some sea turtle populations remains bleak. A multi-national, holistic (covering all turtle life phases) framework for sea turtle conservation is considered essential to their recovery (Bellagio Conference 2004).

Throughout much of the Pacific, the impacts of fisheries is lessening because of the international transfer of gear types and management measures to reduce and mitigate interactions with sea turtles. However, incidental sea turtle catch continues to be largely unabated in Asian pelagic longline fisheries operating in the North Pacific. For example, at a bycatch working group meeting of the IATTC, held in Kobe, Japan on January 14–16, 2004, a member of the Japanese delegation stated that, based on preliminary data from 2000, the Japanese tuna longline fishery has been estimated to interact with approximately 6,000 sea turtles, with a 50 percent mortality rate (NMFS 2005a). As the average turtle interaction rate is approximately 10 times higher in shallow-set longline sets than in deep-setlonglines sets, incidental sea turtle catches are likely even higher in Taiwanese and Chinese pelagic shallow-set longline fisheries than in the Japanese deep-set fishery (NMFS 2005a).

International codes of conduct, regional memoranda of understanding and voluntary plans of action to reduce sea turtle bycatch on the high seas need to be supported by the active engagement of longline industries at the fishermen's level (Simonds 2003). In practical terms, this means continuing to verify the effectiveness of specific longline gear modifications and transferring this technology through fishing associations and industry working relationships (Simonds 2003).

Past Council/NMFS Actions Impacting Marine Mammals

As discussed in Chapter 3, the MMPA requires that all commercial FMP fisheries be evaluated by NMFS for impacts on marine mammals and be designated either Category I, II, or III (with Category III having the lowest impact). The fishery classification criteria consist of a two-tiered, stock-specific approach that first addresses the total impact of all fisheries on each marine mammal stock, and then addresses the impact of individual fisheries on each stock. Under existing regulations, all fishers participating in Category I or II fisheries must register under the MMPA, obtain an Authorization Certificate, pay a fee of $25, and report any interactions with marine mammals. Additionally for Category I fisheries, fishers may be subject to a take reduction plan and requested to carry an observer (68 FR 20941).

In the Western Pacific Region, only the Hawaii-based longline fishery is listed as a Category I fishery, primarily due to concerns over interactions between the fishery and false killer whales (*Pseudorca crassidens*) within EEZ waters around the Hawaiian Islands. The fishery is in compliance with the MMPA in that it is subject to observer coverage and participants must obtain an Authorization Certificate and report any interactions. All other fisheries in the Western Pacific Region are classified as Category III fisheries (see 68 FR 20941 for further information).

Some marine mammals (e.g., Hawaiian monk seals, hsHumpback whale) occurring in the Western Pacific Region are also protected under the ESA, and NMFS must ensure that fisheries managed by the Council are not likely to jeopardize the continued existence of any threatened or endangered species or result in adverse impacts on the critical habitat of such species. Biological opinions prepared by NMFS have concluded that no fisheries managed by the Council are likely to jeopardize the continued existence or critical habitat of any ESA-listed marine mammal populations in the Western Pacific Region.

Reasonably Foreseeable Future Council/NMFS Actions Impacting Marine Mammals

Through data collected from observer programs and other sources, the Council and NMFS will continue to monitor interactions between managed fisheries and marine mammals. NMFS scientists in association with other researchers will continue to collect biological samples to refine stock definitions as well as conduct surveys to monitor populations. The Council and NMFS will continue to conduct workshops with participation from fishermen to develop mitigation methods as appropriate, and NMFS will continue to conduct mandatory annual protected species workshops for all longline permit holders that teach how to identify marine mammals and how to reduce and mitigate interactions.

External Factors/Actions Potentially Impacting Marine Mammals

A comprehensive discussion on the external factors affecting Hawaiian monk seals is provided in the 2005 EIS (June 17, 2005; 70 FR 35275). These factors include natural occurrences such as male aggression and mobbing, shark predation, disease, and ecosystem productivity regime shifts, as well as anthropogenic impacts such as sea wall entrapments, hookings, research activities, marine debris, and vessel groundings.

External factors affecting other marine mammals such as whales and dolphins include the following: (a) incidental take in fisheries; (b) collisions with ship traffic, ship disturbance, and ship noise, and (c) marine debris and waste disposal.

Interactions with Fisheries

Nearshore gillnet fisheries in Hawaii have been reported to interact with some dolphin species (e.g., bottlenose dolphins); however, the rate of interactions or severity of interactions is not well known (Forney 2004). Dolphins and false killer whales are also known to strip bait and catches from fishing lines without becoming hooked or entangled. Additionally, monk seal drownings in nearshore (reef) nets have been documented in Hawaii.

Ship Traffic, Disturbance, and Anthropogenic Noise

Collisions with vessels and disturbance from low-frequency noise are potential threats to cetaceanscetaceans and other marine mammals. Increasing levels of anthropogenic noise in the world’s oceans may have an adverse effect on marine mammals. The Marine Mammal Commission is currently assessing the acoustic impact of underwater sound on marine mammals.

Marine Debris and Waste Disposal

External activities that may have adverse effects on marine mammal habitat include the dispersal of marine debris, large oil spills, and other types of marine pollution. Petroleum has the potential to be toxic to marine mammals if it is inhaled, ingested, or absorbed through the skin, mucous membranes, or eyes, or if it inhibits feeding by fouling the baleen plates of whales. Hydrocarbons can also bioaccumulate in zooplankton and fish eaten by marine mammals and other wildlife. Any detrimental effects of marine pollution on their prey species would also affect marine mammals. Aside from large, catastrophic spills, the long-term effects of low levels of petroleum exposure are unknown.

Marine debris can be toxic to marine mammals if ingested or it can entangle them, leading to decreased ability to breathe, feed, breed, swim, or haul out. The animals affected may be more vulnerable to predators or diseases, thereby reducing their ability to survive, care for their young, and reproduce. These factors can have significance in local areas where there are high concentrations of marine debris, thus contributing to cumulative effects on marine mammals.

Past, Present, and Reasonably Foreseeable Council/NMFS Actions Affecting Seabirds

Primarily, the birds that have most interacted with fisheries managed under the FMPs have been boobies and albatrosses. From 1990 to 1993 and from 2003 to the present, the NWHI bottomfish fishery has been observed by NMFS's observer program. A main objective of NMFS's observer program is to monitor fisheries for interactions with protected species. Prior to 1999, the Hawaii-based pelagic longline fisheries managed under the Council's Pelagics FMP were estimated to interact with around 2,000 albatross (black-footed and Laysan), primarily in the shallow-set fishery that targets swordfish. The short-tailed albatross, which is listed as endangered under the ESA, is thought to forage in areas where the Hawaii-based longline vessels fish. However, no interactions between the short-tailed albatross and the Hawaii-based longline fleet have ever been reported or observed. In 2002, the Council amended the Pelagics FMP to require Hawaii-based longline vessels to use known seabird mitigation measures that are expected to reduce seabird interaction rates significantly In 2005 the Council amended the Pelagics FMP to allow longline vessels to side-set in lieu of most required alternative measures. Side-setting has been proven to nearly eliminate seabird interactions with longline vessels. .

The Council and NMFS will continue to monitor seabird interactions with managed fisheries, and if a management need arises, will recommend/implement appropriate measures.

External Actions Potentially Impacting Seabirds

Exogenous factors known to impact seabird populations include the following: a) degradation of nesting habitats that include lead and other toxins (e.g., polychlorinated biphenyls) left over from military activities in the NWHI, as well as invasive species such as rats that consume seabird eggs, and b) marine debris and plastics—albatross often consume floating plastics and pass the objects on to chicks while feeding. Non-U.S. pelagic longline fisheries are also likely to be an external factor impacting seabird populations. However, detailed impacts are unknown.

Potential Effects of the Alternatives on Protected Species

Alternatives for Approving and Implementing FEP

As described in Section 4.1, the delineation of FMP (Alternative 1A) or FEP boundaries (Alternatives 1B, 1C, and 1D) would not have any direct effects on protected species as FMP or FEP boundaries are simply geographic representation on maps. Although continuing the FMPs or implementingFEPs does allow for low-level interactions between fisheries and protected species, existing regulations require fishing vessels to employ a range of gear types and fishing methods to reduce and mitigate interactions with protected species. Ddata collection programs (e.g., logbooks, observers) for which interactions with protected species can be monitored would be maintained under all of Component 1's alternatives.

Alternatives for Management Unit Species

Maintaining the current lists of MUS (Alternative 2A), reorganizing the current lists based on FEP boundaries (Alternative 2B), or adding incidentally caught species to MUS lists (Alternatives 2C and 2D) have no direct impacts on protected species. The benefit of MUS lists is that management measures can be adopted to reduce or increase harvests of such species. However, expanded MUS lists could result in the increased monitoring and management of resources important to protected species.

Alternatives for Council Advisory Structure

Alternatives to modify the Council advisory structure to be in line with FEPs have no direct impacts on protected species as they are purely administrative.

Alternatives for Regional Coordination

Regional coordination on ecosystem issues between the Council, Federal, state, and local agencies as well as nongovernment groups potentially could have positive impacts on protected species because of enhanced communication and understanding between agencies and stakeholder groups.

Alternatives for International Coordination

Increasing the Council's level of participation in international management fora as well as establishing meetings between neighboring nations could have positive impacts on protected species because of enhanced communication and understanding between agencies and stakeholder groups.

Potential Cumulative Effects on Protected Species

Exogenous factors that impact protected species include habitat degradation from land-based pollution and runoff, direct harvests outside the control of U.S. jurisdiction, ocean tourism activities, ocean drilling and mining, shipping activities, research activities, and marine debris and derelict fishing gear (i.e., entanglements). Currently, all operating fisheries managed under Western Pacific FMPs are in compliance with MSA, ESA, MMPA, as well as NEPA, and the level of interactions between protected species and Western Pacific fisheries have been found to not jeopardize the continued existence of any protected species or result in any adverse impact to the critical habitat of such species. The transition to place-based FEPs is the 'Councils first step towards an ecosystem management approach, and the current regulations would be unchanged. However, subsequent actions would be developed under an adaptive management strategy for the relevant FEPs.

The cumulative effects of the Council establishing FEPs and associated MUS lists as well as reorganizing its advisory structure and developing mechanisms for regional and international coordination vehas no discernible impact when added to the effects of exogenous factors on protected species. Nevertheless, a major objective of shifting towards place-based FEPs is to focus on the ecosystem and the species and communities of which is comprised. Broader understanding of a particular ecosystem will likely provide benefits to protected species.

4.8.5 Fishery Participants and Communities

Past, Present, and Reasonably Foreseeable Future Council/NMFS Actions Impacting Fishery Participants and Communities

Soon after the MSA was promulgated 1976, the Council began developing FMPs for fisheries of the Western Pacific Region. In 1983, the Precious Corals and Crustaceans FMPs were approved by the Secretary of Commerce, with FMPs for Bottomfish and Seamount Groundfish, Pelagics, and Coral Reef Ecosystems approved in later years. FMPs do not "open" fisheries, but on the contrary, serve as mechanisms for the Council and NMFS to respond to management issues. Before FMPs, fishery participants were subject to little to no regulation, whereas through the FMPs and subsequent amendments, fishery participants have become subject to increasing regulation. Such regulations include but are not limited to, permit and reporting requirement, gear requirements, maximum vessel lengths, limited entry programs, observers, VMS, and protected species mitigation measures. See section 1.2.3 for a description of the Council's FMPs and management measures.

The 1996 reauthorization of the MSA required that the Council identify fishing communities under its jurisdiction. A fishing community, as defined by the MSA, means "a community which is substantially dependent or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes vessel owners, operators, and crew and Unites States fish processors that are based in such a community" (16 U.S.C. § 1802). The Council has identified American Samoa, Guam, CNMI, and each of the inhabited Hawaiian Islands, respectively, as fishing communities. The MSA requires that the Council or Secretary of Commerce describe the likely effects, if any, of conservation and management measures on fishing communities when developing FMPs or FMP amendments (16 U.S.C. §1853).The impacts of Council/NMFS actions on fishery participants are often transferred to fishing communities. For example, restricting access to a fishery through a limited entry program could have socio-economic effects on fishermen that do not qualify for a limited entry permit. Observable effects on fishing communities from the regulation of fishery participants depend on the number of fishery participants affected and to what degree they are affected.

Fishery management measures implemented under the FMPs have impacted fishing participants and fishing communities on various levels. The Council and NMFS will continue to assess the impact of management actions on fishery participants and fishing communities, and where possible, minimize negative effects while developing appropriate measures for the conservation and management of fishery resources.

External Factors Affecting Fishery Participants and Communities

There are wide-ranging factors (that change over time) that affect fishing participants as well as fishing communities. Current factors include high fuel costs, increased seafood imports, and restricted access to traditional fishing grounds. High fuel costs affect fishing participants in that it is simply increasingly expensive to go fishing. The effect is that fishery participants reduce fishing trips, switch toless fuel-intensive fisheries, or simply do not go fishing at all. The amount of imported seafood is also increasing, andwhere the U.S. nowimports nearly 70 percent of consumed seafood.[63] Increased seafood imports are significant as it relates to market competition, where a glut of fish products can flood the market andof lower ex-vesselprices. Oonce market channels are lost to imported seafood products it may also be hard for fishery participants to regain those channels.

[63] http://www.fas.usda.gov/ffpd/Fish-Circular/Market_News/IATR_Seafood_Imports.pdf

Another factor affecting fishery participants is that the establishment of no-take marine protected areas is on the rise in the Western Pacific Region. The effect of these no-take areas is that they often eliminate access to traditional fishing grounds. Therefore, if a fishery participant wants to fish, and their traditional area is closed, then they must find new fishing areas which could mean increased travel times and resulting in higher associated costs as well as increased competition between other fishery participants as effort increases in available fishing areas. Increased travel distances from home to fishing locations in some cases also pose safety risks as fishermen may travel to unfamiliar areas or to areas prone to adverse weather and sea conditions.

Regional economies also have the ability to affect fishery participants and communities. For example, in recent years Hawaii has seen a boom in development projects on islands such as Maui and Hawaii. Increased construction jobs are believed tohave lead to decreased participation in some fisheries (e.g., MHI bottomfish). Reduced participation in fisheries can affect fishing communities or jobs that depend on fisheries, leading to increased seafood imports to supply demand. This is observed in the MHI bottomfish example, where in 2001, bottomfish imports surpassed local bottomfish landings for the first time, a trend that continues today.

The Effects of the Alternatives on Fishery Participants and Communities

Alternatives for Approving and Implementings FEP

As the alternatives for FEP boundaries (other than Alternative 1A) focus on establishing a new institutional structure for implementing practical steps toward an ecosystem approach and current FMP regulations will be not be changed, but simply reorganized dependent on the FEP boundaries, no short-term impacts on fishery participants or communities are expected. The anticipated long-term impacts of implementing FEPs (Alternatives 1B, 1C, and 1D) wouldbe positive as it would integrate scientific information and human needs in a manner that significantly increases the involvement of local communities in the management and conservation of marine resources.

Alternatives for Managed Species

Because Alternative 2A would maintain the current MUS and Alternative 2B would maintain the current list, but organize it in a manner to be specific to the FEPs, these alternatives would have no direct or indirect effects on fishery participants or communities. Alternatives 2C and 2D, which would add a significant amount of new species to the MUS lists, might result in indirect effects on fishery participants and community members beleading them to believe that the ocean and its marine resources are overregulated and that they no longer have the freedom or right to fish. Such feelings may result in reduced participation, which in turn could affect the availability of locally caught fish to community members.

Alternatives for Council Advisory Structure

None of the alternatives would have any direct impacts on fishery participants or communities as they would not change current fishery regulations. The alignment of the advisory groups with place-based fisheries management (Alternative 3D) would be anticipated to increase the sense of shared ownership and investment in the management of marine resources by both residents and managers.

Because the implantation of FEPs is anticipated to positively impact fishery participants and communities, their additive impacts are not expected to adversely affect local fishery participants and communities. On the contrary, one objective of the FEP approach is the explicit recognition and increased inclusion of local expertise in the management and conservation of marine resources, which in turn may help reduce the effects of some adverse exogenous factors (e.g., improperly placed MPAs) on fishery participants and communities.

Alternatives for Regional Coordination

Alternatives that would lead to increased regional coordination (Alternatives 4B, 4C, 4D) would be expected to improve the status of marine ecosystems through enhanced understanding of a wider range of impacts on fishery resources and habitat and the potential implementation of measures to mitigate such impacts. Alternative 4A (no action) would not provide such mechanisms to enhance understanding of the ecosystem impacts.

Alternatives for International Coordination

Increasing the Council's level of participation in international management fora as well as establishing meetings between neighboring nations (Alternative 5B) would provide additional venues for fishery participants and international managers to exchange scientific and management information, and may attract new contributors who would bring additional expertise and perspectives to that process, thus further improving the status and management of marine fisheries throughout the Western Pacific Region.

Potential Cumulative Effects on Fishery Participants and Communities

The exogenous factors that fisheries participants and communities face include rising fuel costs, competition from seafood imports, loss of access to traditional fishing areas, and changes in the regional economy. Shifting from species-based FMPs to place-based FEPs as well as enhancing regional and international coordination is expected to improve fisheries management by incorporating ecosystem considerations. One objective of moving towards ecosystem based management under a place-based FEP management regime is maintain fishing opportunities for fishery participants and associated benefits to fishing communities while not disrupting the function of the ecosystem. The cumulative effects on fishing participants and communities are unknown, but anticipated to be beneficial.

4.8.6 Administration and Enforcement

No substantive changes would occur to the regulations affecting the Federal fisheries under any of the alternatives. However, managers and scientists would need to adapt to the place-based and multispecies nature of the proposed FEP. Managers and scientists would be asked to increasingly consider fishery interactions as well as the impacts of nonfishery activities on the marine environment. Additionally, management plan teams and other advisory groups would be asked to increasingly consider these indirect and often complex impacts when making recommendations. However, fisheries managers and scientists are increasingly considering ecosystem characteristics and functions when conducting research and making management decisions, respectively; this current heightened attention to fisheries' ecosystems would probably remain under allathe Alternatives

Enforcement agencies currently operate throughout the Western Pacific Region. Cumulative effects on enforcement and management could decrease as the participants ilyvoluntary become more involved in fishery management. Additionally, the increase inclusion of local expertise and knowledge in the conservation of the marine resources would improve the success of the management of the fisheries. Thus, the cumulative effects of this shift towards ecosystem-based fisheries management on administration and enforcement are unknown, but anticipated to be beneficial.

4.9 Reasons for Choosing the Preferred Alternatives

The U.S. Pacific island-based pelagic fisheries and the four demersal fisheries (bottomfish, crustaceans, precious corals and coral reef resources) are currently managed under FMPs. While the 1996 Sustainable Fishery Act amendments to theMSA require consideration of fishery impacts on species not explicitly managed under FMPs (e.g., bycatch reduction), there are several limitations to the current management framework (i.e., species-based FMPs) that appear to constrain the Council in developing holistic conservation and management measuresfor a wider range of marine resources and marine ecosystems.

Current stock assessments generally do not explicitly recognize the significant natural variability in marine resources and habitats, although some models do incorporate spatial and temporal environmental effects. Under place-based FEPs, stock assessments will increasingly and explicitly separate environmentally-driven resource variability (e.g., inter-annual, decadal, long-term ocean regime shifts) from fishery-driven and habitat-driven effects on target stocks and other components of ecosystems, thus improving fishery science and management.

In addition, the majority of current monitoring under the FMPs accounts for major resource removals by fishing, but not by other sources such as coastal development which has destroyed or severely degraded inshore fish habitat and associated stocks around the more heavily populated islands of the U.S. Pacific. Through regional coordination efforts under ecosystemplace-based FEPs, consideration offor all sources of resource removal will be simplified, including those related to shoreline modification, waste discharge, watershed erosion, storm runoff and other terrestrial activities. FEP monitoring will ultimately include ecosystem indicators and models which take into account non-fishing uses, their impacts on resources, and even the tradeoffs among different user groups who depend on the same resource.

As discussed in Chapter 1, the purpose of the proposed Federal Action in this EIS is to establish an institutional framework that will facilitate a shift to an ecosystem approach for fisheries management in the Western Pacific Region. This will be accomplished, in part, through the approval and implementation of place-based FEPs, Component 1 of the proposed Federal Action. Component 1 also includes the reorganization of existing species-based FMP regulations into place-based FEP regulations.

For Component 1's aAlternatives (Alternatives 1B, 1C, 1D and 1E) Alternatives 1C and 1D are most similar in their impacts (Table 4-2). Both of these alternatives would facilitate a practical ecosystem approach to fisheries management in the Western Pacific Region so that the full range of fisheries' impacts and other activities on marine ecosystems are addressed in a manner that coherently considers each archipelago's biological resources, physical conditions, socioeconomic needs and cultural traditions. However, Alternative 1D recognizes the highly mobile and often migratory nature of pelagic stocks and fisheries. Alternative 1D would establish a single Pelagics FEP that would span the entire Western Pacific Region. Alternatives 1B and 1E are not preferred because of their negative impacts on management, administration, e,enforcement fishery participants and communities.

Component 2 is also regulatory in nature and considered part of the Federal action in this document. Component 2 is contingent upon selecting one of the action alternatives under Component 1. All alternatives under Component 2 (Alternatives 2A, 2B, 2C, and 2D), consider changes to the MUS list. Alternative 2A is not preferred because of its negative impacts on management, administration, enforcement, fishery participants and communities. In particular, under Alternative 2A, there would be some demersal species identified as MUS in an FEP for which they were not actually present. Under Alternative 2B, the Preferred Alternative, the MUS list for each archipelagic FEP would consist of all MUS currently on any of the four existing demersal FMP MUS lists that are known to occur within the range of that particular FEP. The MUS list for the pelagic FEP will be identical to the pelagic FMP MUS list. Alternative 2B is similar to Alternative 2A but would eliminate the confusion that could result from the inclusion on the MUS list of species not physically present in a given FEP area. Alternatives 2C and 2D were rejected primarily because of their impacts on management, administration, and enforcement and because they would add species to the MUS lists that would require potentially expensivemonitoring and annual evaluation with no apparent benefit.

The Preferred Alternatives promote a holistic view of marine resources through increased examination of meta-population resource dynamics and linkages between upland watershed activities, coastal habitats and nearshore waters. This will lead to enhanced understanding and improved management of the relationships between different fish stocks and users of those stocks. In general, species-based FMPs focus on individual stocks of fish or related species and the people who harvest them. However, fish and fishermen do not act in isolation, and fishermen may be active in several fisheries targeting different resources over years or sseasonally.

Furthermore, the harvests of one species often influence the dynamics of fish markets (and subsequent fishing effort) for others. The Preferred Alternatives will provide fishery managers with comprehensive information on all fishery impacts within a given area and allow improved decision making with less unintended consequences due to poorly understood connections. By operating within an ecosystem context, fishery scientists andmanagers will also be better positioned to anticipate likely physical and biological responses to changing environmental conditions and to determine appropriate management actions to forestall adverse impacts on marine ecosystems, rather than reacting to changes after they occur. In addition, greater stability and predictability is more likely when resources are considered in aggregate rather than as independent units.

The ecosystem approach under the Preferred sis expected toAlternative may improve the management of coastal resources at both Federal and local levels through changes in the structure of resource management plans and the process by which these plans are developed and implemented. There is potential for jurisdictional disputes. However, it is the Council’s role to provide guidance and clarification on mandated responsibilities and management authorities to preclude governance issues from occurring. Because the organizational structure for developing and implementing FEPs is broader than for FMPs, and incorporates more local community input, it is likely to make better use of local knowledge and experience in management strategies and tactics. This will strengthen cooperation and voluntary compliance with management measures which is especially important in the Western Pacific Region where enforcement capabilities are often low.

The southern and western Pacific Ocean is dotted with thousands of islands governed by several nations. American Samoa, for example, is surrounded by the EEZs of five independent nations and much ofthe PRIA are part of larger archipelagic island chains. Several targeted pelagic species are considered highly migratory and management of these resources is increasingly becoming an international issue. As marine ecosystems are generally considered “open” systems and large scale changes can be observed within smaller units, international coordination as well as cooperation among the Council, RFMOs, US Department of State, NMFS and neighboring nations in the Western Pacific Region iswill be a necessary component of the successful implementation of an ecosystem approach to fisheries management under the Preferred Alternatives.

Table 4-2. **Comparison of the Action Alternatives to Alternative 1A, the No Action Alternative**.

Issue	Area	Alternative 1A - No Action (Baseline)	Alternative 1B	Alternative 1C	Alternative 1D - Preferred	Alternative 1E
Number of FMP(s) and FEP(s)		5 FMPs	5 FMPs 1 FEP	1 FMP 4 FEPs	5 FEPs	26 FEPs
Physical Environment	American Samoa Mariana Hawaii PRIA Pelagic	As described in Chapter 3	In the short-term, establishing the FEP(s) under these alternatives will not alter the impacts to the physical environment by any Federal fisheries. In the long-term, increased consideration of fishery interactions and non-fishery impacts on the physical environment associated with the successful implementation of an ecosystem management approach would to improve our understanding and conservation of the physical environment.			
Biological Environment	American Samoa Mariana Hawaii PRIA Pelagic		In the short-term, there are no differences between the direct and indirect impacts of these alternatives and the impacts of the No Action Alternative. In the long-term, increased consideration of fishery interactions and nonfishery impacts on target and nontarget species would improve management of these resources.			
Essential Fish Habitat	American Samoa Mariana Hawaii PRIA Pelagic	As described in Chapter 3	The implementation of the FEP(s) under these alternatives would not change current Federal fisheries regulations or designations of EFH or HAPC. The impacts of the activities under existing FMPs on EFH and HAPC would continue as under the No Action Alternative.			
Protected Species	American Samoa Marianas Hawaii PRIA Pelagic	As described in Chapter 3	The implementation of the FEP(s) under these alternatives would not change any fishing regulations (including those to reduce and mitigate interactions with protected species). Thus, it is expected that the same low level of interactions with protected species will continue. Protected species will maintain the same level of protection as under the No Action Alternative.			
	American			(+)	(+)	(+)

Impacts to fishery participants and communities	Samoa		No difference between this alternative and the No Action Alternative.	See Footnote 1 (-) See Footnote 2	See Footnote 1 (+) See Footnote 3	See Footnote 1 (+) See Footnote 3 (-) See Footnote 4
	Marianas		(+) See Footnote 1 (-) See Footnote 2	(+) See Footnote 1 (-) See Footnote 2	(+) See Footnote 1 (+) See Footnote 3	(+) See Footnote 1 (+) See Footnote 3. (-) See Footnote 4
	Hawaii		No difference between this alternative and the No Action Alternative.	(+) See Footnote 1 (-) See Footnote 2	(+) See Footnote 1 (+) See Footnote 3	(+) See Footnote 1 (+) See Footnote 3 . (-) See Footnote 4
	PRIA		No difference between this alternative and the No Action Alternative.	(+) See Footnote 1 (-) See Footnote 2	(+) See Footnote 1 (+) See Footnote 3	(+) See Footnote 1 . (+) See Footnote 3 (-) See Footnote 4
	Pelagic		(+)	(+)	(+)	(+)

			See Footnote 1 (-) See Footnote 2.	See Footnote 1 (-) See Footnote 2.	See Footnote 1 (+) See Footnote 3	See Footnote 1 (+) See Footnote 3 (-) See Footnote 4
Administration and Enforcement	American Samoa		No significant difference between this alternative and the No Action Alternative.	(+) See Footnote 5	(+) See Footnote 5.	(+) See Footnote 5 (-) See Footnote 6 (-) See Footnote 7
	Marianas		(+) See Footnote 5	(+) See Footnote 5	(+) See Footnote 5.	(+) See Footnote 5 (-) See Footnote 6 (-) See Footnote 7
	Hawaii		No significant difference between this alternative and the No Action Alternative.	(+) See Footnote 5	(+) See Footnote 5	(+) See Footnote 5 (-) See Footnote 6 (-) See Footnote 7
	PRIA		No significant	(+)	(+)	(+)

			difference between this alternative and the No Action Alternative.	See Footnote 5	See Footnote 5	See Footnote 5 (-) See Footnote 6 (-) See Footnote 7
	Pelagic		(+) See Footnote 5	(+) See Footnote 5 (-) See Footnote 8	(+) See Footnote 5	(+) See Footnote 5 (-) See Footnote 8 (-) See Footnote 6 (-) See Footnote 7

Footnote 1: Anticipated to be beneficial as it would integrate scientific information and human needs in a manner that significantly increases the involvement of local communities in the management and conservation of marine resources.

Footnote 2: May cause some confusion to participants in the fisheries as they switch to ecosystem management for the demersal and pelagic fisheries within each archipelago and remain with a species-based FMP for the high-seas pelagic fisheries.

Footnote 3: When compared to Alternatives 1B and 1C, would cause less confusion to the participants because the entire Western Pacific Region ouldwill switch from FMPs to placed-based FEPs.

Footnote 4: Participants would be responsible for determining which of the 26 FEP regulations pertain to the areas in which their fishing operations occur and for which species. May have a negative impact in the long-term if regulations for the fisheries become inconsistent, or overly specific, between the 26 FEPs.

Footnote 5: In the s-tShort Term, impact on enforcement and management agencies are not expected to be adverse as the fishery boundaries, fishery operations, and regulations would not change. Iin the long-term, voluntary compliance could be increased in the communities as the participants become more involved in fishery management.

Footnote 6: Enforcement would be responsible for determining which of the 26 FEP regulations pertain to each area and species. May have a negative impact in the long-term if regulations for the fisheries become inconsistent, or overly specific, between the 26 FEPs.

Footnote 7: The smaller ecosystems, semi-unique units, could result in management that fails to fully consider the interconnectedness of these smaller ecosystems within the larger archipelagic or pelagic environment.

Footnote 8: May have a negative impact in the long-term if regulations for the pelagic fisheries become inconsistent or overly specific, between the proposed demersal and pelagic archipelagic-based FEPs and the domestic pelagic fisheries on the high seas.

CHAPTER 5: ENVIRONMENTAL MANAGEMENT ISSUES

5.1 Introduction

This chapter summarizes an analysis of certain environmental management issues. These issues include effective use or conservation of some types of resources, consistency with other planning efforts, and mitigation of unavoidable impacts. These issues are very broad in scope and in some cases not relevant to the actions considered in this DPEIS.

5.2 Short-Term Uses versus Long-Term Productivity

Short-term uses are generally those that determine the present quality of life for the public. The quality of life for future generations depends on long-term productivity—the capability of the environment to provide on a sustainable basis. As described in Chapter 1, the purpose of an ecosystem approach to fisheries "is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from a full range of goods and services provided by marine ecosystems" (Garcia et al. 2003). As the actions considered in this EIS represent the first phase of the Council's incremental shift toward an ecosystem approach, the very nature of this shift is to plan and manage fisheries to meet the needs of today's communities while ensuring that sustainable fishery resources are available to future generations. By design, the essence of an ecosystem approach is to balance today's needs with the needs of future generations; that is, a balance between short-term use versus long-term productivity.

5.3 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are actions that disturb either a nonrenewable resource or a renewable resource to the point that it can only be renewed over a long period of time (i.e. decades). Loss of biodiversity may be viewed as an irreversible resource commitment. An *irretrievable commitment* is the loss of opportunities for production or use of a renewable resource for a short-to-medium period of time (years).

None of the actions considered in this EIS will result in irreversible commitments or irretrievable commitments. The actions considered represent the first phase of the Council's incremental shift toward an ecosystem approach, which by design, plans for and manages fisheries to avoid irreversible and irretrievable commitments.

5.4 Energy Requirements and Conservation Potential of the Alternatives

Section 1502.16 (e) of the National Environmental Policy Act (NEPA) requires that environmental consequences be considered with respect to energy requirements and conservation potential of various alternatives and mitigation measures.

Since this action does not directly affect fish harvesting and processing effort nor indirectly impact energy consumption in managed ecosystems or any other sectors of the economy, there will be no immediate or short-term impacts on energy consumption.
However, future actions that could be implemented under the various FEPs could result in longer-term and cumulative impacts on energy consumption, especially the consumption of fossil fuels, depending upon specific ecosystems-based management measures and resulting energy requirements for the directed fisheries, ecosystems, and other sectors of the economy. Catch restrictions or area closures for specific fisheries based on fish stock abundance and availability would certainly impact energy requirements for directed fisheries in terms of fuel consumption and indirectly impact energy requirements in those sectors of the economy that rely on the availability of fish, e.g. processors, retail fish outlets, and restaurants.

It is important to recognize that energy requirements associated with fisheries and other segments of the ecosystem are also dependent to a great extent upon exogenous factors such as fuel price and availability and general technological gains. Increases in fuel prices could limit the rents available to a fishery and, in turn, cause reductions in fishing effort resulting in lower fuel consumption. Advancements in fish finding technology or other acoustic technologies could achieve reductions in energy costs per unit of effort to produce fish or other resources from a desired ecosystem. In addition, technological improvements in fishing gear could result in decreased energy costs per unit of fishing effort while supporting other ecosystem goals.

While this management action does not directly impact energy use, it is important to note that as FEPs are developed and ecosystem-based management measures are introduced, the energy requirements of each management action should be analyzed for their impacts to the consumption of fossil fuels and other forms of energy consistent with NEPA requirements.

5.5 Urban Quality, Historic Resources, and Design of the Built Environment, Including Reuse and Conservation Potential of the Alternatives

Because the actions considered in this EIS are strictly institutional and do not involve the material construction of any type, the alternatives do not affect urban quality, historic resources, or design of built environment.

5.6 Cultural Resources and Conservation Potential of the Alternatives

As Chapters 1 and 4 describe, an ecosystem approach to fisheries management involves shifting from species-based management to place-based management. In doing so, the role within fisheries management of indigenous peoples, fishery participants, and community members will be strengthened. Traditional and accumulated knowledge of local island fishermen is especially rich (Johannes 1981), and the Council's transition to an ecosystem approach is designed to access their understanding of the marine environment. For these reasons, none of the actions considered in this EIS are expected to adversely affect cultural resources.

5.7 Possible Conflicts Between the Alternatives and Other Plans

There are no known possible conflicts between the alternatives and other plans as this is the first phase of the Council's incremental shift toward an ecosystem approach. Moving toward an ecosystem approach will involve intra- and interagency coordination and there are no plans currently available that conflict with the Council's shift toward and ecosystem approach.

5.8 Adverse Effects That Cannot Be Avoided

Because the alternatives considered in this EIS are strictly administrative in nature, none would result in adverse direct or indirect effects that cannot be avoided

5.9 Possible Mitigation Methods for Unavoidable Adverse Effects

Because the alternatives considered in this EIS are strictly institutional, none would result in unavoidable adverse effects, the identification of mitigation methods or measures are not needed.

CHAPTER 6: PREPARERS, DISTRIBUTION OF THE EIS, AND RESPONSE TO PUBLIC COMMENTS

6.1 Preparers of the EIS

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Tamra Faris, Environmental Policy Advisor, NMFS provided guidance in the development of this EIS.

Marilyn Luipold, PIR NEPA Coordinator, NMFS provided guidance in the development of this EIS.

6.2 Distribution of EIS

The following agencies, organizations, and individuals were provided review copies of the EIS.

Federal Agencies

Director	NMFS PIFSC
Chief	NMFS Office of Law Enforcement Pacific Islands Division
Administrator	NMFS Pacific Islands Regional Office
General Counsel	Pacific Islands Region NOAA
Admiral	U.S. Coast Guard (14th District)
Regional Administrator	U.S. Fish and Wildlife Service
Chairman	Marine and Fisheries Advisory Council
Regional Administrator	Environmental Protection Agency (Three Copies)

U.S. Congressional Delegation

Representative	Commonwealth of the Northern Mariana Islands
Senators	State of Hawaii
Representatives	State of Hawaii
Representative	Territory of Guam
Representative	Territory of American Samoa

State/Territory/Commonwealth Agencies/Organizations

Governor	State of Hawaii
Director	American Samoa, Department of Marine and Wildlife Resources
Director	CNMI Division of Fish & Wildlife
Director	CNMI Division of Environmental Quality
Director	Division of Aquatic Resources, DLNR
Director	Guam Division of Aquatic and Wildlife Resources
Director	Hawaii Coastal Zone Management Program
Director	Hawaii Department of Land and Natural Resources
Director	Hawaii Office of Environmental Quality Control

Administrator	Office of Hawaiian Affairs
Director	Public Libraries Hawaii

Council Groups

Executive Directors	Regional Fishery Management Councils
Council Members	Western Pacific Regional Fishery Management Council

Media

News Editor	Associated Press, Hawaii
Editor	Environment Hawaii
Editor	Hawaii Fishing News
Editor	Hawaii Tribune-Herald
Editor	Honolulu Advertiser (Oahu, Kauai, and Maui offices)
Editor	Honolulu Star Bulletin (Oahu, Kauai, and Maui offices)
Editor	Honolulu Weekly
Editor	Kauai Times
Editor	Maui News
Editor	Molokai Advertiser-News
Editor	The Garden Island, Kauai
Editor	Marianas Variety
Editor	Samoa News
Editor	Pacific Daily News

Others

KAHEA: The Hawaiian-Enviromental Alliance
‘Ilio ‘ulaokalani Coalition
Environmental Defense
Marine Conservation Biology Institute
The Ocean Conservancy, Director of Ecosystems Protection

6.3 Summary of Public Comments, Responses and Associated Actions

This section presents a summary of the public comments, and responses to those comments, received on the Draft Programmatic Environmental Impact Statement (DPEIS) Toward an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans, dated October 27, 2005. A total of 770 public comments were received, seven of which were unique letters, 242 of which were copies of one letter ("Hold Wespac Accountable"), and 521 of which were copies of a second letter ("I Support Strong NWHI Protection"). Appendix E contains a copy of the unique letters and of the two form letters.

Comment 1: The Hold WesPac Accountable and I Support Strong NWHI Protection letters, as well as a unique letter from the Marine Conservation Biology Institute (MCBI), stated that there was an inappropriately limited opportunity for public input.

Response 1: While seen as an important consideration, there was confusion between the actions considered in the DPEIS and in this EIS and the Fishery Ecosystem Plans (FEPs) being developed by the Western Pacific Regional Fishery Management Council (WPRFMC). These are two different types of products, each with its own process and public review provisions. The DPEIS fulfilled the NEPA public review process through proper Federal Register notice and associated public 45 day comment period. No changes were made in response to this comment.

Comment 2: The Hold Wespac Accountable and I Support Strong NWHI Protection letters, as well as the MCBI letter claim that the Council voted on the FEPs prior to completion of the FPEIS.

Response 2: The Council reviewed the analyses presented here prior to voting on the FEPs and will review the public comments on the DPEIS to determine whether they wish to reconsider their action. This comment does not address the NEPA analysis or process and no changes were made in response.

Comment 3: The Hold Wespac Accountable and I Support Strong NWHI Protection letters, as well as two unique letters expressed concern over a perceived lack of specific information provided regarding changing from a species based management system to an ecosystem approach to management.

Response 3: The DPEIS describe a framework for beginning an incremental approach to the adoption of ecosystem approaches to management (EAM) in the Western Pacific Region. The DPEIS describe a realignment of existing fishery regulations under a place-based structure with refined management unit species (MUS) lists representative of these places. Although it is understood that the full implementation of EAM must take into account more than just target fisheries, and that EAM must consider ecosystem relationships such as food chains, trophic levels, habitat, and social and economic factors, the tools to effectively implement such a regime are still being developed. The DPEIS (and this EIS) seek to describe and address only the first steps in an adaptive management process that will eventually lead to a broader EAM. This first step merely creates a framework that can be used to build an ecosystem approach and does not change the present management of these resources. It is expected that future actions to further implement EAM, such as addressing trophic interactions, will require a thorough scientific and management assessment (including NEPA analysis) of their potential impacts. That process will have to be collaborative and interactive across many public, private and governmental spectrums to be successful. No changes were made in response to this comment.

Comment 4: The U.S. Environmental Protection Agency (EPA) commented that the preferred alternative under Issue 2 (List of MUS) chosen by NMFS and the Council would define and manage only the currently listed MUS which are known to be present within each FEP's boundaries. The DPEIS states that "while principles of ecosystem approach to fisheries management direct managers to consider predator/prey relationships for each target species, it does not require managers to manage every species under an ecosystem approach." This comment went on to say that while the EPA understands it would be difficult to monitor and manage all species under an ecosystem approach, an option that takes into account other species occupying the same niche as fisheries and that interacts with fisheries may be more appropriate from and ecosystem standpoint. Accordingly the EPA suggests that the EIS provide a more in-depth comparison of Alternative 2C (include existing MUS plus incidentally caught and associated species known to be present within each FEP's boundaries) to Alternative 2B (include existing MUS known to be present within each FEP's boundaries).

Response 4: NMFS agrees that an ecosystem approach to fisheries management should be comprehensive and take into account all species or stock complexes within each FEP boundary to the extent that we are to identify them to achieve Magnuson-Stevens Fishery Conservation and Management Act objectives. As discussed in the DPEIS (and this EIS), the value of including incidentally caught species would be negligible given that they are caught in low numbers and are not targeted species. No changes were made in response to this comment.

Comment 5: The EPA commented that it supports Alternative 2B as it provides for protection of target and non-target stocks as well as protected species. However while the DPEIS discusses how the removal of species from the MUS list not physically present within each FEP's boundaries would be part of an adaptive management approach, it did not discuss how species could be added to the MUS list. As a result the EPA requests that adaptive management measures be included to ensure that all ecosystem important species will be include species that prove important to managing species within each FEP.

Response 5: As discussed in Section 1.3 of this DPEIS, federal fisheries in the Western Pacific Region are managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Under the MSA, additional MUS may be designated through the plan amendment process. This is the same process currently used to add or remove species from the MUS lists in the existing FMPs. The WPRFMC will be responsible for developing plan amendments that would add to or remove MUS from the FEPs. If approved by the Secretary of Commerce, FEP amendments will be implemented via proposed and final rulemaking by NMFS. No changes were made in response to this comment.

Comment 6: The EPA commented that there is no discussion under Issue 2 (List of MUS) concerning how the species managed under the restructured MUS lists will be monitored, The EPA requests that descriptions be included regarding how the MUS will be monitored, how frequently they will be assessed, and how these activities will be funded.

Response 6: As discussed in Section 3.6.4 of the DPEIS (and this EIS) the current MUS monitoring program under the existing FMPs will be maintained until better methodologies are found.

Comment 7: The Ocean Conservancy commented that NEPA requires that major Federal actions significantly affecting the quality of the human environment contain a detailed statement of, among other things, "the environmental impact of the proposed action." 42 U.S.C. § 4332(C)(i). However the Ocean Conservancy believes that by defining the action too narrowly, the agency has failed to consider the full effects on the human environment as required under NEPA and that a switch to environmental planning must include full discussions and analyses of the interconnectedness of marine habitats and species as a unified whole. In addition it must consider the food chain and possible disruptions to that chain. Only then will the quality of the effects on the human environment be fully discussed.

Response 7: The DPEIS (and this EIS) describe a framework for beginning an incremental approach to the adoption of EAM in the Western Pacific Region. The DPEIS (and this EIS) describe a realignment of existing fishery regulations under a place-based structure with refined MUS lists representative of these places. As discussed in the DPEIS, although it is understood that the full implementation of EAM must take into account more than just the target fisheries, and that EAM must consider ecosystem relationships such as food chains, trophic levels, habitat, and social and economic factors, the tools to effectively implement such a regime are still being developed. The DPEIS (and this EIS) seek to describe and address only the first steps in an adaptive management process that will eventually lead to a broader EAM. This process merely creates a framework that can be used to build an ecosystem approach and does not change the present management of these resources. It is expected that future actions to further implement EAM, such as addressing trophic interactions, will require a thorough scientific and management assessment (including NEPA analysis) of their potential impacts. That process will have to be collaborative and interactive across many public, private and governmental spectrums to be successful. No changes were made in response to this comment.

Comment 8: KAHEA, the 'Ilio 'ulaokalani Coalition, and Environmental Defense commented that there was a failure to provide reasonable opportunity for public comment, analysis by State of Hawai`i, or by Wespac [WPRFMC] members. On December 20, 2005, Wespac held an "emergency meeting" by teleconference for the purpose of voting to take final action on over 1,200 pages of "Fishery Ecosystem Plans," and recommend new Federal regulatory actions despite the absence of an opportunity for public comment on the final FEPs and despite a vote by Wespac in November, 2005 (at a previous public meeting in Guam) to weigh final approval of the FEPs at its next scheduled meeting in March, 2006.

Response 8: While seen as an important consideration, there was confusion between the NEPA analysis and the FEPs. These are two different types of products, each with its own process and public review provisions. The DPEIS fulfilled the NEPA public review process through proper Federal Register notice and associated public 45 day comment period. This comment does not address the NEPA analysis or process and no changes were made in response.

Comment 9: KAHEA, the 'Ilio 'ulaokalani Coalition, and Environmental Defense commented that the fact that Wespac and the National Marine Fisheries Service (NMFS) released (i.e. failed to release) the FEPs and DPEIS to the public in a timely manner represents a violation of NEPA requirements. Wespac took "Final Action" on the FEPs prior to the close of public comment on the DPEIS which was ostensibly designed to solicit public input on whether the FEPs should be promulgated, and if so, which type of FEPs should be promulgated – (i.e. which federal regulatory actions should be taken). The Draft FEPs, proposing federal regulatory actions, were released one month prior to the DPEIS. The Final FEPs were not released to the public until two working days prior to the start of "public hearings."

Response 9: While seen as an important consideration, there was confusion between the NEPA analysis and the FEPs. These are two different types of products, each with its own process and public review provisions. The DPEIS fulfilled the NEPA public review process through proper Federal Register notice and associated public 45 day comment period. The Council reviewed the analyses presented here prior to voting on the FEPs and will review the public comments on the DPEIS to determine whether they wish to reconsider their action. This comment does not address the NEPA analysis or process and no changes were made in response.

Comment 10: KAHEA, the 'Ilio 'ulaokalani Coalition, and Environmental Defense commented that the FEPs upon which Wespac voted were riddled with what one Wespac member called "absolute inaccuracies." According to State representatives, the Hawaiian Archipelago FEP contains "numerous factual and typographic errors" which "indicate that the document is far from ready from final approval." The state representative presented examples including fifteen instances of species or entire families of organisms listed for Hawaii which "do not occur in the Hawaiian archipelago.

Response 10: Staff from the Hawaii Division of Aquatic Resources have reviewed the Hawaiian Archipelago FEP and identified those MUS species not known to occur in the Hawaiian Archipelago, these have been removed from the MUS lists in the FEPs. Similar refinements of the MUS lists for the other FEPs were made in response to comments from other local marine resource management agencies. In addition a professional editor has correct grammatical and typographic errors. These changes were carried over into this EIS.

Comment 11: KAHEA, the 'Ilio 'ulaokalani Coalition, and Environmental Defense commented that the DPEIS and the FEPs call for violations of existing rules and the Executive Orders which established the NWHI Coral Reef Ecosystem Reserve. For example, despite a ban on coral harvesting in the NWHI Reserve and a Record of Decision by NOAA forbidding any such harvest, both the DPEIS (pg. 165) and the FEP for the Hawaiian Archipelago (pg. 117) describe coral harvesting quotas and activities for banks in the NWHI. The DPEIS failed to mention in its description on permitting (pg. 164) that Coral Reef Ecosystem FMP permits may not be issued for the NWHI (to do so would violate the Executive Orders and NMFS rules). Despite the fact that the NWHI lobster fishery is closed under a permanent injunction and Executive Order, there are ten pages of discussion of details regarding the NWHI lobster fishery, including the fact that Wespac rules allow the taking of egg-bearing female lobster and undersized juveniles ("retain all fishery") in the overfished waters of the NWHI (where the spiny lobster population has plummeted) but forbid the take of egg-bearing females and undersized juveniles in the Main Hawaiian Islands .

Response 11: The DPEIS included discussions of NWHI fisheries and applicable MSA fishery regulations. The Executive Orders were never codified under the MSA or any other regulatory authority and significant questions over their applicability remained. However the establishment of the NWHI Marine National Monument has been acknowledged in the EIS, and it has rendered these comments moot. No changes were made in response to this comment.

Comment 12: KAHEA, the ‘Ilio ‘ulaokalani Coalition, and Environmental Defense commented that Wespac utilized public funds to make misleading claims regarding “agency” status. These commentors stated that their understanding is that Wespac is a Council authorized by the Magnuson-Stevens Act and is not a federal agency, therefore it is not liable to face lawsuits for its actions. However, Wespac has apparently been utilizing public funds to declare that it is a federal agency, including in Wespac’s announcement regarding the FEP “public hearings,” published in the Honolulu Advertiser on December 11, 2005. This “Notice of Public Hearings and Public Meetings,” bearing the official Wespac seal , states that “The Council is the policy-making agency for offshore waters around the U.S. Pacific islands.” However, both the State of Hawai`i and the U.S. Fish and Wildlife Service make policy regarding “offshore waters around the U.S. Pacific Islands.” A quick survey of Wespac’s website identifies other occasions when Wespac has distributed press releases and other materials to the public claiming that it is a federal agency (for example in November 2002, March and November, 2005, etc.) At the December 20, “public hearing” in Honolulu, Environmental Defense’s Hawai`i representative asked for clarification from the NOAA Fisheries, Regional Administrator regarding whether Wespac was or was not an agency. The NOAA Administrator responded that Wespac is not a federal agency . No information was forthcoming regarding why the Council continues to misrepresent itself to the public as a federal agency (apparently utilizing federal funds to do so) or what steps NOAA intends to take regarding this misrepresentation and apparent misuse of federal funds.

Response 12: This comment does not address the NEPA analysis or process and no changes were made in response.

Comment 13: U.S. Fish and Wildlife Service (USFWS) commented that although it recognizes that a great amount of work went into producing the DPEIS, but despite the lengthy comments previously expressed by the USFWS and the Department of the Interior and formal agreements between NMFS and the USFWS regarding jurisdictional authorities that were incorporated into the Coral Reef Ecosystem Fishery Management Plan, many of their substantive concerns regarding the UFWS’ exclusive authority to manage fisheries within the boundaries of 10 National Wildlife Refuges (NWRs) in the Central Pacific Ocean remain inadequately addressed and not clearly described in the analysis contained in the DPEIS.

Response 13: NMFS will continue to work closely with the Council, the Department of Interior (USFWS) and the Department of Defense under the MSA’s authorization for NMFS to protect, conserve and manage fishery resources in the U.S. EEZ . NMFS also recognizes that it is not uncommon for multiple agencies to be vested with concurrent management authority involving marine resources and where applicable looks forward to integrated management approaches. Language in the FEPs (and their associated regulations) and this EIS mirrors that in the Coral Reef Ecosystem Fishery Management Plan regarding USFWS jurisdiction. No changes were made in response to this comment.

Comment 14: The USFWS commented that DPEIS Section 1.2.3; Roles and Responsibilities of the Federal Government ..; pg 4; first paragraph; first sentence should be changed to read as follows: "The US. Fish and Wildlife Service manages waters and submerged lands within Baker Island NWR, Howland Island NWR, Jarvis Island NWR, Kingman Reef NWR, Palmyra Atoll NWR, Johnston Island NWR, Rose Atoll NWR, Guam NWR, Midway

Atoll NWR and Hawaiian Islands NWR and provides a comprehensive conservation approach to protect and conserve fish, wildlife and plants and their habitats for the continuing benefit of present and future generations of Americans."

Response 14: Text has been edited in response to this comment.

Comment 15: The USFWS commented that DPEIS Section 1.2.3; Roles and Responsibilities of the Federal Government ...; pg. 4 first paragraph include the following sentence after the first sentence of this paragraph: "Fishing is not allowed in any waters withdrawn as a NWR by the President or Secretary of the Interior unless specifically authorized by regulations issued by the Service." It is essential to include this sentence in the Final PEIS because NMFS agreed to include this clarifying language in the Record of Decision for the Coral Reef Ecosystem Fishery Management Plan (CREFMP) and in subsequent rules and regulations implementing the CREFMP. In addition, this exclusive regulatory authority of the Service to manage fisheries in NWRs applies to all current Fishery Management Plans and is particularly important to include in this PEIS because the establishment of boundaries for Fishery Ecosystem Plans in the Western Pacific Region is the proposed Federal action and categorized as regulatory in this document.

Response 15: Comment acknowledged . Given the status of this issue in discussions between NMFS and USFWS, this section was not changed.

Comment 16: The USFWS commented that DPEIS Section 2.1 Issue 1: Fishery Ecosystem Plan Boundaries (Regulatory); pg 22; first paragraph; last sentence specifically identify the NWRSAA as a law that will be complied with in implementing the proposed action. Thus, the last sentence will read: "These actions will be taken in accordance with the MSA, NEPA, ESA, MMPA, NWRSAA, and other applicable laws and statutes".

Response 16: The issue of jurisdiction remains unresolved and thus no changes were made in response to this comment. However the failure to specifically list any specific law or statute does not mean that it cannot be addressed.

Comment 17: The USFWS commented that DPEIS Section 3.5.1.2 Protected Species; pg 103; Table 20 Title should be modified to read as follows: "Twelve species of migratory seabirds reside at Rose Atoll NWR.

Response 17: Text has been edited.

Comment 18: The USFWS commented that DPEIS Section 3.5.5.1 Baker Island; pg. 153; Social Environment; Baker Island NWR should be corrected to reflect that the Baker Island NWR was established in 1974, not 1936.

Response 18: Text has been edited.

Comment 19: The USFWS commented that the fifth sentence in the above DPEIS section should read as follows: "The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take marine protected area (MPA)." The USFWS also requested that the last sentence be deleted because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. In addition inclusion of the sentence confuses the public as to the extent of the no-take MPA at Baker Island NWR.

Response19: While there is potential overlap, recognizing the Council’s existing management measures and regulations is required. No changes were made in response to this comment.

Comment 20: The USFWS commented that DPEIS Section 3.5.5.2 Howland Island; pg. 155; Social Environment; should be corrected to reflect that the Howland Island NWR was established in 1974, not 1976.

Response 20: Text has been edited.

Comment 21: The USFWS commented that the seventh sentence in the above DPEIS section should read as follows: 'The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take MPA." The USFWS also requested that the last sentence be deleted because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. In addition inclusion of the sentence confuses the public as to the extent of the no-take MPA at Howland Island NWR.

Response 21: While there is potential overlap, recognizing the Council’s existing management measures and regulations is required. No changes were made in response to this comment.

Comment 22: The USFWS commented that DPEIS Section 3.5.5.3 Jarvis Island; pg. 156-157; Social Environment; should be corrected to reflect that the Jarvis Island NWR was established in 1974, not 1976.

Response 22: Text has been edited.

Comment 23: The USFWS commented that the fourth sentence in the above DPEIS section should read as follows: "The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take MPA." The USFWS also requested that the last sentence be deleted because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the true extent of the no-take MPA at Jarvis Island NWR.

Response 23: While there is potential overlap, recognizing the Council’s existing management measures and regulations is required. No changes were made in response to this comment.

Comment 24: The USFWS commented that DPEIS Section 3.5.5.4 Palmyra Atoll; pg. 158; Social Environment should read as follows: 'The Refuge boundary, established by the Secretary of the Interior in 2001, coincides with the 12-nm territorial seas boundary and this area is managed by USFWS as a no-commercial-take MPA." Also, please delete the last sentence because the Council's 50-fathom low-use MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the extent of the no-take MPA at Palmyra Atoll NWR.

Response 24: While there is potential overlap, recognizing the Council’s existing management measures and regulations is required. No changes were made in response to this comment.

Comment 25: The USFWS commented that DPEIS Section 3.5.5.5 Kingman Reef; pg. 159 does not include a "Social Environment" sub-section and fails to identify the existence of Kingman Reef NWR to the public. The USFWS requested that the following sentences be added "Since 2001, Kingman Reef has been a National Wildlife Refuge managed by USFWS. The Refuge boundary, established by the Secretary of the Interior, coincides with the 12-nm territorial seas boundary and this area is managed by USFWS as a no-take MPA." The USFWS also requested that the last sentence be deleted because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the true extent of the no-take MPA at Kingman Reef NWR.

Response 25: A Social Environment section was added for Kingman Reef with the following text: "In 2001, management authority of the refuge was transferred to the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service administers the island as a National Wildlife Refuge and asserts a 12-nautical mile boundary around the atoll. The Coral Reef Ecosystems FMP (69 FR 8336) established a low-use MPA from 0 to 50 fathoms around Kingman Atoll."

Comment 26: The USFWS commented that DPEIS Section 3.5.5.6 Johnston Atoll; pg 161; Social Environment; pg 161 should read as follows "Today, the U.S. Air Force continues to maintain administrative jurisdiction and control over the 3-nm Naval Defensive Sea around Johnston Atoll and access to his area is prohibited."

Response 26: Comment acknowledged. Given the status of this issue in discussions between NMFS, USFWS and the U.S. Navy, this section was not changed.

Comment 27: The USFWS commented that it continues to manage Johnston Atoll as a National Wildlife Refuge and noted that the USFWS rescinded its recreational fishing regulations at Johnston Island NWR because there are no longer any military personnel stationed on Johnston Island. The USFWS also commented that DPEIS Chapter 5 Environmental Management Issues; Section 5.7 Possible Conflicts Between the Alternatives and Other Plans; pg 219 fails to provide a full and objective discussion of significant impacts of the proposed action on the USFWS' ability to manage NWRs as commercial fishing within the Pacific NWRs is an activity that is not allowed by the USFWS. If the DPEIS is implemented as currently written, their ability to manage marine resources within NWR ecosystems will be seriously compromised because activities that would be permitted under the Final PEIS would violate their current management regimes at these NWRs. The USFWS is very concerned that the proposed type of overlapping management regime alluded to in the DPEIS appears to have a strong potential to result in unnecessary duplication of effort, bureaucracy, and expenditures, and be a source of confusion both to the Service and NMFS, as well as to the public. In their view, Council and NMFS pursuit of applying the proposed DPEIS place-based management regime within NWRs has been a misdirection of effort since the NWRSAA requires that the USFWS maintain sole and exclusive management authority over NWRs. To avoid unnecessary conflicts, they recommend that NMFS produce a Final PEIS that includes MPAs that are compatible with and reflective of the management regime currently being implemented by the USFWS within these Pacific NWRs.

Response 27: NMFS will continue to work closely with the Council, the Department of Interior (USFWS) and the Department of Defense under the MSA's authorization for NMFS to protect, conserve and manage fishery resources in the U.S. EEZ. NMFS also recognizes that it is not uncommon for multiple agencies to be vested with concurrent management authority involving marine resources and where applicable looks forward to integrated management approaches. No changes were made in response to this comment.

Comment 28: The USFWS commented that deficiencies in the DPEIS preclude its use as a basis for a meaningful analysis of anticipated impacts to fish and wildlife resources and NWR management under the newly proposed fishery regulatory regime because the DPEIS does not fully analyze the proposed alternatives for their compatibility with the primary purposes for which the relevant NWRs were established. Finally, the USFWS believes that the DPEIS proposes activities that are incompatible with the National Wildlife Refuge System requirements found at 50 CFR 29 and because of this, it appears that the proposed Fishery Ecosystem Plans would also violate the intent of Section 304 of the MSA that fishery plans and their amendments be developed and implemented in compliance with all applicable law. Therefore, they recommend that the Final PEIS include a thorough and complete analysis of the affects of the proposed Federal action on existing NWRs. If these deficiencies are not corrected in the Final PEIS, the USFWS will refer the matter to the Council of Environmental Quality, pursuant to 40 CFR 1504.

Response 28: NMFS believes that the document currently contains a thorough and complete analysis of the federal regulatory actions being proposed (designation of FEP boundaries and MUS lists). NMFS will continue to work closely with the Council, the Department of Interior (USFWS) and the Department of Defense under the MSA's authorization for NMFS to protect, conserve and manage fishery resources in the U.S. EEZ. NMFS also recognizes that it is not uncommon for multiple agencies to be vested with concurrent management authority involving marine resources and where applicable looks forward to integrated management approaches. The DPEIS (and this EIS) describe a framework for beginning an incremental approach to the adoption of EAM in the Western Pacific Region. The DPEIS (and this EIS) seek to describe and address only the first steps in an adaptive management process that will eventually lead to a broader EAM. This process merely creates a framework that can be used to build an ecosystem approach and does not change the present management of these resources. It is expected that future actions to further implement EAM, such as addressing trophic interactions, will require a thorough scientific and management assessment (including NEPA analysis) of their potential impacts. That process will have to be collaborative and interactive across many public, private and governmental spectrums to be successful. No changes were made in response to this comment.

Comment 29: The American Samoa Department of Marine and Wildlife Resources commented that the DPEIS cites the Manua Islands at two different distances from Tutuila (60 and 70 miles) and that it is stated the region is geologically inactive yet a seamount is forming near the Manua Islands.

Response 29: Text has been edited.

CHAPTER 7: REFERENCES

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CHAPTER 8: GLOSSARY

Abyssalpelagic zone: The pelagic environment from a depth of approximately 4,000-7,000 meters.

Adaptive Management: A program that adjusts regulations based on changing conditions of the fisheries and stocks.

Aphotic: Light level modifier of the deep epipelagic ocean ecosystem, and turbid regions of all other waters; areas never reached by natural light.

Archipelago: A group of islands; an expanse of water with scattered islands.

Associated Species: Those species that (a) prey upon the target species, (b) are preyed on by it, (c) compete with it for food, living space, etc., or (d) co-occur in the same fi shing area and are exploited (or accidentally taken) in the same fishery or fisheries.

Atoll: Earthform consisting of a ringlike perimeter reef area, often with a reef islet, enclosing a lagoon area.

Bank: Submerged earthform with a crest at a depth of 20–200 meters in oceanic waters and of 0–5 meters in nearshore and neritic waters.

Barrier Reef: A reef growing offshore from a land mass and separated from the shoreline, often by a lagoon or estuary.

Bathypelagic Zone: The pelagic environment between depths of 1,000 meters and 4,000 meters.

Benthic: 1. Defining a habitat or organism found on the sea bottom 2. Of or pertaining to the seafloor (or bottom) of a water body.

Biological Opinion: A scientifi c assessment issued by the National Marine Fisheries Service or U.S. Fish and Wildlife Service, as required by the Endangered Species Act (ESA) for listed species. Determines the likelihood of an action to jeopardize the existence of a species listed under the ESA.

Biomass: Or standing stock. The total weight of a group (or stock) of living organisms (e.g. fish, plankton) or of some defined fraction of it (e.g. spawners) in an area, at a particular time.

Bycatch: Any fish harvested in a fishery which are not sold or kept for personal use, and includes economic discards and regulatory discards.

Barrier Net: A small-mesh net used to capture coral reef or coastal pelagic fishes.

Bioprospecting: The search for commercially valuable biochemical and genetic resources in plants, animals and microorganisms for use in food production, the development of new drugs and other biotechnology applications.

Charter Fishing: Fishing from a vessel carrying a passenger for hire (as defined in section 2101(21a) of Title 46, United States Code) who is engaged in recreational fishing.

Commercial Fishing: Fishing in which the fish harvested, either in whole or in part, are intended to enter commerce or enter commerce through sale, barter or trade. For the purposes of this Fishery Ecosystem Plan, commercial fishing includes the commercial extraction of biocompounds.

Consensual Management: Decision making process where stakeholders meet and reach consensus on management measures and recommendations.

Coral Reef Ecosystem (CRE): Those species, interactions, processes, habitats and resources of the water column and substrate located within any waters less than or equal to 50 fathoms in total depth.

Council: The Western Pacific Regional Fishery Management Council (WPRFMC).

Critical Habitat: Those geographical areas that are essential for bringing an endangered or threatened species to the point where it no longer needs the legal protections of the Endangered Species Act (ESA), and which may require special management considerations or protection. These areas are designated pursuant to the ESA as having physical or biological features essential to the conservation of listed species.

Dealer: One who buys and sells species in the fisheries management unit without altering their condition.

Dip Net: A hand-held net consisting of a mesh bag suspended from a circular, oval, square or rectangular frame attached to a handle. A portion of the bag may be constructed of material, such as clear plastic, other than mesh.

Ecology: The study of interactions between an organism (or organisms) and its (their) environment (biotic and abiotic).

Ecological Integrity: Maintenance of the standing stock of resources at a level that allows ecosystem processes to continue. Ecosystem processes include replenishment of resources, maintenance of interactions essential for self-perpetuation and, in the case of coral reefs, rates of accretion that are equal to or exceed rates of erosion. Ecological integrity cannot be directly measured but can be inferred from observed ecological changes.

Economic Discards: Coral reef resources that are the target of a fishery but which are not retained because they are of an undesirable size, sex or quality or for other economic reasons.

Ecosystem: A geographically specified system of organisms (including humans), the environment, and the processes that controls its dynamics.

Ecosystem-Based Fishery Management: Fishery management actions aimed at conserving the structure and function of marine ecosystems in addition to conserving fishery resources.

Ecotourism: Observing and experiencing, first hand, natural environments and ecosystems in a manner intended to be sensitive to their conservation.

Environmental Impact Statement (EIS): A document required under the National Environmental Policy Act (NEPA) to assesses alternatives and analyze the impact on the environment of proposed major Federal actions.

Essential Fish Habitat (EFH): Those waters and substrate necessary to a species or species group or complex, for spawning, breeding, feeding or growth to maturity.

Exclusive Economic Zone (EEZ): The zone established by Proclamation numbered 5030, dated March 10, 1983. For purposes of the Magnuson Act, the inner boundary of that zone is a line coterminous with the seaward boundary of each of the coastal states, commonwealths, territories or possessions of the United States.

Exporter: One who sends species in the fishery management unit to other countries for sale, barter or any other form of exchange (also applies to shipment to other states, territories or islands).

Fish: Finfish, mollusks, crustaceans and all other forms of marine animal and plant life other than marine reptiles, marine mammals and birds.

Fishery: One or more stocks of fish that can be treated as a unit for purposes of conservation and management and that are identified on the basis of geographical, scientific, technical, recreational and economic characteristics; and any fishing for such stocks.

Fishing: The catching, taking or harvesting of fish; the attempted catching, taking or harvesting of fish; any other activity that can reasonably be expected to result in the catching, taking or harvesting of fish; or any operations at sea in support of, or in preparation for, any activity described in this definition. Such term does not include any scientific research activity that is conducted by a scientific research vessel.

Fishing Community: A community that is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs and includes fishing vessel owners, operators and crews and United States fish processors that are based in such community.

Food Web: Inter-relationships among species that depend on each other for food (predator-prey pathways).

Framework Measure: Management measure listed in an FMP for future consideration. Implementation can occur through an administratively simpler process than a full FMP amendment.

Ghost Fishing: The chronic and/or inadvertent capture and/or loss of fish or other marine organisms by lost or discarded fishing gear.

Habitat: Living place of an organism or community, characterized by its physical and biotic properties.

Habitat Area of Particular Concern (HAPC): Those areas of EFH identified pursuant to Section 600.815(a)(9). In determining whether a type or area of EFH should be designated as a HAPC, one or more of the following criteria must be met: (1) ecological function provided by the habitat is important; (2) habitat is sensitive to human-induced environmental degradation; (3) development activities are, or will be, stressing the habitat type; or (4) the habitat type is rare.

Harvest: The catching or taking of a marine organism or fishery MUS by any means.

Hook-and-line: Fishing gear that consists of one or more hooks attached to one or more lines.

Live Rock: Any natural, hard substrate (including dead coral or rock) to which is attached, or which supports, any living marine life-form associated with coral reefs.

Longline: A type of fishing gear consisting of a main line which is deployed horizontally from which branched or dropper lines with hooks are attached.

Low-Use MPA: A Marine Protected Area zoned to allow limited fishing activities.

Main Hawaiian Islands (MHI): The islands of the Hawaiian islands archipelago consisting of Niihau, Kauai, Oahu, Molokai, Lanai, Maui, Kahoolawe, Hawaii and all of the smaller associated islets lying east of 161°20' W longitude.

Marine Protected Area (MPA): An area designated to allow or prohibit certain fishing activities.

Maximum Sustainable Yield (MSY): The largest long-term average catch or yield that can be taken, from a stock or stock complex under prevailing ecological and environmental conditions.

National Marine Fisheries Service (NMFS): The component of the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, responsible for the conservation and management of living marine resources. Also known as NOAA Fisheries Service.

No-Take MPA: A Marine Protected Area where no fishing or removal of living marine resources is authorized.

Northwestern Hawaiian Islands (NWHI): the islands of the Hawaiian islands archipelago lying to the west of 161°20'W longitude.

Optimum Yield (OY): With respect to the yield from a fishery "optimum" means the amount of fish that: (a) 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; (b) is prescribed as such on the basis of the MSY from the fishery, as reduced by any relevant economic, social or ecological factor; and (c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery.

Overfishing: Fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield on a continuing basis.

Pacific Remote Island Areas (PRIAs): Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Wake Island and Palmyra Atoll.

Passive Fishing Gear: Gear left unattended for a period of time prior to retrieval (e.g., traps, gill nets).

Precautionary Approach: The implementation of conservation measures even in the absence of scientific certainty that fish stocks are being overexploited.

Recruitment: A measure of the weight or number of fish which enter a defined portion of the stock such as fishable stock (those fish above the minimum legal size) or spawning stock (those fish which are sexually mature).

Reef: A ridgelike or moundlike structure built by sedentary calcareous organisms and consisting mostly of their remains. It is wave-resistant and stands above the surrounding sediment. It is characteristically colonized by communities of encrusting and colonial invertebrates and calcareous algae.

Reef-obligate Species: An organism dependent on coral reefs for survival.

Regulatory Discards: Any species caught that fishermen are required by regulation to discard whenever caught, or are required to retain but not sell.

Resilience: The ability of a population or ecosystem to withstand change and to recover from stress (natural or anthropogenic).

Restoration: The transplanting of live organisms from their natural habitat in one area to another area where losses of, or damage to, those organisms has occurred with the purpose of restoring the damaged or otherwise compromised area to its original, or a substantially improved, condition; additionally, the altering of the physical characteristics (e.g., substrate, water quality) of an area that has been changed through human activities to return it as close as possible to its natural state in order to restore habitat for organisms.

Rock: Any consolidated or coherent and relatively hard, naturally formed, mass of mineral matter.

Rod-and-Reel: A hand-held fishing rod with a manually or electrically operated reel attached.

Scuba-assisted Fishing: Fishing, typically by spear or by hand collection, using assisted breathing apparatus.

Secretary: The Secretary of Commerce or a designee.

Sessile: Attached to a substrate; non-motile for all or part of the life cycle.

Slurp Gun: A self-contained, typically hand-held, tube–shaped suction device that captures organisms by rapidly drawing seawater containing the organisms into a closed chamber.

Social Acceptability: The acceptance of the suitability of management measures by stakeholders, taking cultural, traditional, political and individual benefits into account.

Spear: A sharp, pointed, or barbed instrument on a shaft, operated manually or shot from a gun or sling.

Stock Assessment: An evaluation of a stock in terms of abundance and fishing mortality levels and trends, and relative to fishery management objectives and constraints if they have been specified.

Stock of Fish: A species, subspecies, geographical grouping or other category of fish capable of management as a unit.

Submersible: A manned or unmanned device that functions or operates primarily underwater and is used to harvest fish.

Subsistence Fishing: Fishing primarily to obtain food for personal use rather than for sale or recreation.

Target Resources: Species or taxa sought after in a directed fishery.

Trophic Web: A network that represents the predator/prey interactions of an ecosystem.

Trap: A portable, enclosed, box-like device with one or more entrances used for catching and holding fish or marine organism.

Western Pacific Regional Fishery Management Council (WPRFMC or Council): Representatives from the State of Hawaii, the Territories of American Samoa and Guam and the Commonwealth of the Northern Mariana Islands with authority over the fisheries in the Pacific Ocean seaward of the State of Hawaii, the Territory of American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands and the Pacific Remote Island Areas.

Appendix A: List of Current and Preferred Management Unit Species under Alternative 2D

Table A-1: Current Bottomfish and Seamount Groundfish FMP MUS.

Scientific Name	English Common Name	Scientific Name	English Common Name
Aphareus rutilans	Silver jaw jobfish	*Pristipomoides auricilla*	Yellowtail snapper
Aprion virescens	Gray jobfish	*P. filamentosus*	Pink snapper
Caranx ignobilis	Giant trevally	*P. flavipinnis*	Yelloweye snapper
C. lugubris	Black jack	*P. seiboldii*	Pink snapper
Epinephelus fasciatus	Blacktip grouper	*P. zonatus*	Snapper
E. quernus	Sea bass	*Pseudocaranx dentex*	Thicklip trevally
Etelis carbunculus	Red snapper	*Seriola dumerili*	Amberjack
E. coruscans	Longtail snapper	*Variola louti*	Lunartail grouper
Lethrinus amboinensis	Ambon emperor	*Beryx splendens*	Alfonsin
L. rubrioperculatus	Redgill emperor	*Hyperoglyphe japonica*	Ratfish
Lutjanus kasmira	Blue stripe snapper	*Pseudopentaceros richardsoni*	Armorhead

Table A-2: Current Crustaceans FMP MUS

Scientific Name	English Common Name
Panulirus marginatus	Spiny lobster
Panulirus penicillatus	Spiny lobster
Family Scyllaridae	Slipper lobster
Ranina ranina	Kona crab

Table A-3: Current Precious Corals FMP MUS

Scientific Name	English Common Name	Scientific Name	English Common Name
Corallium spp.	Any coral of the genus *Corallium*	*Calyptrophora* spp.	Gold coral
Corallium secundum	Pink coral (also known as red coral)	*Lepidisis olapa*	Bamboo coral

Corallium regale	Pink coral (also known as red coral)	*Acanella* spp.	Black coral
Corallium laauense	Pink coral (also known as red coral)	*Antipathes dichotoma*	Black coral
Gerardia spp.	Gold coral	*Antipathes grandis*	Black coral
Narella spp.	Gold coral	*Antipathes ulex*	Black coral

Table A-4: Current Pelagics FMP MUS.

Scientific Name	English Common Name	Scientific Name	English Common Name
Coryphaena spp.	Mahimahi (dolphinfishes)	*Isurus oxyrinchus*	Shortfin mako shark
Acanthocybium solandri	Wahoo	*Isurus paucus*	Longfin mako shark
Makaira mazara: M. indica	Indo-Pacific blue marlin, black marlin	*Lamna ditropis*	Salmon shark
Tetrapturus audax	Striped marlin	*Thunnus alalunga*	Albacore
T. angustirostris	Shortbill spearfish	*T. obesus*	Bigeye tuna
Xiphias gladius	Swordfish	*T. albacares*	Yellowfin tuna
Istiophorus platypterus	Sailfish	*T. thynnus*	Northern bluefin tuna
Alapias pelagicus	Pelagic thresher shark	*Katsuwonus pelamis*	Skipjack tuna
Alopias superciliousus	Bigeye thresher shark	*Euthynnus affinis*	Kawakawa
Alopias vulpinus	Common thresher shark	*Lampris* spp.	Moonfish
Carcharhinus falciformis	Silky shark	*Gempylidae*	Oilfish family
Carcharhinus longimanus	Oceanic whitetip shark	family *Bramidae*	Pomfret
Prionace glauca	Blue shark	*Auxis* spp., *Scomber* spp., *Allothunus* spp.	Other tuna relatives

TableA-5: Current Coral Reef Ecosystems FMP MUS (currently harvested taxa).

Scientific Name	English Common Name	Scientific Name	English Common Name
Carcharhinidae Sphyrnidae	Sharks	*Scaridae*	Parrotfishes
Carangidae	Jacks and scads	*Pomacentridae*	Damselfishes
Serrandiae	Groupers	*Siganidae*	Rabbitfishes
Lutjanidae	Snappers	*Sphyraenidae*	Barracudas
Lethrinidae	Emperors	*Pomacanthidae*	Angelfishes
Acanthuridae	Surgeonfishes	*Cirrhitidae*	Hawkfishes
Balistidae	Trigger fishes	*Dasyatididae* *Myliobatidae* *Mobulidae*	Rays and skates
Holocentridae	Solderfishes and squirrel-fishes	*Ephippidae*	Batfishes
Kuhliidae	Flagtails	*Monodactylidae*	Monos
Kyphosidae	Rudderfishes	*Haemulidae*	Sweetlips
Labridae	Wrasses	*Echineididae*	Remoras
Mullidae	Goatfishes	*Malacanthidae*	Tilefishes
Mugilidae	Mullets	*Acanthoclinidae*	Spiny basslets
Muraenidae *Chlopsidae* *Congridae* *Moringuidae* *Ophichthidae*	Eels	*Pseudochromidae*	Dottybacks
Polynemidae	Threadfins	*Apogonidae*	Cardinalfishes
Blenniidae	Blennies	*Scorpaenidae*	Scorpionfishes
Bothidae *Soleidae* *Pleurnectidae*	Flounders and Soles	*Pinguipedidae*	Sandperches
Ostraciidae	Trunkfishes	*Caracanthidae*	Coral crouchers
Tetradontidae	Puffer fishes and Porcupine fishes	*Antennariidae*	Frogfishes
Plesiopidae	Prettyfins	*Caesionidae*	Fusiliers
Tetrarogide	Waspfishes	*Grammistidae*	Soapfishes

Table A-6: Coral Reef Ecosystems FMP MUS (potentially harvested taxa).

Scientific Name	English Common Name		Scientific Name	English Common Name
Syngnathidae	Pipefishes and seahorses		*Anomalopidae*	Flashlightfishes
Aulostomidae	Trumpetfishes		*Clupeidae*	Herrings
Fistulariidae	Cornetfishes		*Engraulidae*	Anchovies
Monocanthidae	Filefishes		*Gobiidae*	Gobies
Chaetodontidae	Butterfly fishes		*Gymnosarda unicolor*	Dog tooth tuna
Order: Stomatopoda Order: Decapoda	**Reef-Associated Crustaceans:** Lobsters Shrimps/Mantis Crabs		*Holothuridae* *Diadematidae*	**Reef-Associated Echinoderms:** Sea cucumbers and sea urchins
Octopodidae *Sepiidae* *Loliginidae*	**Reef-Associated Cephalopods:** Octopus Squids Cuttlefish		*Turbinidae* *Trochidae* *Strombidae* *Cypraeidae*	**Reef-Associated Gastropods:** Turban shells Top shells Sea snails Sea slugs Conchs Cowries
Ostreidae *Tridacnidae*	**Reef-Associated Bivalves:** Oysters Clams		*Sabellidae* Annelids	**Reef-Associated Worms:** Segmented worms Flatworms Bristleworms ribbonworms Feather duster worms
Class: *Cyanophyta* Class: *Chlorophyta* Class: *Rhodophyta* Class: *Phaeophyta*	**Reef-Associated Algae:** Blue-green algae Green algae Red algae Brown algae		*Porifera*	**Reef-Associated Sponges:**
Heliopora Tubipora Azooxanthellates Fungiidae Millepora	**All Reef-Associated Stony Corals and Live Rock:**		Gorgonians Actinaria Zoanthinaria Stylasteridae Solanderidae	**Other Reef-Associated Stony Corals and Live Rock:**

Phylum: *Coelenterata* (Cnidaria)	**Reef-Associated Hydrozoans and Bryzoans:**		*Chordata*	**Reef-Associated Tunicates:** Sea squirts
Note. All other Coral Reef Ecosystem MUS that are marine plants, invertebrates, and fishes that spend the majority of their nonpelagic (postsettlement) life history stages within waters less than or equal to 50 fathoms in total depth.				

Table A-7: Alternative 2B, American Samoa Archipelago FEP MUS (Preferred).

American Samoa Bottomfish Management Unit Species		
Scientific Name	**English Common Name**	**Samoan Name**
Aphareus rutilans	red snapper/silvermouth	palu-gutusiliva
Aprion virescens	gray snapper/jobfish	asoama
Caranx ignobilis	Giant trevally/jack	sapoanae
Caranx lugubris	Black trevally/jack	tafauli
Epinephelus fasciatus	blacktip grouper	fausi
Variola louti	lunartail grouper	papa, velo
Etelis carbunculus	red snapper	palu malau
Etelis coruscans	red snapper	palu-loa
Lethrinus amboinensis	ambon emperor	filoa-gutumumu
Lethrinu rubrioperculatus	redgill emperor	filoa-paomumu
Lutjanus kasmira	blueline snapper	savane
Pristipomoides auricilla	yellowtail snapper	palu-i’usama
Pristipomoides filamentosus	pink snapper	palu-‘ena’ena
Pristipomoides flavipinnis	yelloweye snapper	palu-sina
Pristipomoides seiboldii	pink snapper	palu
Pristipomoides zonatus	Snapper	palu-ula, palu-sega
Seriola dumerili	Amberjack	Malauli

American Samoa Crustacean Management Unit Spcies		
Scientific Name	**English Common Name**	**Samoan Name**
Panulirus marginatus	spiny lobster	ula
Panulirus penicillatus	spiny lobster	ula-sami
Family Scyllaridae	slipper lobster	papata
Ranina ranina	kona crab	pa'a

American Samoa Precious Coral Management Unit Species		
Scientific Name	**English Common Name**	**Samoan Name**
Corallium secundum	pink coral (also known as red coral)	amu piniki-mumu
Corallium regale	pink coral (also known as red coral)	amu piniki-mumu
Corallium laauense	pink coral (also known as red coral)	amu piniki-mumu
Gerardia spp.	gold coral	amu auro
Narella spp.	gold coral	amu auro
Calyptrophora spp.	gold coral	amu auro
Lepidisis olapa	bamboo coral	amu ofe
Acanella spp.	bamboo coral	amu ofe
Antipathes dichotoma	black coral	amu uliuli
Antipathes grandis	black coral	amu uliuli
Antipathes ulex	black coral	amu uliuli

American Samoa Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Samoan Name**
Acanthuridae (Surgeonfishes)	Acanthurus olivaceus	orange-spot surgeonfish	afinamea
	Acanthurus xanthopterus	yellowfin surgeonfish	**
	Acanthurus triostegus	convict tang	aanini
	Acanthurus dussumieri	eye-striped surgeonfish	**
	Acanthurus nigroris	blue-lined surgeon	ponepone, gaitolama
	Acanthurus lineatus	blue-banded surgeonfish	alogo
	Acanthurus nigricauda	blackstreak surgeonfish	pone-i'usama
	Acanthurus nigricans	whitecheek surgeonfish	laulama,

American Samoa Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Samoan Name**
	Acanthurus guttatus	white-spotted surgeonfish	maogo
	Acanthurus blochii	ringtail surgeonfish	**
	Acanthurus nigrofuscus	brown surgeonfish	ponepone
	Acanthurus mata	elongate surgeonfish	**
	Acanthurus pyroferus	mimic surgeonfish	**
	Ctenochaetus strigosus	yellow-eyed surgeonfish	pone
	Ctenochaetus striatus	striped bristletooth	pone, pala'ia, logoulia
	Ctenochaetus binotatus	twospot bristletooth	**
	Naso unicornus	bluespine unicornfish	ume-isu
	Naso lituratus	orangespine unicornfish	ili'ilia, umelei
	Naso hexacanthus	black tongue unicornfish	**
	Naso vlamingii	bignose unicornfish	ume-masimasi
	Naso annulatus	whitemargin unicornfish	**
	Naso brevirostris	spotted unicornfish	ume-ulutao
	Naso thynnoides	barred unincornfish	**
Balistidae (Triggerfishes)	*Balistoides viridescens*	titan triggerfish	sumu, sumu-laulau
	Balistapus undulatus	orangstriped triggerfish	**
	Melichthys vidua	pinktail triggerfish	sumu-'apa'apasina, sumu-si'umumu
	Melichthys niger	black triggerfish	sumu-uli
	Pseudobalistes fuscus	blue Triggerfish	sumu-laulau
	Rhinecanthus aculeatus	picassofish	sumu-uo'uo, sumu-aloalo
	Sufflamen fraenatum	bridled triggerfish	sumu-gase'ele'ele
	Selar crumenophthalmus	bigeye scad	atule
	Decapterus macarellus	mackerel scad	atuleau, namuauli
Carcharhinidae (Sharks)	*Carcharhinus amblyrhynchos*	grey reef shark	malie-aloalo
	Carcharhinus albimarginatus	silvertip shark	aso
	Carcharhinus galapagensis	galapagos shark	malie
	Carcharhinus melanopterus	blacktip reef shark	apeape, malie-alamata
	Triaenodon obesus	whitetip reef shark	malu
Holocentridae (Soldierfish/Squir-relfish	*Myripristis berndti*	bigscale soldierfish	malau-ugatele, malau-va'ava'a
	Myripristis adusta	bronze soldierfish	malau-tui
	Myripristis murdjan	blotcheye soldierfish	**
	Myripristis amaena	brick soldierfish	**
	Myripristis pralinia	scarlet soldierfish	malau-mamo, malau-va'ava'a.
	Myripristis violacea	violet soldierfish	malau-tuauli

American Samoa Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Samoan Name**
Holocentridae (Soldierfish/ Squirrelfish)	*Myripristis vittata*	whitetip soldierfish	**
	Myripristis chryseres	yellowfin soldierfish	**
	Myripristis kuntee	pearly soldierfish	malau-pu'u
	Myripristis hexagona	double tooth squirrelfish	**
	Sargocentron melanospilos	blackspot squirrelfish	**
	Sargocentron microstoma	file-lined squirrelfish	malau-tianiu
	Sargocentron tiereoides	pink squirrelfish	**
	Sargocentron diadema	crown squirrelfish	malau-tui, malau-talapu'u, malau-tusitusi, malau-pauli.
	Sargocentron punctatissimum	peppered squirrelfish	**
	Sargocentron tiere	blue-lined squirrelfish	**
	Sargocentron spiniferum	Saber or Long jaw squirrelfish	tamalu, mu-malau, malau-toa
	Neoniphon spp.	spotfin squirrelfish	**
Kuhliidae (Flagtails)	*Kuhlia mugil*	barred flag-tail	safole, inato
	Kyphosus biggibus	rudderfish	nanue
Kyphosidae (Rudderfish)	*Kyphosus cinerascens*	rudderfish	nanue, mata-mutu, mutumutu.
	Kyphosus vaigienses	rudderfish	nanue
Labridae (Wrasses)	*Cheilinus undulatus*	napoleon wrasse	lalafi, tagafa. malakea
	Cheilinus trilobatus	triple-tail wrasse	lalafi-matamumu
	Cheilinus chlorourus	floral wrasse	lalafi-matapua'a
	Cheilinus fasciatus	harlequin tuskfish	lalafi-pulepule
	Oxycheilinus diagrammus	bandcheek wrasse	sugale
	Oxycheilinus arenatus	arenatus wrasse	sugale
	Xyrichtys aneitensis	whitepatch wrasse	sugale-tatanu
	Cheilio inermis	cigar wrasse	sugale-mo'o
	Hemigymnus melapterus	blackeye thicklip	sugale-laugutu, sugale-uli, sugale-aloa, sugale-lupe.
	Hemigymnus fasciatus	barred thicklip	sugale-gutumafia
	Halichoeres trimaculatus	three-spot wrasse	lape, sugale-pagota
	Halichoeres hortulanus	checkerboard wrasse	sugale-a'au, sugale-pagota, ifigi
	Halichoeres margaritaceus	weedy surge wrasse	sugale-uluvela
	Thalassoma purpureum	surge wrasse	uloulo-gatala, patagaloa
	Thalassoma quinquevittatum	red ribbon wrasse	lape-moana
	Thalassoma lutescens	sunset wrasse	sugale-samasama
	Novaculichthys taeniourus	rockmover wrasse	sugale-la'o, sugale-

American Samoa Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Samoan Name**
			taili, sugale-gasufi.
Mullidae (Goatfishes)	*Mulloidichthys spp.*	yellow goatfish	i'asina, vete, afulu
	Mulloidichthys vanicolensis	yellowfin goatfish	vete
	Mulloidichthys flaviolineatus	yellowstripe goatfish	afolu, afulu
	Parupeneus spp	banded goatfish	afoul, afulu
	Parupeneus barberinus	dash-dot goatfish	tusia, tulausaena, ta'uleia
	Parupeneus bifasciatus	doublebar goatfish	matulau-moana
	Parupeneus heptacanthus	redspot goatfish	moana-ula
	Parupeneus cyclostomas	yellowsaddle goatfish	i'asina, vete, afulu, moana
	Parupeneus pleurostigma	side-spot goatfish	matulau-ilamutu
	Parupeneus multifaciatus	multi-barred goatfish	i'asina, vete, afulu
Mugilidae (Mullets)	*Crenimugil crenilabis*	fringelip mullet	anae, aua. Fuafua
	Neomyxus leuciscus	false mullet	moi, poi
Muraenidae (Moray eels)	*Gymnothorax flavimarginatus*	yellowmargin moray eel	pusi
	Gymnothorax javanicus	giant moray eel	maoa'e
	Gymnothorax undulatus	undulated moray eel	pusi-pulepule
Octopodidae (Octopus)	*Octopus cyanea*	octopus	fe'e
	Octopus ornatus	octopus	fe'e
Polynemidae	*Polydactylus sexfilis*	threadfin	umiumia, i'ausi
Pricanthidae (Bigeye)	*Heteropriacanthus cruentatus*	glasseye	matapula
	Priacanthus hamrur	bigeye	matapula
Scaridae (Parrotfishes)	*Calotomus carolinus*	stareye parrotfish	fuga
	Scarus spp.	parrotfish	fuga, galo-uluto'I, fuga-valea, laea-mamanu
	Hipposcarus longiceps	pacific longnose parrotfish	ulapokea, laea-ulapokea
Scombridae	*Gymnosarda unicolor*	dogtooth tuna	tagi
Siganidae (Rabbitfish)	*Siganus aregenteus*	forktail rabbitfish	loloa, lo
Sphyraenidae (Barracuda)	*Sphyraena helleri*	heller's barracuda	sapatu
	Sphyraena barracuda	great Barracuda	saosao
Turbinidae (green snails	*Turbo spp.*	green snails	alili

American Samoa Coral Reef Ecosytem Management Unit Species (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Samoan Name**
Labridae	Wrasses (those species not listed as CHCRT)	sugale, sugale-vaolo, sugale-a'a, lalafi, lape-a'au, la'ofia
Carcharhinidae Sphyrnidae	sharks (those species not listed as CHCRT)	malie, apoapo, moemoeao
Dasyatididae Myliobatidae	rays and skates	fai
Ephippidae	batfishes	pe'ape'a
Haemulidae	sweetlips	mutumutu, misimisi, ava'ava-moana
Echeneidae	remoras	talitaliuli
Malacanthidae	tilefishes	mo'o, mo'otai
Pseudochromidae	dottybacks	tiva
Plesiopidae	prettyfins	aneanea, tafuti
Caracanthidae	coral crouchers	tapua
Anomalopidae	flashlightfishes	##
Serrandiae	groupers (those species not listed as CHCRT or BMUS)	gatala, ataata, vaolo, gatala-uli, gatala-sega, gatala-aleva, ateate, apoua, susami, gatala-sina, gatala-mumu.
Carangidae	jacks and scads (those species not listed as CHCRT or BMUS)	lupo, lupota, mamalusi, ulua, sapoanae, taupapa, nato, filu, atuleau, malauli-apamoana, malauli-sinasama, malauli-matalapo'a, lai
Holocentridae	soldierfishes and squirrelfishes (those species not listed as CHCRT)	malau
Mullidae	goatfishes (those species not listed as CHCRT)	i'asina, vete, afulu, afoul, ulula'oa
Acanthuridae	surgeonfishes (those species not listed as CHCRT)	pone, palagi
Clupeidae	herrings	pelupelu, nefu
Engraulidae	anchovies	nefu, file

American Samoa Coral Reef Ecosytem Management Unit Species (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Samoan Name**
Gobiidae	gobies	mano'o, mano'o-popo, mano'o-fugafuga, mano'o-apofusami, mano'o-a'au.
Lutjanidae	snappers (those species not listed as CHCRT or BMUS)	mu, mu-taiva, tamala, malai, feloitega, mu-mafalaugutu, savane-ulusama, matala'oa.
Balistidae	trigger fishes (those species not listed as CHCRT)	sumu, sumu-papa, sumu-taulau.
Siganidae	rabbitfishes (those species not listed as CHCRT)	lo
Kyphosidae	rudderfishes (those species not listed as CHCRT)	nanue, matamutu, mutumutu
Caesionidae	fusiliers	ulisega, atule-toto
Lethrinidae	emperors (those species not listed as CHCRT or BMUS)	filoa, mata'ele'ele, ulamalosi
Muraenidae Chlopsidae Congridae Moringuidae Ophichthidae	eels (those species not listed as CHCRT)	pusi, maoa'e, atapanoa, u'aulu, apeape, fafa, gatamea, pusi-solasulu.
Apogonidae	cardinalfishes	fo, fo-tusiloloa, fo-si'umu, fo-loloa, fo-tala, fo-manifi, fo-aialo, fo-tuauli.
Zanclidae spp.	moorish idols	pe'ape'a, laulaufau
Chaetodontidae	butterfly fishes	tifitifi, si'u, i'usamasama, tifitifi-segaula, laulafau-laumea, alosina.
Pomacanthidae	angelfishes	tu'u'u, tu'u'u-sama, tu'u'u-lega, tu'u'u-ulavapua, tu'u'u-matamalu, tu'u'u-alomu, tu'u'u-uluvela, tu'u'u-atugauli, tu'u'u-tusiuli, tu'u'u-manini.
Pomacentridae	damselfishes	tu'u'u, mutu, mamo, tu'u'u-lumane.
Scorpaenidae	scorpionfishes	i'atala, la'otele, nofu
Blenniidae	blennies	mano'o, mano'o-mo'o, mano'o-palea, mano'o-la'o.

American Samoa Coral Reef Ecosytem Management Unit Species (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Samoan Name**
Sphyraenidae spp	barracudas (those species not listed as CHCRT)	sapatu
Cirrhitidae	hawkfishes (those species not listed as CHCRT)	la'o, ulutu'i, lausiva
Antennariidae	frogfishes	la'otale, nofu
Syngnathidae	pipefishes and seahorses	##
Pinguipedidae	sandperches	ta'oto
Gymnosarda unicolor	dog tooth tuna	tagi
Aulostomus chinensis	trumpetfish	taoto-ena, taoto-sama, 'au'aulauti, taotito
Fistularia commersoni	cornetfish	taotao, taoto-ama
Tetradontidae	puffer fishes and porcupine fishes	sue, sue-vaolo, sue-va'a, sue-lega, sue-mu, sue-uli, sue-lape, sue-afa, sue-sugale.
Bothidae Soleidae	flounders and soles	ali
Ostraciidae	trunkfishes	moamoa
Echinoderms	sea cucumbers and sea urchins	fugafuga, tuitui, sava'e
Heliopora	blue corals	amu
Tubipora	organpipe corals	amu
Azooxanthellates	ahermatypic corals	**
Fungiidae	mushroom corals	amu
	small and large coral polyps	amu
Millepora	fire corals	amu
	soft corals and gorgonians	amu
Actinaria	Anemones	lumane, matalelei
Zoanthinaria	soft zoanthid corals	**
Mollusca	(those species not listed as CHCRT)	##
Gastropoda	sea snails	sisi-sami
Trochus spp.		aliao, alili
Opistobranches	sea slugs	sea
Pinctada margaritifera	black lipped pearl oyster	##
Tridacnidae	giant clam	faisua
Other Bivalves	other Clams	pipi, asi, fatuaua, tio, pae, fole

American Samoa Coral Reef Ecosytem Management Unit Species (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Samoan Name**
Crustaceans	lobsters, shrimps/mantis shrimps, true crabs and hermit crabs (those species not listed as Crustacean MUS)	ula, pa'a, kuku, papata
Tunicates	sea squirts	##
Porifera	Sponges	##
Stylasteridae	lace corals	amu
Solanderidae	Hydroid corals	amu
Annelids	segmented worms (those species not listed as CHCRT)	##
Algae	seaweed	limu
Live rock		##
All other coral reef ecosystem management unit species that are marine plants, invertebrates, and fishes which spend the majority of their non-pelagic (post settlement) life history stages within waters less than or equal to 50 fathoms in total depth.		

Samoan names provided by Fini Aitaoto

Table A-8: Alternative 2B, Marianas Archipelago FEP MUS (Preferred).

Marianas Bottomfish Management Unit Species		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Aphareus rutilans	red snapper/silvermouth	lehi/maroobw
Aprion virescens	gray snapper/jobfish	gogunafon/aiwe
Caranx ignobilis	giant trevally/jack	tarakitu/etam
Caranx lugubris	black trevally/jack	tarakiton attelong/orong
Epinephelus fasciatus	blacktip grouper	gadao/meteyil
Variola louti	lunartail grouper	bueli/bwele
Etelis carbunculus	red snapper	buninas agaga/ falaghal moroobw
Etelis coruscans	red snapper	buninas/taighulupegh
Lethrinus rubrioperculatus	redgill emperor	mafuti/atigh
Lutjanus kasmira	blueline snapper	funai/saas
Pristipomoides auricilla	yellowtail snapper	buninas/ falaghal-maroobw

Marianas Bottomfish Management Unit Species		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Pristipomoides filamentosus	Pink snapper	buninas/ falaghal-maroobw
Pristipomoides flavipinnis	yelloweye snapper	buninas/ falaghal-maroobw
Pristipomoides seiboldii	Pink snapper	NA
Pristipmoides zonatus	Snapper	buninas rayao amiriyu/ falaghal-maroobw
Seriola dumerili	Amberjack	tarakiton tadong/ meseyugh

Marianas Crustacean Management Unit Species		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Panulirus marginatus	spiny lobster	mahongang
Panulirus penicillatus	spiny lobster	mahongang
Family Scyllaridae	slipper lobster	pa'pangpang
Ranina ranina	Kona crab	NA

Marianas Precious Corals Management Unit Species		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Corallium secundum	pink coral (also known as red coral)	NA
Corallium regale	pink coral (also known as red coral)	NA
Corallium laauense	pink coral (also known as red coral)	NA
Gerardia spp.	gold coral	NA
Narella spp.	gold coral	NA
Calyptrophora spp.	gold coral	NA
Lepidisis olapa	bamboo coral	NA
Acanella spp.	bamboo coral	NA
Antipathes dichotoma	black coral	NA

Marianas Precious Corals Management Unit Species		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Antipathes grandis	black coral	NA
Antipathes ulex	black coral	NA

Marianas Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Chamorro/Carolinian Name**
Acanthuridae (Surgeonfishes)	*Acanthurus olivaceus*	orange-spot surgeonfish	NA
	Acanthurus xanthopterus	yellowfin surgeonfish	hugupao dangulo/ mowagh
	Acanthurus triostegus	convict tang	kichu/limell
	Acanthurus leucopareius	whitebar surgeonfish	NA
	Acanthurus lineatus	blue-banded surgeonfish	hiyok/filaang
	Acanthurus nigricauda	blackstreak surgeonfish	NA
	Acanthurus nigricans	whitecheek surgeonfish	NA
	Acanthurus guttatus	white-spotted surgeonfish	NA
	Acanthurus blochii	ringtail surgeonfish	NA
	Acanthurus pyroferus	mimic surgeonfish	NA
	Zebrasoma flavescens	Yellow tang	NA
	Ctenochaetus striatus	striped bristletooth	NA
	Ctenochaetus binotatus	twospot bristletooth	NA
	Naso unicornus	bluespine unicornfish	tataga/igh-falafal
	Naso lituratus	orangespine unicornfish	hangon/bwulaalay
	Naso tuberosus	humpnose unicornfish	NA
	Naso hexacanthus	black tongue unicornfish	NA
	Naso vlamingii	bignose unicornfish	NA
	Naso annulatus	whitemargin unicornfish	NA
	Naso brevirostris	spotted unicornfish	NA
	Naso caesius	gray unicornfish	NA
Balistidae (Triggerfishes)	*Balistoides viridescens*	titan triggerfish	NA

	Balistoides conspicillum	clown triggerfish	NA
	Balistapus undulatus	orangstriped triggerfish	NA
	Melichthys vidua	pinktail triggerfish	NA
	Melichthys niger	black triggerfish	NA
Carangidae (Jacks)	*Selar crumenophthalmus*	bigeye scad	atulai/peti
	Decapterus macarellus	mackerel scad	NA
Carcharhinidae (Sharks)	*Carcharhinus amblyrhynchos*	grey reef shark	NA
	Carcharhinus albimarginatus	silvertip shark	NA
	Carcharhinus galapagensis	Galapagos shark	NA
	Carcharhinus melanopterus	blacktip reef shark	NA
	Triaenodon obesus	whitetip reef shark	NA
Holocentridae (Solderfish/ Squirrelfish	*Myripristis berndti*	bigscale soldierfish	saksak/Mweel
	Myripristis adusta	bronze soldierfish	sagamelon
	Myripristis murdjan	blotcheye soldierfish	sagamelon
	Myripristis amaena	brick soldierfish	sagamelon
	Myripristis pralinia	scarlet soldierfish	sagamelon
	Myripristis violacea	violet soldierfish	sagamelon
	Myripristis vittata	whitetip soldierfish	sagamelon
	Myripristis chryseres	yellowfin soldierfish	sagamelon
	Myripristis kuntee	pearly soldierfish	sagamelon
	Sargocentron caudimaculatum	tailspot squirrelfish	sagamelon
	Sargocentron diadema	crown squirrelfish	chalak
	Sargocentron tiere	blue-lined squirrelfish	sagsag/leet
	Sargocentron spiniferum	saber or long jaw squirrelfish	sisiok
	Neoniphon spp.	spotfin squirrelfish	sagsag/Leet
Kuhliidae (Flagtails)	*Kuhlia mugil*	barred flag-tail	NA
Kyphosidae (Rudderfish)	*Kyphosus biggibus*	rudderfish	guili
	Kyphosus cinerascens	fudderfish	guili/schpwul
	Kyphosus vaigienses	rudderfish	guilen puengi/reel
Labridae (Wrasses)	*Cheilinus chlorourus*	floral wrasse	NA
	Cheilinus undulatus	napoleon wrasse	tangison/maam
	Cheilinus trilobatus	triple-tail wrasse	lalacha mamate/ porou
	Cheilinus fasciatus	harlequin tuskfish or	NA

		red-breasted wrasse	
	Oxycheilinus unifasciatus	ring-tailed wrasse	NA
	Xyrichtys pavo	razor wrasse	NA
	Xyrichtys aneitensis	whitepatch wrasse	NA
	Cheilio inermis	cigar wrasse	NA
	Hemigymnus melapterus	blackeye thicklip	NA
	Hemigymnus fasciatus	barred thicklip	NA
	Halichoeres trimaculatus	three-spot wrasse	NA
	Thalassoma purpureum	surge wrasse	NA
	Hologynmosus doliatus	longface wrasse	NA
Mullidae (Goatfishes)	*Mulloidichthys spp.*	yellow goatfish	NA
	Mulloidichthys vanicolensis	yellowfin goatfish	satmoneti/wichigh
	Mulloidichthys flaviolineatus	yellowstripe goatfish	ti‘ao (juv.) satmoneti (adult)
	Parupeneus spp.	banded goatfish	NA
	Parupeneus barberinus	dash-dot goatfish	satmonetiyo/failighi
	Parupeneus bifasciatus	doublebar goatfish	satmoneti acho/ sungoongo
	Parupeneus ciliatus	white-lined goatfish	ti‘ao (juv.) satmoneti (adult)
	Parupeneus cyclostomas	yellowsaddle goatfish	ti‘ao (juv.) satmoneti (adult)
	Parupeneus pleurostigma	side-spot goatfish	ti‘ao (juv.) satmoneti (adult)
	Parupeneus multifaciatus	multi-barred goatfish	ti‘ao (juv.) satmoneti (adult)
	Upeneus arge	bantail goatfish	NA
Mugilidae (Mullets)	*Mugil cephalus*	striped mullet	aguas (juv.) laiguan (adult)
	Moolgarda engeli	Engel’s mullet	aguas (juv.) laiguan (adult)
	Crenimugil crenilabis	fringelip mullet	aguas (juv.) laiguan (adult)
Muraenidae (Moray eels)	*Gymnothorax flavimarginatus*	yellowmargin moray eel	NA
	Gymnothorax javanicus	giant moray eel	NA

	Gymnothorax undulatus	undulated moray eel	NA
Octopodidae (Octopus)	*Octopus cyanea*	octopus	gamsun
	Octopus ornatus	octopus	gamsun
Polynemidae	*Polydactylus sexfilis*	threadfin	NA
Pricanthidae (Bigeye)	*Heteropriacanthus cruentatus*	glasseye	NA
	Priacanthus hamrur	bigeye	NA
Scaridae (Parrotfishes)	*Bolbometopon muricatum*	humphead parrotfish	atuhong/roow
	Scarus spp.	parrotfish	palakse/laggua
	Hipposcarus longiceps	Pacific longnose parrotfish	gualafi/oscha
	Calotomus carolinus	stareye parrotfish	palaksin chaguan
Scombridae	*Gymnosarda unicolor*	dogtooth tuna	white tuna/ayul
Siganidae (Rabbitfish)	*Siganus aregentus*	forktail rabbitfish	hiting/manahok/llegh
	Siganus guttatus	golden rabbitfish	hiting
	Siganus punctatissimus	gold-spot rabbitfish	hiting galagu
	Siganus spinus	scribbled rabbitfish	hiting/sesyon/palawa
	Siganus vermiculatus	vermiculate rabbitfish	hiting
Sphyraenidae (Barracuda)	*Sphyraena helleri*	Heller's barracuda	NA
	Sphyraena barracuda	great barracuda	NA
Turbinidae (turban /green snails	*Turbo spp.*	green snails turban shells	aliling pulan/aliling tulompu

Marianas Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Labridae	wrasses (those species not listed as CHCRT)	
Carcharhinidae Sphyrnidae	sharks	
Dasyatididae Myliobatidae	rays and skates	

Marianas Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Serrandiae	groupers (those species not listed as CHCRT or BMUS)	
Carangidae	jacks and scads (those species not listed as CHCRT or BMUS)	
Holocentridae	solderfishes and squirrelfishes (those species not listed as CHCRT)	
Mullidae	goatfishes (those species not listed as CHCRT)	
Acanthuridae	surgeonfishes (those species not listed as CHCRT)	
Ephippidae	batfishes	
Monodactylidae	monos	
Haemulidae	sweetlips	NA
Echeneidae	remoras	NA
Malacanthidae	tilefishes	NA
Lethrinidae	emperors (those species not listed as CHCRT)	
Pseudochromidae	dottybacks	
Plesiopidae	prettyfins	
Muraenidae Chlopsidae Congridae Ophichthidae	eels (those species not listed as CHCRT)	NA
Apogonidae	cardinalfishes	NA
Zanclidae spp.	moorish Idols	NA
Aulostomus chinensis	trumpetfish	NA
Fistularia commersoni	cornetfish	NA
Chaetodontidae	butterfly fishes	NA
Pomacanthidae	angelfishes	NA
Pomacentridae	damselfishes	NA
Scorpaenidae	scorpionfishes	NA
Caracanthidae	coral crouchers	NA
Anomalopidae	flashlightfishes	NA
Clupeidae	herrings	NA
Engraulidae	anchovies	NA
Gobiidae	gobies	NA
Blenniidae	blennies	NA
Sphyraenidae spp	barracudas (those species not listed as CHCRT)	NA

Marianas Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Lutjanidae	snappers (those species not listed as CHCRT or BMUS)	NA
Balistidae	trigger fishes (those species not listed as CHCRT)	NA
Siganidae	rabbitfishes (those species not listed as CHCRT)	NA
Pinguipedidae	sandperches	NA
Gymnosarda unicolor	dog tooth tuna	NA
Kyphosidae	rudderfishes (those species not listed as CHCRT)	NA
Bothidae Soleidae	flounders and Soles	NA
Ostraciidae	trunkfishes	NA
Caesionidae	fusiliers	NA
Cirrhitidae	hawkfishes	NA
Antennariidae	frogfishes	NA
Syngnathidae	pipefishes and Seahorses	NA
Tetradontidae	puffer fishes and Porcupine fishes	NA
Heliopora	blue corals	NA
Tubipora	organpipe corals	NA
Azooxanthellates	ahermatypic corals	NA
Echinoderms	sea cucumbers and sea urchins	NA
Mollusca	(those species not listed as CHCRT)	NA
Gastropoda	sea snails	NA
Trochus spp.		NA
Opistobranches	sea slugs	NA
Pinctada margaritifera	black lipped pearl oyster	NA
Tridacnidae	giant clam	NA
Other Bivalves	other clams	NA
Fungiidae	mushroom corals	NA
	small and large coral polyps	NA
Millepora	fire corals	NA
	soft corals and Gorgonians	NA
Actinaria	anemones	NA
Zoanthinaria	soft zoanthid corals	NA
Hydrozoans and Bryzoans		NA
Tunicates	sea squirts	NA
Porifera	sponges	NA
Cephalopods		NA

Marianas Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)		
Scientific Name	**English Common Name**	**Chamorro/Carolinian Name**
Crustaceans	lobsters, Shrimps/Mantis shrimps, true crabs and hermit crabs (Those species not listed as CMUS)	NA
Stylasteridae	lace corals	NA
Solanderidae	hydroid corals	NA
Algae	seaweed	NA
Annelids	segmented worms	NA
Live rock		NA
All other coral reef ecosystem management unit species that are marine plants, invertebrates, and fishes which spend the majority of their non-pelagic (post settlement) life history stages within waters less than or equal to 50 fathoms in total depth.		

Table A-9: Alternative 2B, Hawaii Archipelago FEP MUS (Preferred).

Hawaii Bottomfish Management Unit Species		
Scientific Name	**English Common Name**	**Local/Hawaiian Name**
Aphareus rutilans	silver jaw jobfish	lehi
Aprion virescens	gray jobfish	uku
Caranx ignobilis	giant trevally	white papio/ulua au kea
Caranx lugubris	black jack	ulua la’uli
Epinephelus quernus	sea bass	hāpu‘upu‘u
Etelis carbunculus	red snapper	ehu
Etelis coruscans	longtail snapper	onaga or ‘ula‘ula koa‘e
Lutjanus kasmira	blue stripe snapper	ta‘ape
Pristipomoides auricilla	yellowtail snapper	kalekale
Pristipomoides filamentosus	pink snapper	‘ōpakapaka
Pristipomoides seiboldii	pink snapper	kalekale

Hawaii Bottomfish Management Unit Species		
Scientific Name	**English Common Name**	**Local/Hawaiian Name**
Pristipomoides zonatus	snapper	gindai
Pseudocaranx dentex	thicklip trevally	pig ulua, butaguchi
Seriola dumerili	amberjack	kahala
Beryx splendens	alfonsin	NA
Pseudopentaceros richardsoni	armorhead	NA

Hawaii Crustacean Management Unit Species		
Scientific Name	**English Common Name**	**Local Name**
Panulirus marginatus	spiny lobster	ula
Panulirus penicillatus	spiny lobster	ula
Family *Scyllaridae*	slipper lobster	ula papapa
Ranina ranina	Kona crab	papa'i kua loa

Hawaii Precious Corals Management Unit Species		
Scientific Name	**English Common Name**	**Local Name**
Corallium secundum	pink coral (also called red coral)	NA
Corallium regale	pink coral (also called red coral)	NA
Corallium laauense	pink coral (also called red coral)	NA
Gerardia spp.	gold coral	NA
Narella spp.	gold coral	NA
Lepidisis olapa	bamboo coral	NA
Antipathes dichotoma	black coral	NA

Antipathes grandis	black coral	NA
Antipathes ulex	black coral	NA

Hawaii Coral Reef Ecosystem MUS (Currently Harvested Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Local Name**
Acanthuridae (Surgeonfishes)	*Acanthurus olivaceus*	orange-spot surgeonfish	na‘ena‘e
	Acanthurus xanthopterus	yellowfin surgeonfish	pualu
	Acanthurus triostegus	convict tang	manini
	Acanthurus dussumieri	eye-striped surgeonfish	palani
	Acanthurus nigroris	blue-lined surgeon	maiko
	Acanthurus leucopareius	whitebar surgeonfish	maiko or maikoiko
	Acanthurus nigricans	whitecheek surgeonfish	NA
	Acanthurus guttatus	white-spotted surgeonfish	‘api
	Acanthurus blochii	ringtail surgeonfish	pualu
	Acanthurus nigrofuscus	brown surgeonfish	mai‘i‘i
	Ctenochaetus strigosus	yellow-eyed surgeonfish	kole
	Ctenochaetus striatus	striped bristletooth	NA
	Naso unicornus	bluespine unicornfish	kala
	Naso lituratus	orangespine unicornfish	kalalei or umaumalei
	Naso hexacanthus	black tongue unicornfish	kala holo
	Naso annulatus	whitemargin unicornfish	kala
	Naso brevirostris	spotted unicornfish	kala lolo
	Naso caesius	gray unicornfish	NA
	Zebrasoma flavescens	yellow tang	lau‘ipala
Balistidae (Triggerfish)	*Melichthys vidua*	pinktail triggerfish	humuhumu hi‘ukole
	Melichthys niger	black triggerfish	humuhumu ‘ele‘ele

Hawaii Coral Reef Ecosystem MUS (Currently Harvested Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Local Name**
	Rhinecanthus aculeatus	picassofish	humuhumu nukunuku apua‘a
	Sufflamen fraenatum	bridled triggerfish	NA
Carangidae (Jacks)	*Selar crumenophthalmus*	bigeye scad	akule or hahalu
	Decapterus macarellus	mackerel scad	‘opelu or ‘opelu mama
Carcharhinidae (Sharks)	*Carcharhinus amblyrhynchos*	grey reef shark	manō
	Carcharhinus galapagensis	galapagos shark	manō
	Carcharhinus melanopterus	blacktip reef shark	manō
	Triaenodon obesus	whitetip reef shark	manō lalakea
Holocentridae (Solderfish/ Squirrelfish	*Myripristis berndti*	bigscale soldierfish	menpachi or ‘u‘u
	Myripristis amaena	brick soldierfish	menpachi or ‘u‘u
	Myripristis chryseres	yellowfin soldierfish	menpachi or ‘u‘u
	Myripristis kuntee	pearly soldierfish	menpachi or ‘u‘u
	Sargocentron microstoma	file-lined squirrelfish	‘ala‘ihi
	Sargocentron diadema	crown squirrelfish	‘ala‘ihi
	Sargocentron punctatissimum	peppered squirrelfish	‘ala‘ihi
	Sargocentron tiere	blue-lined squirrelfish	‘ala‘ihi
	Sargocentron xantherythrum	hawaiian squirrelfish	‘ala‘ihi
	Sargocentron spiniferum	saber or long jaw squirrelfish	‘ala‘ihi
	Neoniphon spp.	spotfin squirrelfish	‘ala‘ihi
Kuhliidae (Flagtails)	*Kuhlia sandvicensis*	Hawaiian flag-tail	‘aholehole
Kyphosidae (Rudderfish)	*Kyphosus biggibus*	rudderfish	nenue
	Kyphosus cinerascens	rudderfish	nenue
	Kyphosus vaigiensis	rudderfish	nenue

Hawaii Coral Reef Ecosystem MUS (Currently Harvested Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Local Name**
Labridae (Wrasses)	*Bodianus bilunulatus*	saddleback hogfish	‘a‘awa
	Oxycheilinus unifasciatus	ring-tailed wrasse	po‘ou
	Xyrichtys pavo	razor wrasse	laenihi or nabeta
	Cheilio inermis	cigar wrasse	kupoupou
	Thalassoma purpureum	surge wrasse	ho‘u
	Thalassoma quinquevittatum	red ribbon wrasse	NA
	Thalassoma lutescens	sunset wrasse	NA
	Novaculichthys taeniourus	rockmover wrasse	NA
Mullidae (Goatfishes)	*Mulloidichthys spp.*	yellow goatfish	weke
	Mulloidichthys pfleugeri	orange goatfish	weke nono
	Mulloidichthys vanicolensis	yellowfin goatfish	weke‘ula
	Mulloidichthys flaviolineatus	yellowstripe goatfish	weke‘a or weke a‘a
	Parupeneus spp	banded goatfish	kumu or moano
	Parupeneus bifasciatus	doublebar goatfish	munu
	Parupeneus cyclostomas	yellowsaddle goatfish	moano kea or moano kale
	Parupeneus pleurostigma	side-spot goatfish	malu
	Parupeneus multifaciatus	multi-barred goatfish	moano
	Upeneus arge	bantail goatfish	weke pueo

Hawaii Coral Reef Ecosystem MUS (Currently Harvested Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Local Name**
Mugilidae (Mullets)	*Mugil cephalus*	stripped mullet	‘ama‘ama
	Neomyxus leuciscus	false mullet	uouoa
Muraenidae (Moray eels)	*Gymnothorax flavimarginatus*	yellowmargin moray eel	puhi paka
	Gymnothorax javanicus	giant moray eel	puhi
	Gymnothorax undulatus	undulated moray eel	puhi laumilo
Muraenidae	*Enchelycore pardalis*	dragon eel	puhi
Octopodidae (Octopus)	*Octopus cyanea*	octopus	he‘e mauli or tako
	Octopus ornatus	octopus	he‘e or tako
Polynemidae	*Polydactylus sexfilis*	threadfin	moi
Priacanthidae (Big-eyes)	*Heteropriacanthus cruentatus*	glasseye	‘aweoweo
	Priacanthus hamrur	bigeye	‘aweoweo
Scaridae (Parrotfish)	*Scarus spp.*	prrotfish	uhu or palukaluka
	Calotomus carolinus	stareye parrotfish	panuhunuhu
Sphyraenidae (Barracuda)	*Sphyraena helleri*	Heller’s barracuda	kawele‘a or kaku
	Sphyraena barracuda	great barracuda	kaku
Turbinidae	*Turbo spp.*	green snails turban shells	NA
Zanclidae	*Zanclus cornutus*	moorish idol	kihikihi
Chaetodontidae	*Chaetodon auriga*	butterflyfish	kikakapu
	Chaetodon lunula	raccoon butterflyfish	kikakapu

Hawaii Coral Reef Ecosystem MUS (Currently Harvested Reef Taxa)			
Family Name	**Scientific Name**	**English Common Name**	**Local Name**
	Chaetodon ephippium	saddleback butterflyfish	kikakapu
Sabellidae		featherduster worm	NA

Hawaii Coral Reef Ecosystem MUS (Potentially Harvested Reef Taxa)		
Scientific Name	**English Common Name**	**Local Name**
Labridae	wrasses (those species not listed as CHCRT)	hinalea
Carcharhinidae Sphyrnidae	sharks (those species not listed as CHCRT)	manō
Dasyatididae Myliobatidae	rays and skates	hihimanu
Serrandiae	groupers, seabass (those species not listed as CHCRT or in BMUS)	roi, hapu'upu'u
Malacanthidae	tilefishes	NA
Carangidae	jacks and scads (those species not listed as CHCRT or in BMUS)	dobe, kagami, pa'opa'o, papa, omaka, ulua,
Holocentridae	solderfishes and squirrelfishes (those species not listed as CHCRT)	'u'u
Mullidae	goatfishes (those species not listed as CHCRT)	weke, moano, kumu

Hawaii Coral Reef Ecosystem MUS (Potentially Harvested Reef Taxa)		
Scientific Name	**English Common Name**	**Local Name**
Acanthuridae	surgeonfishes (those species not listed as CHCRT)	na'ena'e, maikoiko
Echeneidae	remoras	NA
Muraenidae Congridae Ophichthidae	eels (those species not listed as CHCRT)	puhi
Apogonidae	cardinalfishes	‘upapalu
Clupeidae	herrings	NA
Engraulidae	anchovies	nehu
Caracanthidae	coral crouchers	NA
Gobiidae	gobies	‘o‘opu
Lutjanidae	snappers (those species not listed as CHCRT or in BMUS)	to'au
Aulostomus chinensis	trumpetfish	nunu
Fistularia commersoni	cornetfish	nunu peke
Zanclidae spp.	moorish Idols	kihikihi
Chaetodontidae	butterflyfishes	kikakapu
Pomacanthidae	angelfishes	NA
Pomacentridae	damselfishes	mamo
Scorpaenidae	scorpionfishes, lionfishes	nohu, okoze
Blenniidae	blennies	pa o'o
Sphyraenidae spp	barracudas (those species not listed as CHCRT)	kaku
Pinguipedidae	sandperches	NA
Bothidae Soleidae Pleurnectidae	flounders and soles	paki‘i

Hawaii Coral Reef Ecosystem MUS (Potentially Harvested Reef Taxa)		
Scientific Name	**English Common Name**	**Local Name**
Ostraciidae	trunkfishes	makukana
Balistidae	trigger fishes (those species not listed as CHCRT)	humu humu
Kyphosidae	rudderfishes (those species not listed as CHCRT)	nenue
Cirrhitidae	hawkfishes (those species not listed as CHCRT)	po‘opa‘a
Tetradontidae	puffer fishes and porcupine fishes	‘o‘opu hue or fugu
Antennariidae	frogfishes	NA
Syngnathidae	pipefishes and seahorses	NA
Echinoderms	sea cucumbers and sea urchins	namako, lole, wana
Mollusca	(those species not listed as CHCRT)	NA
Azooxanthellates	ahermatypic corals	ko‘a
Fungiidae	mushroom corals	ko‘a
	small and large coral polyps	ko‘a
	soft corals and gorgonians	NA
Actinaria	anemones	NA
Zoanthinaria	soft zoanthid corals	NA
Solanderidae	hydroid corals	NA
Stylasteridae	lace corals	ko‘a
Crustaceans	lobsters, shrimps, mantis shrimps, true crabs and hermit crabs (those species not listed as CMUS)	ula, a‘ama, mo‘ala, ‘alakuma
Hydrozoans and Bryzoans		NA

Hawaii Coral Reef Ecosystem MUS (Potentially Harvested Reef Taxa)		
Scientific Name	**English Common Name**	**Local Name**
Pinctada margaritifera	black lipped pearl oyster	NA
Other Bivalves	other clams	NA
Tunicates	sea squirts	NA
Porifera	sponges	NA
Cephalopods	octopi	tako, he‘e
Gastropoda	sea snails	NA
Opistobranches	sea slugs	NA
Algae	seaweed	limu
Live rock		NA
Annelids	segmented worms (those species not listed as CHCRT)	NA
All other coral reef ecosystem management unit species that are marine plants, invertebrates, and fishes which spend the majority of their non-pelagic (post settlement) life history stages within waters less than or equal to 50 fathoms in total depth.		

Table A-10: Alternative 2B, PRIA FEP MUS (Preferred).

PRIA Bottomfish Management Unit Species	
Scientific Name	**English Common Name**
Aphareus rutilans	silver jaw jobfish
Caranx ignobilis	giant trevally
Caranx lugubris	black jack
Epinephelus fasciatus	blacktip grouper
Epinephelus quernus	sea bass
Etelis carbunculus	red snapper
Etelis coruscans	longtail snapper
L. rubrioperculatus	redgill emperor
Pristipomoides auricilla	yellowtail snapper
Pristipomoides filamentosus	pink snapper

Pristipomoides seiboldii	pink snapper
Variola louti	lunartail grouper

PRIA Crustacean Management Unit Species	
Scientific Name	**English Common Name**
Panulirus penicillatus	Spiny lobster
Family Scyllaridae	Slipper lobster
Ranina ranina	Kona crab

PRIA Precious Corals MUS	
Scientific Name	**English Common Name**
Corallium secundum	pink coral (also called red coral)
Corallium regale	pink coral (also called red coral)
Corallium laauense	pink coral (also called red coral)
Gerardia spp.	gold coral
Narella spp.	gold coral
Lepidisis olapa	bamboo coral
Antipathes dichotoma	black coral
Antipathes grandis	black coral
Antipathes ulex	black coral

PRIA Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)		
Family Name	**Scientific Name**	**English Common Name**
Acanthuridae (Surgeonfishes)	*Acanthurus olivaceus*	orange-spot surgeonfish
	Acanthurus xanthopterus	yellowfin surgeonfish
	Acanthurus triostegus	convict tang

PRIA Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)		
Family Name	**Scientific Name**	**English Common Name**
	Acanthurus dussumieri	eye-striped surgeonfish
	Acanthurus nigroris	blue-lined surgeon
	Acanthurus leucopareius	whitebar surgeonfish
	Acanthurus lineatus	blue-banded surgeonfish
	Acanthurus nigricauda	blackstreak surgeonfish
	Acanthurus nigricans	whitecheek surgeonfish
	Acanthurus guttatus	white-spotted surgeonfish
	Acanthurus blochii	ringtail surgeonfish
	Acanthurus nigrofuscus	brown surgeonfish
	Ctenochaetus strigosus	yellow-eyed surgeonfish
	Ctenochaetus striatus	striped bristletooth
	Ctenochaetus binotatus	twospot bristletooth
	Zebrasoma flavescens	yellow tang
	Naso unicornus	bluespine unicornfish
	Naso lituratus	orangespine unicornfish
	Naso hexacanthus	black tongue unicornfish
	Naso vlamingii	bignose unicornfish
	Naso annulatus	whitemargin unicornfish
	Naso brevirostris	spotted unicornfish
Labridae (Wrasses)	*Cheilinus undulatus*	napoleon wrasse
	Cheilinus trilobatus	triple-tail wrasse
	Cheilinus chlorourus	floral wrasse
	Oxycheilinus unifasciatus	ring-tailed wrasse
	Oxycheilinus diagrammus	bandcheek wrasse
	Hemigymnus fasciatus	barred thicklip
	Halichoeres trimaculatus	three-spot wrasse

PRIA Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)		
Family Name	**Scientific Name**	**English Common Name**
	Thalassoma quinquevittatum	red ribbon wrasse
	Thalassoma lutescens	sunset wrasse
Mullidae (Goatfishes)	*Mulloidichthys spp.*	yellow goatfish
	Mulloidichthys pfleugeri	orange goatfish
	Mulloidichthys flaviolineatus	yellowstripe goatfish
	Parupeneus spp	banded goatfish
	Parupeneus barberinus	dash-dot goatfish
	Parupeneus cyclostomas	yellowsaddle goatfish
	Parupeneus multifaciatus	multi-barred goatfish
	Upeneus arge	bantail goatfish
Mugilidae (Mullets)	*Crenimugil crenilabis*	fringelip mullet
	Moolgarda engeli	Engel's mullet
	Neomyxus leuciscus	false mullet
Muraenidae (Moray eels)	*Gymnothorax flavimarginatus*	yellowmargin moray eel
	Gymnothorax javanicus	giant moray eel
	Gymnothorax undulatus	undulated moray eel
Octopodidae	*Octopus cyanea*	octopus
	Octopus ornatus	octopus
Pricanthidae (Bigeye)	*Heteropriacanthus cruentatus*	glasseye
Scaridae (Parrotfishes)	*Bolbometopon muricatum*	humphead parrotfish
	Scarus spp.	parrotfish
	Hipposcarus longiceps	pacific longnose parrotfish
	Calotomus carolinus	stareye parrotfish
Scombridae	*Gymnosarda unicolor*	dogtooth tuna

PRIA Coral Reef Ecosystem Management Unit Species (Currently Harvested Coral Reef Taxa)		
Family Name	**Scientific Name**	**English Common Name**
Sphyraenidae (Barracuda)	*Sphyraena barracuda*	great Barracuda

PRIA Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)	
Scientific Name (Family)	**English Common Name**
Labridae	wrasses (those species not listed as CHCRT)
Carcharhinidae Sphyrnidae	sharks (those species not listed as CHCRT)
Myliobatidae Mobulidae	rays and skates
Serrandiae	groupers (those species not listed as CHCRT or as BMUS)
Carangidae	jacks and scads (those species not listed as CHCRT or as BMUS)
Holocentridae	solderfishes and squirrelfishes (those species not listed as CHCRT)
Mullidae	goatfishes (those species not listed as CHCRT)
Ephippidae	batfishes
Haemulidae	sweetlips
Echeneidae	remoras
Malacanthidae	tilefishes
Pseudochromidae	dottybacks
Plesiopidae	prettyfins
Acanthuridae	surgeonfishes (those species not listed as CHCRT)

PRIA Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)	
Scientific Name (Family)	**English Common Name**
Lethrinidae	emperors (those species not listed as CHCRT or as BMUS)
Clupeidae	herrings
Gobiidae	gobies
Lutjanidae	snappers (those species not listed as CHCRT or as BMUS)
Balistidae	trigger fishes (those species not listed as CHCRT)
Siganidae	rabbitfishes (those species not listed as CHCRT)
Muraenidae Chlopsidae Congridae Ophichthidae	eels (those species not listed as CHCRT)
Apogonidae	cardinalfishes
Zanclidae spp.	moorish Idols
Chaetodontidae	butterfly fishes
Pomacanthidae	angelfishes
Pomacentridae	damselfishes
Scorpaenidae	scorpionfishes
Blenniidae	blennies
Sphyraenidae spp.	barracudas (those species not listed as CHCRT)
Pinguipedidae	sandperches
Kyphosidae	rudderfishes (those species not listed as CHCRT)
Caesionidae	fusiliers

PRIA Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)	
Scientific Name (Family)	**English Common Name**
Cirrhitidae	hawkfishes (those species not listed as CHCRT)
Antennariidae	frogfishes
Syngnathidae	pipefishes and Seahorses
Bothidae	flounders and Soles
Ostraciidae	trunkfishes
Tetradontidae	puffer fishes and Porcupine fishes
Aulostomus chinensis	trumpetfish
Fistularia commersoni	cornetfish
Heliopora	blue corals
Tubipora	organpipe corals
Azooxanthellates	ahermatypic corals
Fungiidae	mushroom corals
	small and large coral polyps
Millepora	fire corals
	soft corals and Gorgonians
Actinaria	anemones
Zoanthinaria	soft zoanthid corals
Hydrozoans and Bryzoans	
Tunicates	sea squirts
Echinoderms	sea cucumbers and sea urchins
Mollusca	(those species not listed as CHCRT)
Gastropoda	sea snails
Trochus spp.	
Opistobranches	sea slugs
Pinctada margaritifera	black lipped pearl oyster

PRIA Coral Reef Ecosystem MUS (Potentially Harvested Coral Reef Taxa)	
Scientific Name (Family)	**English Common Name**
Tridacnidae	giant clam
Other Bivalves	other Clams
Cephalopods	
Crustaceans	lobsters, shrimps/mantis shrimps, true crabs and hermit crabs (those not listed as CMUS)
Porifera	sponges
Stylasteridae	lace corals
Solanderidae	hydroid corals
Annelids	segmented worms
Algae	seaweed
Live rock	
All other coral reef ecosystem management unit species that are marine plants, invertebrates, and fishes that spend the majority of their non-pelagic (post settlement) life history stages within waters less than or equal to 50 fathoms in total depth.	

Tablea-11: Alternative 2B, Pacific Pelagics FEP MUS (Preferred).

Scientific Name	English Common Name
Coryphaena spp.	mahimahi (dolphinfishes)
Acanthocybium solandri	wahoo
Makaira mazara: M. indica	Indo-Pacific blue marlin, black marlin
Tetrapturus audax	striped marlin
Tetrapturs angustirostris	shortbill spearfish
Xiphias gladius	swordfish
Istiophorus platypterus	sailfish
Alapias pelagicus	pelagic thresher shark

Scientific Name	English Common Name
Isurus oxyrinchus	shortfin mako shark
Isurus paucus	longfin mako shark
Lamna ditropis	salmon shark
Thunnus alalunga	albacore
Thunnus obesus	bigeye tuna
Thunnus albacares	yellowfin tuna
Thunnus thynnus	northern bluefin tuna
Katsuwonus pelamis	skipjack tuna

Alopias superciliousus	bigeye thresher shark
Alopias vulpinus	common thresher shark
Carcharhinus falciformis	silky shark
Carcharhinus longimanus	oceanic whitetip shark
Prionace glauca	blue shark

Euthynnus affinis	kawakawa
Lampris spp.	moonfish
Gempylidae	oilfish family
Bramidae	pomfret family
Auxis spp., Scomber spp., Allothunus spp.	Other tuna relatives

APPENDIX B - Summary Conclusions and Recommendations from the Ecosystem Science and Management Planning Workshop

Development of Ecosystem-based Approaches to Marine Resource Management in the Western Pacific Region

Convened by the Western Pacific Regional Fishery Management Council

April 18-22, 2005

Preface

Much has been said and written in recent years about the need for application of ecosystem principles to the management of U.S. fisheries under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). While the topic of ecosystem principles has received increased attention recently in both the U.S. Commission on Ocean Policy and the Pew Ocean Commission, it has been the subject of discussions for several years previously. For example, the National Environmental Policy Act (NEPA) could be considered a legal embodiment of the need to consider how federal actions would affect the environmental resources (hence ecosystem-based principles) in which they were carried out.

The Western Pacific Regional Fishery Management Council, one of eight regional fishery management councils, is moving progressively to apply ecosystem principles in its fishery management plans. Recognizing that the Council has limited experience and tools for this work, and further recognizing broad, multi-Council interest in this arena, the Council has embarked on a series of workshops to exchange information and learn from outside experiences in resource management based on or integrating ecosystem principles into the planning and management process. This workshop was held April 18-22, 2005, at Council offices in Honolulu, Hawaii. The theme of this workshop was the science and data needs to support the application of ecosystem principles into planning and management. Experts from throughout the nation and the Pacific were invited to make presentations and engage in discussions about their work, experiences, and views on these topics. This report presents the results of the workshop.

Introduction

Fishery management over the past decade has been moving away from developing single-species- and stock-policies, and towards considering fishery impacts on aquatic ecosystems more holistically. This shift was evident in the 1996 reauthorization of the US Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which incorporated many elements of the Ecosystem Approach to Management (EAM). This included a requirement for Fishery Management Plans (FMPs) to incorporate considerations of essential fish habitat, which was defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." FMPs are required to "describe and identify essential fish habitat for the fishery, 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 1996 Magnuson-Stevens Act also contained a new National Standard (NS9) for by-catch, which was defined as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards." Conservation and management measures in FMPs were required to "minimize by-catch and to the extent by-catch cannot be avoided, minimize the mortality of such by-catch."

Moreover, the 1996 reauthorization of Magnuson-Stevens Act also included the establishment of an Ecosystem Principles Advisory Panel to expand the application of ecosystem principles in fishery conservation and management activities. Following the directives of Magnuson-Stevens Act, this Panel completed a report to Congress in 1999, entitled Ecosystem-Based Fishery Management. Further, the 2003 Pew Ocean Commission and the 2004 U.S. Commission on Ocean Policy both advised NOAA Fisheries to adopt ecosystem approaches to management. From the foregoing it was clear that the next reauthorization of the Magnuson-Stevens Act would likely include a requirement for the Regional Fishery Management Councils (RFMCs) to prepare Fishery Ecosystem Plans (FEPs). Recognizing this momentum towards FEPs, the Western Pacific Council convened a workshop in April 2005 to begin the preparations for moving from FMPs to FEPs.

The Workshop was held in Honolulu, April 18-22, 2005, at the Council offices. The three basic themes for the Workshop were Data, Models, and Indicators, recognizing that a later workshop would address social and economic policy and human organization issues.

Objective, tasks and approach

The Western Pacific Regional Fishery Management Council is moving incrementally to apply ecosystem principles in its fishery management plans. Recognizing its limited experience and tools in ecosystem-based management approaches, the Council embarked on a series of three workshops to exchange information and learn from outside expertise. The present report summarizes the first workshop, held April 18-22, 2005, on the **topic** of the science and data needs to support ecosystem-based management approaches. The present conclusions and recommendations attempts to summarize the main points and issues presented in this report.

The **objective** of the Workshop was to identify science requirements to support Ecosystem-Based Approaches (EBA) for marine resource management in the Western Pacific Region. The **tasks** assigned to the Workshop were:

1. Review state-of-the-art ecosystem models applied to marine resource management and their application in governance systems;
2. Identify management requirements in the Western Pacific Region;
3. Identify the best suite of quantitative ecosystem indicators and associated tradeoffs to support management requirements in the Western Pacific Region;
4. Within the confines of existing mandates (e.g., Magnuson-Stevens Act, National Marine Sanctuaries Act), identify the most effective short-term application of EBA to marine resource management that can be implemented based on current data (and in this context, address whether the precautionary approach has a role);

5. Identify new data or models that would be required to advance EBA to marine resource management in the Western Pacific Region; and
6. Identify changes in policy or science administration that would be required to more effectively implement EBA to marine resource management.

The approach taken in the present workshop was to separate the general topic into three themes: data, models and indicators. The workshop utilized a combination approach of alternating plenary presentations/discussions lead by an invited expert panel with breakout working groups (by theme) reporting back to plenary for further discussion.

Principally, the foundation of ecosystem-based fishery management is the application of conservative and precautionary approaches for the major targeted stocks or fisheries in a designated region. However, added to this base are considerations of the impacts of fisheries on non-target species, effects of fishing on habitats supporting production and ecosystem functions, predator-prey dynamics, and relationships between the biota and the environment. It is this second added component that differentiates ecosystem-based management approaches from the more traditional, fisheries management approaches generally focused on maximizing yield or value from targeted stocks on a more or less single-species or targeted multi-species group basis (e.g., Hawaiian bottomfish). Given the complexity of marine ecosystems, relationships between species, as well as between species and their environment are likely complex and complicated, and often little understood or difficult to untangle. The resultant high levels of uncertainty place a premium on conservative and precautionary approaches to exploitation in an ecosystem-based management setting.

A problem managers have encountered in implementing an ecosystem-based approach to management is the lack of a 'road map' on how to integrate the various components of an ecosystem approach into a clear operational governance system. In an integrated approach, the governance system examines a suite of information to develop management measures which achieve various strategic goals. This requires taking into account numerous perspectives and desired outcomes from a variety of stakeholders, including those representing non-extractive interests and ecosystem services. An integrated approach must also rely on a comprehensive ecosystem observing system to collect data at various spatial and temporal scales, and a management decision support system to synthesize the information and develop status indicators for individual ecosystem components, forecast status and trends, and evaluate the biological, social and economical effects of policy choices.

The literature on ecosystem-based approaches suggests that there are eight broad categories of operational objectives that should be considered in developing fishery ecosystem plans:

1) Conserving and managing the species;
2) Minimizing by-catch;
3) Managing tradeoffs;
4) Account for feedback effects;
5) Establish appropriate ecosystem boundaries;
6) Maintain ecosystem productivity and balance ecosystem structure;
7) Account for climate variability; and

8) Use adaptive approaches to management.

Key points

During the discussions and plenary sessions several key points were raised repeatedly, and are summarized here:

1) Management/policy issues need to be clearly and precisely stated prior to data collection or modeling/analyses being initiated;
2) Model or analysis choice must be driven firstly by management/policy issues, and secondly by available or obtainable data;
3) Adaptive management experiments, involving deliberate spatial comparisons of policy options (such as, e.g., MPAs) are of crucial importance for developing and implementing ecosystem-based management approaches;
4) Models cannot and should not determine the management decision, which, by its very nature, is choice driven and influenced by tradeoffs. Models are only intellectual devices to help scientists and managers think about problems and possible solutions;
5) Some data collection efforts, while labeled as ecosystem-based, may not be appropriately scaled (in terms of spatio-temporal sampling) or may not target useful variables or parameters for ecosystem-based fisheries management. Such research and monitoring efforts need to be better targeted and focused towards clearly identified management/policy issues, if the data collections are funded for and based on ecosystem-based management needs;
6) New or different data may need to be collected, depending on clearly identified management/policy issues, and the associated analysis/modeling needs. Such data activities should include data 'mining' and data recovery from old and/or unusual sources (e.g., research theses, unpublished grey literature, old print and electronic media etc.); and
7) Concerted efforts are required to reduce or overcome agency specific disagreements (e.g., jurisdictional boundaries) and miscommunication in an integrative approach to move towards system management as a centralized objective. It may be prudent to examine approaches taken and lessons learned elsewhere, e.g., the Australian experiences with managing the Great Barrier Reef Marine Park and World Heritage Area, with its joint state-federal jurisdiction and management agreement.

Recommendations

Several **recommendations** can be extracted from the discussions and working group outcomes as presented in this report:

1) Clearly define and articulate management/policy issues and questions along lines of urgency and identified needs;
2) Assign a centralized resource entity with sufficient seniority and appropriate financial and human resources to establish and maintain a centralized data reference and contact point (the "who, what, where and how" of data);

3) Review and evaluate all currently available data and data collection schemes (biological, social, economic etc.), and initiate and maintain data 'mining' and recovery activities;
4) Undertake initial assessments and analyses of available data, based on key management/policy issues identified by management and stakeholders. This is primarily aimed at identifying strengths and weaknesses of current data and data collection programs, and pointing out obvious data gaps;
5) Identify and initiate adaptive management experiments at ecosystem scale;
6) Ensure that data collection and models/analyses for ecosystem-based management are coordinated with and driven by clearly identified management needs and issues;
7) Encourage keeping all models/analyses at the most 'simple' level possible, i.e., avoid temptation to build large, exceedingly complex models;
8) Ensure adequate support and resources for clearly identified ecosystem-scale monitoring, research and modeling/analytical investigations; and
9) Evaluate a suite of indicators (both existing fishery-based, as well as new and emerging ecosystem-based) in an evolving and adaptive process.

Overall, it was consistently emphasized that clear management objectives need to be outlined and policy issues identified before appropriate and suitable models/analyses and indicators can be proposed or developed, which in turn will be influenced by currently available data, and will determine future data needs. Thus, a key recommendation was that specific management issues are identified and clearly delineated, and potentially available management and policy tools and options clarified prior to analytical options and data needs being decided and implemented.

Simultaneously, a key recommendation was that a comprehensive data availability inventory needs to be undertaken, incorporating all quantitative and qualitative information available (ideally combining scientific as well as socio-economic data). This data inventory should be centralized, freely available and comprehensive. As examples of first steps in this direction one can consider WPacFIN's activities with respect to parts of fishery-dependent data, and the UH's Pelagic Fisheries Research Program's 'atlas' activities for documenting available information and oceanographic models. This endeavor should be a permanent feature for the entire Western Pacific region's ecosystem-based approach to science and management, and be lead by a dedicated and appropriately resourced data inventory entity of significant seniority (a centralized 'resource contact' responsible for the "who owns it, what exists, where is it, how can it be used" of data), and who facilitates utilization of the wide array of existing and likely future data. This inventory should include all data types, including qualitative information sources. In the initial phase, this data inventory entity should facilitate the establishment of a *Data Needs Working Group* for research in ecosystem-based approaches for fisheries management. Subsequently, potential useful models or analytical approaches can be outlined driven by management and policy issues and needs, but reflective of currently available data. Thereafter, additional future data needs can be identified. It should be noted that much of the data currently available were not initially collected under ecosystem-based management considerations or tied to any specific management issue of objective, and hence the utility of the information for such an application has not been determined for all data. These aspects should be considered as part of any data inventory initiative.

With regards to data needs, the utility of data 'mining' and data recovery from unusual sources and old media was also raised as an issue of concern. Substantial resources have been invested in the past to collect a wide range of data, both quantitative and qualitative in the scientific as well as socio-economic fields. Yet, much of these data were only utilized for a narrow (e.g., graduate research thesis), or at the time important aspect, and only exist in grey literature with limited print runs, or on old media. It has been shown that recovering such 'old' data can make significant contributions to science, and be of renewed interest as historic baselines for current and future ecosystem-based science and management[1]. Thus a recommendation was that data recovery and 'mining' activities should form an integral part of the data inventory activities. As an added incentive for such data activities are the opportunities to establish historic baselines of knowledge that are essential for ecosystem-based approaches, e.g., the reconstruction of likely historic fisheries catches in the Western Pacific region[2].

It was strongly suggested that existing data should be evaluated and assessed in detail first. By preliminary examining the presently existing fisheries dynamic, survey and other datasets in a collective and integrated manner, one might be able to determine if patterns exist that could be explained by several different models or hypotheses. This may provide a useful starting position for future data and model considerations. This endeavor should be undertaken in close collaboration with experienced management entities, and ideally with feedback from or coordination with experienced fishing entities to enable accounting for fishing and oceanographic history and knowledge. Furthermore, ecosystem-based management will place increasing demands on spatio-temporal data and information, both with respect to ecosystem components and functions, as well as resources use. Thus, VMS will increasingly become a central requirement for all extractive users in the context of ecosystem-based management approaches. Therefore, Council, NOAA and other responsible agencies should endeavor to use available VMS data for research efforts, and expand use of VMS for coverage of all fishing fleets. This may require concerted efforts in stakeholder engagement and buy-in, and possible adjustments in legal instruments. Such data provide unique and invaluable spatio-temporal information not obtainable otherwise (as it reflects fleet activities), especially if combined with vessel specific catch and effort information. These data will be essential for modelers to better understand spatial effort dynamics and why fishers make the decisions they do. Thus, a recommendation was that comprehensive, but preliminary meta-data-examinations and analyses of all available data (including VMS) should be undertaken as an initial step.

The use and utility of MPAs and spatial fishing/exploitation experiments was identified as a key recommendation lending itself to adaptive management within ecosystem-based fisheries management. The crucial importance of adaptive management experiments, involving deliberate large-scale and long-term spatial comparisons of policy options, was repeatedly emphasized as

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[1] Zeller, D., Froese, R. and Pauly, D. (2005) On losing and recovering fisheries and marine science data. *Marine Policy* 29: 69-73.

[2] Zeller, D., Booth, S. and Pauly, D. (2005) Reconstruction of coral reef- and bottom-fisheries catches for U.S. flag island areas in the Western Pacific, 1950 to 2002. Report to the Western Pacific Regional Fishery Management Council, Honolulu, 110 p. Zeller, D., Booth, S., Craig, P. and Pauly, D. (2006) Reconstruction of coral reef fisheries catches in American Samoa, 1950-2002. *Coral Reefs* 25: 144-152.

fundamental to ecosystem-based management. Of utility are only MPAs large enough to have ecological integrity at an ecosystem and archipelagic scale. Hawaii was cited as one case: this would also require experiments in institutional arrangements for management in both the NWHI and MHI, including governance, stakeholder buy-in and participation, and governance associated enforcement and monitoring prior to and during establishment and management of MPAs. It was deemed prudent at all levels of management and science to incorporate the long-term time horizon (decadal and longer) into the planning, governance, monitoring and enforcement aspects, and ensure stakeholder understanding of the potentially long ecosystem time scales. Of key importance however, is that adaptive management experiments are undertaken at the appropriate spatial and temporal scales, and are comprehensively executed.

In terms of ecosystem modeling, the close interplay with policy and management options was identified as very important. A clear need was outlined to develop clear goals and constraints on the issues and questions to be addressed by models, to avoid arriving at a situation where models are called for to do everything. A model can generate a set of predictions of what might happen under different circumstances; it might expose uncertainties that should cause a responsible manager to think carefully about the management choices he/she has to make. Thus, management actions and research efforts need to be coordinated to better understand ecosystem dynamics. There is also a need to foster participatory decision-making, as more public concerns are raised about ecosystem protection. Thus, a recommendation was to ensure that all data collection and modeling or analytical efforts under the topic of ecosystem-based management are closely coordinated with, and driven by management needs and policy issues. A further recommendation was that models and analyses should be kept as simple as possible to permit clear and unambiguous addressing of 'what if' questions as part of the learning process, which is crucial in understanding whether a model is working and how it is responding to change.

There was also a recommendation to ensure adequate support for ecosystem monitoring, research and modeling is available and being sourced. This needs to extend beyond the focus on extractive resources, to include an emphasis on ecosystem goods and services, and appropriate metrics for accounting for non-consumptive ecosystem services. These non-extractive goods and services will increasingly be deemed of equal importance (and 'value') with the market-based goods that are being produced by these ecosystems.

With regards to the last recommendation on indicators, one of the larger challenges in ecosystem-based approaches to fisheries management is how to link high level principles such as maintaining healthy and productive ecosystem to informative performance indicators. Unfortunately, aside from basic fishery performance indicators (e.g., related to fishery mortality rates and population sizes), there are no established criteria for determining proper reference levels at the ecosystem level. Additionally, quantifying the relative improvement of societal benefit (including non-market and indirect values) for a given management measure is a critical missing element for many reference points.

It is important to recognize that most individual indicators would not be holistic ecosystem indicators *per se*, but would capture elements or selected properties of the ecosystem. It may be necessary to prioritize indicators, which likely will be subjective based on perceived management issues, but may over time identify effective indicators.

There seems to be no single suite of quantitative ecosystem indicators to support fishery management requirements in the Western Pacific Region. The number and variety of indicators available, and the amount of information on each, make it difficult to select any single suite of indicators that fit all species and fisheries.

On the other hand, it may be useful to develop an ecosystem indicator framework analogous to the Leading Economic Indicators that provide a guide to the condition of the U.S. economy. It may be possible to select (or 'evolve' or experimentally develop) a combination of indicators that, over time, would provide a tool to understand species/ecological relationships, and to support predictions of future status and conditions under given management decisions.

Proposed potentially useful indicators for ecosystem-based considerations (using the Pressure, State and Response approach) include information about status and trends of:

- Habitat ('quantity' and 'quality');
- Keystone/functional species dominants;
- Sentinel species;
- Protected species;
- Assemblage structure;
- Biodiversity;
- Pathogens;
- Harmful events (e.g., severe pollution events); and
- Fishery-based data (catches, species, size, catch per effort, mortality).

Thus, the final recommendation of the present workshop was to incorporate and evaluate a suite of indicators (possibly along the Pressure, State and Response groupings suggested in the workshop) in an evolving and adaptive process with input and review from experts in each region and region-wide. Initially, this suite will be based heavily on existing fishery-, habitat- and protected species-indicators, but the suite should be re-considered, amended and re-evaluated at every opportunity in line with management needs/issues and subsequent assessment/modeling requirements. Furthermore, the experiences of the North Pacific Regional Fishery Management Council should be more closely examined for potential applicability to the local situation.

Additional comments

Several additional points were raised by the participants, and marked for attention by management agencies during this workshop, and are worthwhile noting:

The National Research Council (1999) Sustainable Fisheries Report put forward criteria for guidance in ecosystem-based fisheries management, with several points clearly identified that should form the guiding principles for the regions move towards ecosystem-based management:

- Adopt conservative harvest levels;

- Adopt a precautionary approach with respect to uncertainty;
- Reduce excess capacity and assign 'rights' in fisheries;
- Establish MPAs as a buffer against uncertainty and management failure;
- Include by-catch and discards in catch accounting for all sectors;
- Institute scientific and stakeholder reviews in transparent decision processes;
- Conduct targeted research on structure and function in ecosystems; and
- Incorporate ecosystem-based goals in management decisions.

Also, managers have to ensure the establishment and maintenance of the main prerequisites for ecosystem-based fisheries management:

- Effective control over all fisheries by the management system;
- Ability to enforce regulations;
- Ability to monitor all harvest, including by-catch;
- Ability to control fishing capacity and effort; and
- Ability to establish incentives that match the goals.

Furthermore, for scientists to develop models, undertake analyses and derive indicators useful to ecosystem-based management, managers need to:

- Provide clear management objectives - management should listen to available scientific advice, including careful consideration of uncertainties associated with the advice; consider the full range of ecosystem-stakeholder values and opinions; and attempt to seek consensus. Ultimately, however, management has to make clear decisions as to what the chosen objectives are;
- Remove institutional barriers to encourage effective collaboration in research and management;
- Develop better policies and legislation if currently inadequate; and
- Obtain/provide funding for the expanded research base likely needed to support ecosystem-based management.

As a further suggestion for management agencies responsible for the Western Pacific region, it has been suggested that there have been workshops with fishers in most if not all of the U.S. territories, looking at coral reef fisheries management. For the most part, it is the fishing community itself which is not happy with the way coral reef resources are currently managed, given the general decrease in resources observed over the last few years and decades. Furthermore, as far as potential complexity of ecosystem-scale impacts are concerned, experience from the Caribbean should be considered, where herbivores and other species have been overfished, resulting in a de-pauperate herbivorous community that subsequently has been affected by side effects such as disease. While the disease may not have been clearly attributable to direct human impacts, the effects of the disease were deemed closely related to indirect human impact due to the fishing related reduction in community structure. So it behooves managers to take precautionary measures to ensure both functional and structural integrity of ecosystems by

maintaining biodiversity and habitats, as well as target and non-target stocks at conservatively high levels.
In order to engage in ecosystem-based fisheries management, fisheries stakeholders should recognize the inherent and often deep uncertainty associated with natural systems and the affiliated science; should insist that all management and exploitation be conservative and precautionary in nature; and should accept that the burden of proof rests with fisheries. This is a task that management agencies are well placed to actively engage in, facilitate and lead. In principle, stakeholders need to expect that fisheries will change under ecosystem-based fisheries management, specifically:

- Fisheries will be managed for stock abundance not scarcity or productivity, i.e., lower harvest rates from higher biomass;
- Less fishing capacity and employment;
- Higher incomes and use of technology;
- Practices with high habitat impacts replaced with alternative techniques or shut down;
- Greater use of spatially explicit management measures; and
- Restrictions on fisheries to accomplish other goals, e.g., biodiversity protection, ecotourism, recreational use.

In summary, as management in the Western Pacific region moves towards ecosystem-based fisheries management, six general points should be considered as main policy advice consistent with global scientific and management consensus:

1. Industry and management should endeavor to be pro-active in changing the burden of proof regarding impacts of fishing, by taking an active participatory role in research and monitoring, and resource conservation and sustainability;
2. Apply precautionary principle as default;
3. Purchase ‘insurance’, e.g., adequately sized MPAs and spatial management options;
4. Learn from management experience in other areas and by applying ‘adaptive management’ approaches;
5. Use incentives to achieve goals; and
6. Promote fairness and equity within overall ecosystem-based management objectives.

In closing, it is prudent to realize that a ‘healthy’ ecosystem (being aware of the anthropomorphic danger in using this word) is good for ‘healthy’ fisheries. Hence, one could argue that implementing ecosystem-based fisheries management could lead to improved fisheries management of ‘healthy’, productive and sustainable fisheries.

APPENDIX C - Summary Discussion of the Ecosystem Social Science Workshop

Convened by the Western Pacific Regional Fishery Management Council

January 17-20, 2006

Introduction

In 1998, the United States Congress authorized NOAA Fisheries to establish an Ecosystem Principles Advisory Panel (EPAP) to examine ways in which ecosystem principles might be applied to the management of our domestic marine fisheries. The Panel subsequently determined that such principles would best be applied by gradually replacing existing Fishery Management Plans (FMPs) used by the nation's regional fishery management councils with plans that incorporate useful information about the ecosystems within which domestic fisheries occur. These would be called Fishery Ecosystem Plans (FEPs), and would involve a management approach that is "adaptive, specified geographically, takes into account ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives" (NOAA 2004).

The Western Pacific Regional Fishery Management Council (WPRFMC; the Council) subsequently incorporated ecosystem principles in the nation's first ever ecosystem-based fishery management plan— a plan for managing coral reef ecosystems, first implemented in 2001. The Council has since drafted place-based FEPs to further the ecosystem-based approach across the region. A Draft Programmatic Environmental Impact Statement has also been completed (National Marine Fisheries Service 2005a).

In keeping with EPAP recommendations, the Council has undertaken an incremental and collaborative approach to implementing FEPs across the region. One element of this approach is the series of three workshops being conducted by the Council to aid in the transition from FMPs to FEPs and to enhance application of ecosystem-based management principles over the long-term. The workshops are facilitating informed discussion and expertise regarding the ecosystem approach and its effective application in the Western Pacific.

The following pages report on the Ecosystem Social Science Workshop held by the Council in January of 2006. The first workshop, held in April 2005, addressed biophysical dimensions of ecosystem-based management. The social science workshop described herein addressed human dimensions of ecosystem-based approaches to resource management. A final workshop will be designed to synthesize the full range of biophysical and human considerations in an examination of regional ecosystem policy and governance. This will be held sometime late in 2006 or early 2007.

The social science workshop was organized and conducted through the collaborative efforts of Dr. Michael Orbach of the Duke Marine Lab, Nicholas School of the Environment and Earth Sciences; and Impact Assessment, Inc. (IAI).

Workshop Goal

The overarching goal of the workshop was to facilitate informed discussion of social science requirements for effectively supporting ecosystem-based approaches to marine resource management in the Western Pacific region and its sub-regions.

Workshop Objectives

1) Convene nationally-recognized social scientists and regional experts to review social science applications relevant to ecosystem-based marine resource management;

2) Review resource management requirements and pertinent issues in the Western Pacific and its sub-regions;

3) Identify the best suite of ecosystem indicators related to the Human and Institutional Ecology of marine ecosystems in the Western Pacific and its sub-regions;

4) In the short term, and within the parameters of existing mandates (Magnuson-Stevens Fishery Conservation and Management Act, National Marine Sanctuaries Act), identify the most effective ecosystem-based approaches to marine resource management that incorporate the human dimension and that can be implemented based on current data;

5) Explore what new social and policy science data or models would be needed to advance ecosystem-based approaches to marine resource management in the Western Pacific region and its sub-regions;

6) Explore changes in policy or social and policy science administration that would be needed to more effectively implement ecosystem-based approaches to marine resource management in the Western Pacific region and its sub-regions.

Summary Discussion

The social science workshop addressed the human dimensions of ecosystem-based approaches to fishery resource management. The workshop emphasized the three major components of marine systems – the biophysical, the human constituent, and the institutional. A wide range of perspectives were presented on related topics and issues, including the following:

- Marine fisheries, fisheries management, and related human and biophysical factors in the Western Pacific,

- The need for and utility of social science in the context of ecosystem-based management in this region and elsewhere,

- Institutional constraints and opportunities for incorporating social science into ecosystem-based management,

- Relevant information needs, useful types of data, and data collection methods,

- Ecosystem-relevant human behavior and resource modeling,

- Indicators for assessing regulatory effects and the performance of management strategies, and

- Scope and scale of social science applications to ecosystem-based management.

Workshop presentations and discussions were both general and specific in scope, and regional experts were on hand to help ground the discussions with their own perspectives on the realities of island life in the Pacific, and on the various fishery management challenges and solutions that have been encountered and applied in the region.

Summary Points of Particular Relevance to Council FEP Objectives

An extensive assortment of valuable insights, lessons, and pertinent background information about ecosystems, ecosystem social science, and the context of fisheries in the Western Pacific may be derived from the workshop and from these proceedings. Interested persons may consult the body of this report for such information. But some areas of discussion are particularly relevant to the information needs and objectives of the Council as it moves toward full adoption of its Fishery Ecosystem Plans. These lend themselves to summarization and are provided here as a means for bringing the long prior discussion to a conclusion.

- Definitions and parameters vary and continue to evolve, but there is general consensus that the ecosystem approach to fisheries management is novel in its attention to whole marine systems including relationships among the biophysical, human, and institutional components that comprise those systems.

- Human beings, groups, and institutions are critically important elements of marine ecosystems, and given their place in the trophic hierarchy, human behaviors, beliefs and values should be given primary consideration.

- The Council's approach to ecosystem-based management to date involves adaptive management and emphasis on indigenous forms of resource management; both may be particularly amenable in the Pacific islands context.

- Indigenous Pacific islanders draw on lengthy histories and ever-evolving knowledge and traditions of interaction with ocean ecosystems and with each other to successfully use that environment. Persons arriving here during more recent centuries also draw upon traditional and experiential knowledge. Both groups may provide valid information and perspectives on viable models for planning and administration of ecosystem-based management in the region.

- The nascent paradigm shift to ecosystem-based management may potentially lead to further institutional complexity in this unique region of multiple jurisdictions. Given the size of the region, extensive diversity in socio-demographic and socio-political context, and the increasing influence of international decisions regarding migratory species, an incremental and adaptive approach may be the best way to proceed.

- The Council has developed ten objectives for its Fishery Ecosystem Plans. Given the scope of the objectives and potential challenges associated with meeting them, setting priorities and formulating specific management measures may prove most useful for effectively meeting Council goals. Those measures ideally will be formulated based on the many potential contributions of the applied social sciences.

- Each archipelago in the region is distinct in terms of socio-cultural, socioeconomic, and demographic conditions; mode and culture of governance; environmental conditions; and types and extent of fishing and other pursuits and uses of marine resources. This variation may be effectively addressed for purposes of meeting FEP objectives through appropriate application of social science methods and analysis, including those methods that facilitate public participation in resource management decision-making processes.

- An array of data collection methods and analytical techniques has been developed to aid in understanding and communicating both the effects of human activities on biophysical systems and the effects of changing biophysical conditions on resource user groups.

- Selection of social science methods and analytical techniques should be closely tailored to the information needs and objectives at hand, and to particular environmental and societal aspects of each archipelago.

- Valid social and economic indicators are particularly useful for assessing and monitoring direct and indirect human-environmental interactions, and as a basis for adjusting resource use policy under the new mode of management. Indicators should articulate with a wide range of climatic, macro-economic, socio-demographic, regulatory, and community-related factors. In this case, such indicators will need to be developed based on: (a) their potential utility for meeting Council objectives, (b) extant data and the social and biophysical contexts in question, and (c) relevant indicators literature.

- A social science approach to ecosystem-based management in the region should be developed to enhance Council efforts to meet its FEP objectives and to administer the new form of management over the long term. The approach would include a series of related elements, as follow:

    - A venue or venues for choosing high priority FEP objectives, specific management measures for meeting those objectives, and valid social and economic indicators;

    - Design of research to meet prioritized objectives and related information needs;

- Implementation of a research strategy to gather and analyze requisite information, and an indicators-based archipelagic monitoring system through which to gauge and analytically parse social change potentially associated with Council actions; and

- Implementation of a liaison and performance and evaluation program to ensure the validity and effectiveness of the social science approach to ecosystem-based management in the region.

➢ Social science cannot be equated with community development *per se*, but application of social science may further understanding of community context, local receptivity to or need for development programs, and the potential or actual social and economic costs and benefits of such programs. Social science may therefore be used to help identify ways in which communities and individuals may participate in the abundance of positive ocean opportunities available throughout the Western Pacific region.

➢ Given that a number of fisheries or fisheries-relevant social science research and monitoring programs have been undertaken in the United States and abroad in recent years, the Council FEP social science approach would ideally articulate with these, both drawing upon and contributing to the base of knowledge regarding human interaction with the marine environment and the many related aspects of human behavior discussed during the course of the workshop.

Concluding Discussion

Based on the input of national and regional experts convened for the WPRFMC Ecosystem Social Science Workshop, we have presented valid social science approaches to ecosystem-based management. These may be of potential utility to the Council as it moves toward full adoption of its FEPs across the region. The workshop and report have enabled development of background information necessary for initiating refinement of such approaches for real-time application in the Western Pacific. Further work with fisheries managers, compilation and review of archival data, and field reconnaissance will enable full inventory of relevant existing information, identification of salient and ongoing management issues and related information needs, and development of detailed research agendas and designs for specific island areas.

As for biophysical approaches to ecosystem-based management, viable social science approaches must enable understanding of whole systems and relationships between their respective components, including those of user and interest groups, seafood distributors and consumers, and even fisheries researchers and managers and the institutions within which they operate. In the spirit of holistic ecosystem principles and concepts, social science approaches must and can also bear ermpirically-grounded information of predictive utility for management of biophysical components of marine systems.

There is much human and environmental variability within and across the island groups that comprise the vast Western Pacific region. Social science approaches must address such variation and translate findings in a manner that is optimally useful for resource managers seeking to make fair and equitable decisions in an increasingly complex and contested socio-political environment. Regional variation notwithstanding, pursuit and consumption of seafood and related cultural processes are constant and critically important aspects of life throughout the archipelagos. As such, there is vital need for understanding and longitudinal monitoring of the full range of factors that may impinge on these activities and processes, including the potential effects of conservation interests and ecosystem-based management.

Ecosystem concepts and principles were developed and applied in adaptive fashion in this region long ago. Indeed, learned ways of efficient interaction with marine and terrestrial ecosystems led to the proliferation of island societies throughout Oceania. Initial periods of trial and error gradually led to the ordering of society in a manner that in certain places and times enabled equilibrium between available marine resources and the demands of human groups depending on them for purposes of survival. By virtue of attention to and accumulation of knowledge regarding the natural world that surrounded them, and through various mechanisms of social control, Pacific islanders were ultimately successful in overcoming various ecological challenges, including those initiated by their ancestors.

The context has changed dramatically over the millennia, and many of the challenges we now face are global in scale. Yet it may be that knowledge of connections within and across island societies and ecosystems, and proven means for managing the activities of those who use and depend on marine resources for so many reasons, remain the most viable points of departure for addressing marine resource challenges in the Pacific in the decades to come.

Appendix D: Relevant Laws and Executive Orders.

Magnuson–Stevens Fishery Conservation and Management Act

The Magnuson–Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA) is the primary law governing fisheries resources and fishing activities in Federal waters. Originally enacted as the Fishery Conservation and Management Act in 1976, it has been amended frequently since 1976; most recently in 1996, by the Sustainable Fisheries Act. The primary goals at the time of enactment of the MSA were the conservation and management of U.S. fishery resources, the development of United States domestic fisheries, and the phasing out of foreign fishing activities within the U.S. EEZ.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 is the foundation of modern American environmental protection in the United States and its commonwealths, territories, and possessions. NEPA requires that Federal agency decision makers, in carrying out their duties, use all practicable means to create and maintain conditions under which people and nature can exist in productive harmony and fulfill the social, economic, and other needs of present and future generations of Americans. NEPA provides a mandate and a framework for Federal agencies to consider all reasonably foreseeable environmental effects of their proposed actions and to involve and inform the public in the decision-making process. NEPA compliance for fisheries management actions is further guided by regulations issued by the Council on Environmental Quality and those issued by the Department of Commerce's National Oceanic and Atmospheric Administration Administrative Order 216-6, Implementing the National Environmental Policy Act.

Endangered Species Act

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The ESA outlines procedures for Federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions. Criminal and civil penalties are provided for violations of the ESA.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the take of marine mammals in U.S. and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA gives the Secretary authority and duties for all cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions, except walruses). The MMPA requires the NMFS to prepare and periodically review stock assessments of marine mammal stocks.

Administrative Procedure Act

The Administrative Procedure Act (APA) requires Federal agencies to give the public prior notice of rule making and an opportunity to comment on proposed rules. General notice of proposed rule making must be published in the *Federal Register*, unless persons subject to the rule have actual notice of the rule. Proposed rules published in the *Federal Register* must include reference to the legal authority under which the rule is proposed and explain the nature of the proposal including what action is proposed, why, what are its intended effects, and any relevant regulatory history that provides the public with a well-informed basis for understanding and commenting on the proposal.

Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) requires Federal agencies to assess the impacts of their proposed regulations on small entities and to seek ways to minimize economic effects on small entities that would be disproportionately or unnecessarily adversely affected. The most recent amendments to the RFA were enacted on March 29, 1996, with the Contract with America Advancement Act of 1996 (Public Law 104-121). Title II of that law, the Small Business Regulatory Enforcement Fairness Act (SBREFA), amended the RFA to require Federal agencies to determine whether a proposed regulatory action would have a significant economic impact on a substantial number of small entities. For a Federal agency, the most significant effect of SBREFA is that it made compliance with the RFA judicially reviewable.

Freedom of Information Act

The original Freedom of Information Act (FOIA) allowed the public to obtain government information, provided that the information is not protected by one of the nine specific FOIA exemptions, and required that an agency respond to a FOIA request within specified time limits. Exempted information includes the following: classified secret matter of national defense or foreign policy, internal personnel rules and practices, information specifically exempted by other statutes, trade secrets and commercial and financial information, privileged interagency or intra-agency memoranda or letters, personal information affecting an individual's privacy, and investigatory records for law enforcement purposes.

In 1996, the Electronic FOIA (E-FOIA) amendments changed FOIA by (among other things) extending the time limit that agencies had to respond to FOIA requests and requiring agencies to make reports available to the public by computer telecommunications or other electronic means, including listing their major information systems and a guide for obtaining information and establishing an electronic reading room that includes agency policies, staff manuals, and an index of records released under FOIA requests. NMFS compliance with FOIA is also guided by NOAA Administrative Order 205-14.

Information Quality Act

The Information Quality Act (IQA), sometimes referred to as the Data Quality Act, was enacted in December 2000 as Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001. The act required the Office of Management and Budget (OMB) to issue guidance to federal agencies designed to ensure the “quality, objectivity, utility, and integrity” of information disseminated to the public. It also required agencies to issue their own information quality guidelines, and to establish administrative mechanisms that allow affected persons to seek correction of information maintained and disseminated by the agencies that does not comply with the OMB guidance.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) is designed to encourage and assist states in developing coastal management programs, to coordinate state activities, and to safeguard regional and national interests in the coastal zone. Section 307(c) of the CZMA requires that any Federal activity affecting the land or water uses or natural resources of a state’s coastal zone be consistent to the maximum extent possible with the enforceable policies of the affected state’s approved coastal management program.

Paperwork Reduction Act

The Paperwork Reduction Act (PRA) of 1995 requires that agencies obtain Office of Management and Budget approval before requesting most types of information from the public. "Information collections" include forms, interviews, recordkeeping requirements, and vessel and gear marking, to name a few categories.

Executive Order 12898: Environmental Justice

Executive Order 12898, issued in 1994, requires that Federal agencies incorporate environmental justice into their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

Executive Order 13132: Federalism

President Bill Clinton signed Executive Order 13132 to ensure that the principles of federalism are carried out according to the vision of the framers of the Constitution. Among the pertinent provisions of the order are the guiding fundamental principles of federalism, policymaking criteria, special requirements for preemption, special requirements for legislative proposals and increasing flexibility for state and local waivers. Federalism is based on the belief that issues not national in scope should be addressed by the level of government closest to the people.

Executive Order 12630: Taking

Each year federal agencies issue numerous proposed or final rules or take other regulatory actions that may potentially affect the use of private property. Some of these actions may result in the property owner being owed just compensation under the Fifth Amendment. In 1988 the President issued Executive Order 12630 on property rights to ensure that government actions affecting the use of private property are undertaken on a well-reasoned basis with due regard for the potential financial impacts imposed on the government.

Executive Order 13158: Marine Protected Areas

Executive Order 13158 directs the Departments of Commerce and the Interior, and other federal agencies, to strengthen and expand a national system of Marine Protected Areas (MPAs) by working closely with state, territorial, local, tribal, and other stakeholders. Areas protected include coral reefs, kelp forests, shipwrecks, and those frequented by whales and other marine life. It covers oceans, coastal areas, and the Great Lakes.

Appendix E

Public comments received on the Draft Programmatic Environmental Impact Statement Toward an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans, dated October 27, 2005.

Subject: I Support Strong NWHI Protections
From: Photowonder2010@hotmail.com
Date: 15 Dec 2005 17:31:13 -0000
To: WPEAMPEIS@noaa.gov

Regional Administrator William Robinson, National Marine Fisheries Service
National Marine Fisheries Service
1601 Kapiolani Boulevard
Honolulu, HI 96814

Dear Regional Administrator Robinson, National Marine Fisheries Service,

I am deeply concerned about the future of the Northwestern Hawaiian Islands (NWHI), especially if the Western Pacific Region Fisheries Management Council (WESPAC) continues to propose commercial fishing in this fragile region. The NWHI are a rare and culturally-important habitat. Wespac's proposed Ecosystem Management Plan does not protect this unique ocean ecosystem.

Also, Wespac released 1,200 pages of these plans only a few days before the public hearings, giving the public little time to review them despite federal requirements for public comment. I urge an investigation of Wespac's tactics.

The NWHI are spawning grounds for many marine species found in the waters of the main Hawaiian Islands, where our fisheries, tourism, and diving industries are based. I support the application of the strong protections established by Governor Lingle for state waters of the NWHI to surrounding federal waters, and urge their protection from commercial activity.

Thank you.

Sincerely,

Adrienne Moumin
2807 Byron St.
Silver Spring, Maryland 20902

Subject: Hold Wespac Accountable
From: lafleurjourneys@yahoo.com
Date: 09 Dec 2005 02:32:35 -0000
To: WPEAMPEIS@noaa.gov

Administrator William Robinson

Dear Administrator Robinson,

I am gravely concerned about the future of the Northwestern Hawaiian Islands, if Wespac continues to propose commercial fishing in this fragile region.

Wespac's proposed Ecosystem Management Plan is fatally flawed. The Council admits that the "measures being considered would reorganize the current fishery regulations by geographic area, but would not result in substantive changes to the existing regulations."

By refusing to acknowledge the NWHI ecosystem and instead continuing to promote single species management, Wespac mocks the essence of ecosystem planning, which is designed to consider the interactions among various species.

The fishery council's continued use of the single species management model will guarantee more overfishing, more collapses in fish stocks, and subsequent habitat destruction.

Enough is enough! We have already seen the devastation of the NWHI lobster fishery. I am not willing to allow Wespac to threaten the integrity of this last coral reef wilderness.

I want you to know that I also support a Inspector General investigation of this rogue fishery council, which has for decades refused to protect our public trust resources. I join the call for investigation of the strong evidence of improper and dishonest conduct by Wespac in its campaign to undermine the NWHI Executive Orders and NWHI protections.

I urge you to support a full investigation of Wespac's activities, including scrutiny of their lobbying activities, misuse of public funds and manipulations of rules and regulations regarding public participation.

Mahalo for the opportunity to comment.

Sincerely,

steve LaFleur
P.o. box 643
Kihei, Hawaii 96753

Subject: FW: DEIS comment
From: "DMWR" <dmwr@samoatelco.com>
Date: Tue, 20 Dec 2005 09:35:02 -1100
To: <WPEAMPEIS@noaa.gov>

-----Original Message-----
From: Karl Brookins [mailto:asfisherysci1@yahoo.com]
Sent: Monday, December 19, 2005 3:55 PM
To: dmwr@samoatelco.com
Subject: DEIS comment

Department of Marine and Wildlife Resources Comments
American Samoa Government

Review of Draft Programmatic Environmental Impact Statement
Towards an Ecosystem approach for the Western Pacific Region: from species-based management plans to place-ba! sed fishery ecosystem plans. October 27, 2005

Submission deadline: December 19, 2005 to WPEAMPEIS@noaa.gov

The Draft Environmental Impact Statement (DEIS) is poorly drafted; many sentences are unclear and some unintelligible. Errors are common in the text making true evaluation of the document difficult to impossible. For e! xample the description of the preferred alternative 2B on page 177-178: The section includes the phrase "believed to occur" in the title, "known to occur" once in the text, and "physically present" appears four times in the text. Another example is that several of the paragraphs evaluating impacts on environment, stocks, protected species, fishery participants, etc. repeat nearly word for word e.g. pages 185 and 187. If there is actually no new information to include, the paragraphs are better combined to reduce redundancy and length of the document.

The DEIS is self-described as a foundational document for a change to more scientifically based ecosystem management upon which "subsequent phases ... will build off...". Science itself is based on previous works, as is the DEIS. However, the draft DEIS fails to list at least 69 citations in the references including some foundational scientific documents. References are also out of order, and Marine Ecology Progress Series 274:269-303 is attributed to at least five groups of authors with different titles. Errors listed above and others demonstrate the DEIS is seriously flawed and a poor choice as a foundational document.

In the DEIS sections desc! ribing American Samoa most of the citations are omitted from the references. Some important American Samoa information and references do not appear to be cited in the DEIS. One page reports Manua Islands as 60 miles from Tutuila, and the next page reports the distance as 70 miles. The document states the American Samoa region is geologically inactive and yet an undersea volcano is known to be building off Manua Islands.

The finding of little effect from the management actions is misleading in relation to impacts to fishery participants and communities, especially cumulative impacts as the DEIS is to be foundational; future management changes will build upon the ! DEIS thus having cumulative effects. For example beginning an ecosystem approach to fisheries management involves considering predator-prey interactions and invariably involves leaving some resource for predators. Leaving it for predators translates into reduced catches and impacts to participants and communities like American Samoa that are highly dependent on fisheries for employment and food.

Karl Brookins, Ph.D., Chief Fishery Biologist, December 19, 2005

COMMENTS OF ENVIRONMENTAL DEFENSE, `ILIO`ULAOKALANI COALITION, AND KAHEA: THE HAWAIIAN-ENVIRONMENTAL ALLIANCE

CONCERNING

THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT: Towards and Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans

December 27, 2005

Contacts:

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KAHEA:
The Hawaiian-Environmental Alliance
Kahea-alliance@hawaii.rr.com

The Northwestern Hawaiian Islands hui represents a broad network of fishers, Native Hawaiians, scientists, environmentalists, divers and Hawai'i residents associated with the `Ïlio`ulaokalani Coalition, Environmental Defense, and KAHEA: The Hawaiian-Environmental Alliance, representing thousands of members throughout the Hawaiian Islands. Our testimony is based on community input received during over 100 meetings and 30 hearings held in Hawai`i on the Northwestern Hawaiian Islands in the past five years, as well as federal law.

The recent actions of the Western Pacific Regional Fishery Management Council (Wespac) regarding the introduction of "Fishery Ecosystem Plans" and a Draft Programmatic Environmental Impact Statement (DPEIS) **follow a pattern and practice of improper and dishonest conduct, and appear to be consistent with other Wespac attempts to undermine protections established for the Northwestern Hawaiian Islands.** This pattern includes a programmatic failure to meet legal mandates and the questionable use of federal funds to support the Wespac campaign to undermine the NWHI Executive orders, the efforts of the Reserve Council, and the sanctuary designation process.[1]

We call for the withdrawal of the fatally flawed Fishery Ecosystem Plans (FEPs) and the Draft Programmatic Environmental Impact Statement (DPEIS) and we strongly support an Inspector General investigation of Wespac for the following reasons:

1. **Failure to provide reasonable opportunity for public comment, analysis by State of Hawai`i, or by Wespac members.** On December 20, 2005, the Western Pacific Regional Fishery Management Council (Wespac) held a "emergency meeting" by teleconference for the purpose of voting to take Final Action on over 1,200 pages of "Fishery Ecosystem Plans," recommending

[1] See "Report on Suspect Actions of the Western Pacific Regional Fishery Management Council, Recommendation: The Inspector General of the Department of Commerce should investigate the Council," Oahu Game Fish Club, Waianae Boat Fishing Club, November 2005.

new Federal regulatory actions despite the absence of an opportunity for public comment on the final FEPs and despite a vote by Wespac in November, 2005 (at a previous scheduled public meeting in Guam) to weigh Final Approval of the FEPs at its next scheduled meeting in March, 2006.

2. The final FEPs were made available to the public only two working days prior to the start of December FEP "public hearings."

3. State representatives and Wespac members from Hawai`i indicated that they, themselves, had not received the documents in a manner to allow meaningful comment, and that the State had received the final, complete FEP for the Hawaiian archipelago only *after* two days of public hearings had already been held in Hilo and Kona.[2] In addition, the Honolulu "public hearing" on the FEPs was held the day of the Wespac "Final Action" on the FEPs and prior to the close of public comment on the DPEIS on December 27. At the Wespac meeting, prior to the vote on the FEPs staff read aloud a short summary of some written public comments on the DPEIS, despite that one week still remained in the DPEIS public comment period. Comments made in hearings on the FEPs were not differentiated from DPEIS comments and no summary or analysis of inputs solely from the recent hearings (including the Honolulu hearing) on the FEPs was provided.

4. **NEPA violations.** The process by which Wespac and the National Marine Fisheries Service (NMFS) released (i.e. failed to release) the FEP and DPEIS to the public in a timely manner represents a violation of NEPA requirements. Wespac took "Final Action" on the FEPs prior to the close of public comment on the DPEIS which was ostensibly designed to solicit public input on whether FEPs should be promulgated, and if so, which type of FEPs should be promulgated – (i.e. which federal regulatory actions should be taken). The Draft FEPs, proposing federal regulatory actions, were released one month prior to the DPEIS. The Final FEPs were not released to the public until two working days prior to the start of "public hearings."

5. **Error-riddled documents**. The FEPs upon which Wespac voted were riddled with what one Wespac member called "absolute inaccuracies."[3] According to State representatives, the Hawaiian Archipelago FEP contains "numerous factual and typographic errors" which "indicate that the document is far from ready from final approval." The state representative presented examples including fifteen instances of species or entire families of organisms listed for Hawaii which "do not occur in the Hawaiian archipelago. Now this is simply embarrassing. .... It's largely for the reputation of the Council as a whole that it shouldn't be endorsing documents like this before they're correct."[4]

> "Essentially, our take on it is that the State of Hawai`i has a certain amount of scientific integrity to uphold in this process and given that we have identified serious problems with the document as it stands, given that the NOAA representative has acknowledged those problems, given that several other Council members have also found those problems or other problems that we didn't see, it seems that there are a fair number of people on this Council who realize that this document is simply not ready for final action. And we

[2] Letter from Wespac member, Governor's representative, Chair of Hawai`I Department of Land and Natural Resources, Peter Young to Kitty Simonds, December 2, 2005, statements by Dan Polhemus, DLNR, Fred Duerr (Wespac member), Rick Gaffney (Wespac member), Wespac meeting, December 20, 2005.

[3] Rick Gaffney, Wespac member, recreational fisher, statement on December 20, Wespac meeting (by telephone).

[4] Dr. Dan Polhemus, Director, Department of Aquatic Resources, DLNR. December 20, 2005. Wespac meeting, Honolulu.

simply do not understand why it is being rushed to final action and we do not see any benefit to the Council by doing this. And therefore we are not going to support this motion. We are not going to support final action on this document." – Dr. Dan Polhemus, Director, Department of Aquatic Resources, DLNR. December 20, 2005. Wespac meeting, Honolulu.

6. **Draft Programmatic Environmental Impact Statement (DPEIS) and FEPs call for violations of existing rules and the Executive Order** which established the NWHI Coral Reef Ecosystem Reserve. For example, despite a ban on coral harvesting in the NWHI Reserve and a Record of Decision by NOAA forbidding any such harvest, both the DPEIS (pg. 165) and the FEP for the Hawaiian Archipelago (pg. 117) describe coral harvesting quotas and activities for banks in the NWHI. The DPEIS fails to mention in its description on permitting (pg. 164) that Coral Reef Ecosystem FMP permits may not be issued for the NWHI (to do so would violate the EOs and NMFS rules). Despite the fact that the NWHI lobster fishery is closed under a permanent injunction and Executive Order, there are ten pages of discussion of details regarding the NWHI lobster fishery, including the fact that Wespac rules allow the taking of egg-bearing female lobster and undersized juveniles ("retain all fishery") in the overfished waters of the NWHI (where the spiny lobster population has plummeted) but forbid the take of egg-bearing females and undersized juveniles in the Main Hawaiian Islands.

7. Wespac utilization of public funds for misleading claims regarding "agency" status. Our understanding is that Wespac is a Council authorized by the Magnuson-Stevens Act and is not a federal agency, therefore not liable to face lawsuits for its actions. However, Wespac has apparently been utilizing public funds to declare that it is a federal agency, including in Wespac's announcement regarding the FEP "public hearings," published in the Honolulu Advertiser on December 11, 2005. This "Notice of Public Hearings and Public Meetings," bearing the official Wespac seal , states that "The Council is the policy-making agency for offshore waters around the U.S. Pacific islands." However, both the State of Hawai`i and the U.S. Fish and Wildlife Service make policy regarding "offshore waters around the U.S. Pacific Islands." A quick survey of Wespac's website identifies other occasions when Wespac has distributed press releases and other materials to the public claiming that it is a federal agency (for example in November 2002, March and November, 2005, etc.) At the December 20, "public hearing" in Honolulu, the Environmental Defense/Hawai`i representative asked for clarification from the NOAA Fisheries, PIRO Administrator regarding whether Wespac was or was not an agency. The NOAA Administrator responded that Wespac is, indeed, not a federal agency. No information was forthcoming regarding why the Council continues to misrepresent itself to the public as a federal agency (apparently utilizing federal funds to do so) or what steps NOAA intends to take regarding this misrepresentation and apparent misuse of federal funds.

8. Violation of Council member duties under the Magnuson – Stevens Fishery Conservation and Management Act.

All Wespac Council members have taken the federal oath:

- "as a duly appointed member of a regional fishery management Council established under the Magnuson – Stevens Fishery Conservation and Management Act, [to] hereby promise to conserve and manage the living marine resources of the United States of America by carrying out the business of the Council for the greatest overall benefit of the nation;"

- "to serve as a knowledgeable and experienced trustee of the nation's marine fishery resources, being careful to balance competing private or regional interests, and always aware and protective of the public interest in those resources;"

- to "commit yourself to uphold the provisions, standards and requirements of the Magnuson - Stevens Fishery Conservation and Management Act and other applicable law, and to conduct yourself at all times according to the rules of conduct prescribed by the Secretary of Commerce."

Those Council members (and members of the public) who were "knowledgeable and experienced" regarding the Hawaiian archipelago ecosystem pointed out the many flaws and factual errors in the Hawaiian archipelago FEP (see December 20 Wespac meeting transcript excerpts). A Hawai`i Council member stated: "I, too, would be embarrassed to go to a public hearing having voted on something like this that's inaccurate. Someone's going to stand up and say well how could you, you're supposed to be knowledgeable about this, how could you possibly have voted for this?"[5]

Wespac Chair, Frank McCoy of American Samoa, led the effort to override the concerns of those with knowledge and experience in Hawai`i regarding Hawai`i ecosystems. He was assisted by a Council member from Guam who joined the meeting late.

Given the lack of documentation provided to the public prior to hearings and the lack of analysis of public input prior to decision-making and given the confusion regarding the topic of the "public hearings" on the part of the public it is difficult to see how Wespac members voting to take "Final Action" on the FEPs were acting in accordance with their oath to be "always aware and protective of the public interest in those resources."

A Hawai`i Council member, concerned about the tremendous factual inaccuracies, including those in the species list for Hawai`i, expressed concern that an opportunity for discussion and correction of the errors was not provided in the Council meeting. Of the four Hawai`i "civilian" members, only two were present at the Honolulu meeting – one owns companies convicted of poaching in the NWHI; the other cut off discussion by immediately proposing a lengthy resolution to take Final Action, accept the FEPs, provide further input and then to allow "staff" to rewrite the error-riddled FEPs on their own, apparently not subject to any further Council oversight, votes, or public comment. The lengthy "surprise" resolution promoted by this member was located on a Wespac staff member's laptop. The staff member then presented it to the Council. None of the members on the phone could see the text of the resolution. The two Hawai`i members connected by telephone expressed strong concerns about giving staff "carte blanche" to do what they pleased. One Hawai`i member stated that it was like giving the staff (which had produced the original inadequate documents) a "blank check" to do anything they wanted.

Appendix A:

Timeline of events pertaining t o development of Fishery Ecosystem Plans and DPEIS

Compiled by Stephanie Fried, Environmental Defense / Hawai`i[6]

[5] Fred Duerr, Wespac member, December 20 meeting, Honolulu (comment by telephone).
[6] This is only a partial timeline of recent events relating to the FEPs and the DPEIS. Additions and corrections warmly welcomed. Please send comments to stephf@environmentaldefense.org.

Sept. 30, 2005. Release of Draft FEPs. (Hawaiian Archipelago FEP missing Chapters 7 and 10), missing until at least Dec.7 from public versions of document.

Oct. 27. DPEIS released, approximately one month after the preferred alternative FEPs were released. DPEIS describes shift from Fishery Management Plans to Fishery Ecosystem Plans (FEP) and proposes a range of alternative configurations for each proposed FEP -- including objectives, boundaries, lists of species to be managed (Management Unit Species). The deadline for written comments is December 19, 2005.

Nov. 10. Federal register notice states that deadline for public comment on DPEIS is now December 26, 2005.

Nov. 11. Wespac meeting in Guam. Council votes that final approval of FEPs will occur at next Wespac meeting in March 2006. Hawai`i Department of Land and Natural Resources indicates to Wespac that FEP for Hawaiian archipelago is missing entire sections.

Nov. 28. Federal register notice announces Wespac Council meeting (to be held by teleconference) on December 20 and "public hearings" in Hawai`i, beginning December 12. The December 20 meeting – apparently an emergency meeting -- is not listed on Wespac's calendar of meetings for 2005, posted on Wespac website (www.wpcouncil.org). No topic is listed for the "public hearings", so it is unclear if the hearings are on the DPEIS or the FEPs. The agenda indicates that the meeting is held to take "Final Action" on FEP objectives, boundaries, management unit species designation, structure of advisory bodies, etc., in contrast to Council decision of November 11, which approved a March 2006 Final Action vote.

Dec. 2. Peter Young, Governor's representative to Wespac, Chair of the State of Hawai`i Department of Land and Natural Resources, writes to Kitty Simonds expressing "complete surprise" regarding the proposed Wespac Dec. 20 emergency meeting to vote on "final acceptance" of the FEPs; rejects meeting as inappropriate and calls for a postponement, given Council vote of November 11. The letter indicates that:

> "There has been no justification provided as to the need for such an "emergency" action in this regard as defined under section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act."

The State's letter describes the fact that, as of December 2, DLNR has still not yet received a complete draft of the Hawaiian archipelago FEP and could not possibly provide comments in time for the Dec. 20 meeting. Missing from the Hawaii Archipelago FEP were chapters titled; "Chapter 10. Draft regulations for the Hawaii Archipelago FEP" and "Chapter 7. Integration of ecosystem approaches to fisheries management in the Mariana [sic] Archipelago FEP." The letter also underscored that "most Council members will be unable to personally attend the meeting" due to "proximity to the Christmas holiday season," and notes that holding a meeting by phone conference would "clearly limit the opportunity for debate." The State representative then detailed egregious errors found in a preliminary assessment of portions of the draft received by the state, expressed concern about Wespac's proposal to "expand the boundaries" of the FEPs despite the fact that the FEP boundaries already make up U.S. EEZ waters and that expansion could come at the expense of the state or international waters. [Note: or perhaps U.S. Fish and Wildlife refuges]. The State's representative also indicated that there was insufficient time for DLNR staff to "a) review the document, b) forward it back to WESPAC for revisions, and then c) receive a revised version from WESPAC to assess to what extent our revisions had been addressed."

Dec. 6. KAHEA attorney calls Wespac office seeking clarification on the subject matter of the "public hearings." Wespac staffer, Eric Kingma indicates to her that "the official deadline for public comments is December 26, but they would 'really like it' if we could get our comments in by Dec. 19 because on the 20th they have their Council meeting where they are going to be approving the FEPs." The attorney asks whether Wespac is "Approving the EIS already?" Kingma responded that "the EIS and the FEPs are related, so comments on the EIS would be taken to improve the FMPs."

Dec.6. State of Hawai`i, Department of Land and Natural Resources receives copies of the missing Chapters 7 and 10 from the Hawai`i Archipeago FEP. (According to testimony delivered Dec. 20, by state representative at Wespac hearing.)

Dec. 6. EPA federal register notice amends final comment date for DPEIS. New deadline is Dec. 27 instead of Dec. 26. Federal register notice indicates that this information is posted on NOAA PIRO website. As of December 26, this information is NOT posted on NOAA PIRO website. Wespac website still (as of Dec. 26) claims Dec. 26 deadline. The change of date is discovered by an environmentalist on Dec 26.

Dec. 7. (Wednesday) New versions of FEPs, dated December 1, are posted on the Wespac website, at the end of the day. This is the first time that members of the public are able to see the documents. There is no announcement about the posting of the documents. They are "discovered" by accident by environmentalists examining the Wespac website. The Hawai`i FEP is 299 pages long; the Pacific Remote Island Areas FEP is 232 pages long; there are 3 other FEPs. These FEPs, totaling over 1,200 pages, are the heart of the regulatory changes proposed in the DEIS -- in fact, the DPEIS presents a list of alternative FEP configurations and a preferred alternative.

Dec. 9. Environmental Defense representative calls Wespac office to obtain information on the topic of the hearings: FEPs or DPEIS? Receptionist is unable to provide any clarification and indicates that it is necessary to speak to an expert, who is in a meeting.

Dec. 11 (Sunday) Wespac announcement of public hearings published in Honolulu Advertiser lists hearings on FEPs in five locations in Hawai`i and states that "The Council is the policy-making agency for offshore waters around the U.S. Pacific Islands." No mention is made of the DPEIS.

Dec. 12 (Monday). First Wespac "public hearing" is held in Hilo. However, the lengthy FEPs which will be voted on by Wespac have only been available for less than two work days (Thursday and Friday). Despite Wespac advertisements of the hearing, linking it to another meeting where threats of bottomfishing closures in the Main Hawaiian Islands are made, attendance is sparse.

Dec. 13 Wespac "public hearing" in Kona. Three people testify.

Dec. 14. Hawai`i DLNR receives a new, different and "complete" FEP document, two days after public hearings have begun. Wespac Chair, Frank McCoy writes to DLNR that, contrary to State's assertion, the Dec. 20 meeting is "not an 'emergency' meeting, it is a regular Council meeting." He does not explain why the meeting is not listed on the Wespac annual calendar, nor why it is a half-day meeting, instead of the normal four-day Wespac meeting, nor why it is held by teleconference. He responds to DLNR concerns about the lack of time for them to read, respond to, and check Wespac corrections in response to DLNR submissions by stating that "Council staff are preparing an errata that will be sent to all Council members for their review prior to the December 20 Council meeting. This approach facilitates an easy review of the revised text." No mention is made regarding how the public will be able to see the latest revisions, including the "errata" to the FEPs prior to public comment.

Dec. 15. Hearing in Kahului, Maui.

Dec. 20 Wespac meeting to take "Final Action" on the FEPs. Honolulu "public hearing" on FEPs. Four members of the public testify. Only two "civilian" (non-agency) Council members are present in Honolulu – one, the Vice Chair, has owned companies convicted of poaching in the NWHI;

Dec. 20. At the Wespac meeting, an eight page document, dated December 15 and titled, "Errata" , with "new or revised text" "to clarify information in the Council's Fishery Ecosystem Plans dated December 1, 2005" was made available in hard copy format to members of the public who attended the hearing. It appeared to be largely a response to the DLNR letter of December 2. Members of the public attending other hearings apparently did not have access to this document. As of December 26, the "Errata" document has still not been posted on the Wespac website.

Dec. 27. Close of public comment on the DPEIS.

Appendix B.

Unofficial transcript of Wespac meeting, December 20.
Transcribed from recording by S. Fried.

[appended as separate Word file]

Appendix B.

Unofficial transcript of Wespac meeting, December 20.
Transcribed from recording by S. Fried.

Given the time constraints, there was not enough time to transcribe the entire session. Notes are made where transcription is incomplete. Transcription begins at opening of meeting, when call is made to discuss and approve the proposed meeting agenda.

**Dan Polhemus, Representative of the State of Hawai`i, Head, Division of Aquatic Resources, DLNR:** This is Dan Polhemus representing the State of Hawai`i, Division of Aquatic Resources. We question the reason for having final approval of FEPs on today's agenda. We have three basic reasons for this. First, the Council - at its 129th meeting in Guam -- voted to have final approval of these plans at its next meeting in March in order to provide sufficient time for public comment and editing of these plans. We don't believe that holding final approval today provides sufficient time. One of our rationales for this is that we have going through the Hawai`i ecosystem plan draft that we received on the 6th of December in its final complete form and have found numerous factual and conceptual errors in this plan. We have brought these to the attention to Wespac. They have very graciously and in a timely manner corrected many of these, but in going through the document we find that many many additional errors remain. By giving final approval to these plans today in their current form, the Council essentially endorses these errors which we do not believe is the proper thing for the council to do. In addition we believe that public comment, at least for the citizens of the state of Hawaii has been seriously abbreviated and abridged in that it was only allowed for the public to comment within the last week on this plan. The plan has been in a state of evolution. We only received our corrections to our first set of comments on this plan on Dec 6. [Transcriber's note: actual date Dec 14, DP corrects this later, below]. By that point several public comment meetings had already been held in Hilo and Kona. It is not at all clear to us that the public in certain meetings is seeing the same document as the public in other meetings. We also don't completely understand how you can hold public comment today in this meeting for this plan and then undertake final approval of this plan at the same meeting because we don't really understand how the public's comments will be incorporated in the plan prior to its final approval. Therefore, the state of Hawaii is asking that the final approval for these plans be withdrawn from the agenda at this time and reinstated in March as originally voted by the Council. Thank you.

Chair, Frank McCoy (by telephone from American Samoa): 1;22:37 As you know, uh, we responded to Peter [Young, Director, DLNR]' s letter that answered some of those questions. Uh, you know, technically, this, it's, it's uh there's a feeling here that...evolving into this FEP management scheme, that some big things are gonna change. Well that, that is not correct. And I don't think we should have any reason not to, to go in there. We've had ample time to do this. We voted on it a year ago, over a year ago, to start looking into this process. So, to say that we didn't have time, to review this and review that, I'm not gonna accept that... [laughter from audience in Honolulu] I'm gonna move on. The Samoan delegation and our management people here, there are some words in there that don't necessarily verify a lot of things but those are things we are going to run into with any management scheme as we go along and those are things we can correct along the way. This particular paper is not supposed to be written in stone to where nothing else can come along and change it. It's up to this Council to do so. We need to look, take a look at a broader view of what we're doing and, uh, in fact to do our responsibility under the MSA we, we are used to a single species, we, we would we're pretty much focused on a tunnel vision point of view. We need to broaden our view, we need to look a little, we need to take in what happens to some, at other little places, at different places. We need to seriously consider that, you know, we're all part of this ecosystem and not just what we take from the ocean. We are part of the ocean. So, after having said that, uh, it's open for discussion.

Rick Gaffney, Wespac member (Hawai`i), recreational fisher (by telephone): Mr. Chairman.

Chair: Uh, who are you?

Rick Gaffney: This is Rick Gaffney calling. Um, let me apologize in advance to other Council members and the Chair as a newcomer to the Council process, you know, I haven't been there for previous votes, I'm not fully up and running on the process. First off I'd like to endorse statement by State of Hawai`i because I have all of the same concerns. I would also like to enter for the record, that I have in fact submitted a letter with a number of the things I thought were incorrect, or misstatements or inaccuracies or things that I didn't think were clearly explained enough. I sent that to Kitty Simonds as soon as I had an opportunity to review the version of the documents and I haven't had any response to that either in this eratta document or in any other way. I haven't even had the benefit of the kind of response that Peter Young's questions gave. It just seems to me that this process moving much too quickly. We were basically given 1000 pages of documentation to review in less than a week before this meeting and, you know, I don't work for the council full time. I don't have time to sit day and night and read all those documents. But I can tell you that the documents that I have read -- the one on the Hawaiian archipelago, the one on the FEPs in general, the one on the pelagic FEPs -- I find a number of questionable statements, a number of absolute inaccuracies. I don't feel comfortable with going ahead, with voting on these documents, approving these documents when there are all these inaccuracies. Number two, I don't understand what the rush is, I don't understand why we can't take the time to make these documents correct before we proceed.

Bill Robinson, Pacific Islands Regional Office Administrator, NOAA (Honolulu): I just wanted to comment that the arguments that we have just heard from the state of Hawai`i and member Gaffney are legitimate points of view that should be considered by the Council in determining and deciding whether to approve the FEPs or not. As for whether we should proceed with the agenda or not, I think in order to consider those views, you need to proceed with the agenda. My recommendation is that we proceed with the agenda and have that debate as part of this meeting.

Dan Polhemus: 1:16 I wanted to correct one statement I made. And then follow up on Bill's comment. First my recollection was slightly incorrect. We received draft chapters of the missing chapters on 6 December. We did not receive a complete document until the 14 of December, that is 6 days ago. By that time two public meetings for comment had been held, one on December 12 in Hilo and one on December 13 in Kona. So it is hard to understand that the public could have possibly seen a revised document that we, in fact, had not received until the 14th. I also wish to state that the state of Hawai`i has no objection to ecosystem-based management. In fact, we endorse the concept. So we're not having any difficulty with that. Our issues lie entirely with this ecosystem fishery plan in its current form, which we simply feel has been rushed to completion and contains numerous inaccuracies. For instance, I have a copy here marked up by one of my biologists. It has approximately 15 little post-its in it that indicate places where it lists species within this ecosystem plan or families of organisms that do not occur in the Hawaiian archipelago. Now this is simply embarrassing. And if the Council gives final approval to a document like this, it once again is simply saying that it is willing to live with these errors and factual inaccuracies. And that's my concern. It's largely for the reputation of the Council as a whole that it shouldn't be endorsing documents like this before they're correct. I think in its vote in Guam, the Council did the correct thing. It gave itself until March to make sure that this plan is correct at which time I think there's no problem whatsoever in going forward with it. I think you'll have a very properly edited document. I think as it stands today, it is completely inaccurate. Thank you.

Chair, Frank McCoy: Does anybody else have some comments?

**Hawai`i Council Member, Fred Duerr (by telephone)**. Yes, this is Fred Duerr from Hawai`i. I would too have appreciated more time. I have not completely read all of the documents I have. Although in reading them I find that a lot if it seems to be broiler plate or redundant. I question too, the accuracy and some things that are left out. When we were in Guam, I recall a gentleman standing up and saying that the information we had was incorrect and the information we had gotten, part of it was credited to him. As I read through this I find some things I question and things that I think should be added, discussed. I, too, would be embarrassed to go to a public hearing having voted on something like this that's inaccurate and someone's going to stand up and say "How could you vote, you're supposed to be knowledgeable about this, how could you possibly have voted for this?" And I think we better go back and clean up the inaccuracies and do a little more research or have the people do a little more research for us or provide us with some of this information as [unintelligible] as possible.

Chair: As we stated earlier, council members, this is only the beginning of a process. We"re gonna make mistakes, grant you that. We're not gonna create a perfect paper here, you know, that's the way it works, I mean. We gotta start off with something. We're not taking this for its value in this paper. We're supposed to use our original FMPs as guidelines. This is what's gonna guide us into this process and, uh, we're not just gonna discard what we have in place, uh, we, we, we're not putting in the so-called mistakes that everybody's calling mistakes. It's basically misplaced words and that kind of stuff. It's , you know, I don't see anything, uh, I don't, why would I, I'm the Chairman, I'm not ashamed to put this out.

Bill Robinson, NOAA Piro Administrator: Mr. Chairman..

Chair: And that's the way the world works. People make mistakes.

Bill Robinson: Mr. Chairman, this is Bill Robinson again. I'd just like to reiterate my earlier comment that we are having a substantive debate that should occur under Agenda item 3. We're on Agenda item 2 which is approval of agenda. If we want to have the substantive debate, we should approve the agenda and get on with it.

Ed Ebisui, Hawai`i member, in Honolulu at meeting: Mr. Chairman, this is Ed Ebisui.

Chair: Ed, please go ahead.

Ed Ebisui: Thank you. Um yeah, I support what Bill Robinson is saying and I think we ought to close discussion at this point and just have a vote on the draft agenda. I have things to say, but I think it more appropriate to that it should be done during the discussion phase and

Chair: OK, ladies and gentlemen, I think we got uh, yeah, we got sidetracked. So we'll go ahead and let's approve the, let's do what we need to do with the first part, and uh where were we on that? There was a motion (1:55), there was a second, there was a discussion of a proposal..

Yes, Mr. Chairman.

Chair: All those in favor, please communicate.

Ed Ebisui, yes; Sean Martin, yes; Bill Robinson, yes; American Samoa: 2 yes ; Guam; yes; CNMI; yes (2); Duerr yes; Gaffney ; No ; Dan Polhemus, No.

Chair: We're now on agenda item 3, Fishery Ecosystem Plans, and uh, we're just gonna call on Council staff to present the items A through E. Then we'll get in there and take it up with them. Council staff, please.

Summary, not transcript: Presentation by **Jarad Makaiau, Wespac staff**, on FEPs ensues – lengthy account of measures, modifications requested at 129th Council meeting and changes made to the Draft FEPs to produce the FEPs on which the Council is to vote. Describes 20 year effort to begin to consider "ecosystem management." Indicates that there is now an "errata document", dated December 15. Description of public comments on the *DPEIS* received up to the day prior to the Honolulu hearing (DPEIS comment period extends until Dec 27) and indicated that they had received 696 written comments primarily expressing concerns about the NWHI – i.e. that FEPs undermine NWHI protections because they are not consistent with Executive Order, State of Hawai`i marine refuge rules; that the FEPs do not recognize the NWHI ecosystem; are based on single-species models; that insufficient time was provided for public review of FEPs; supporting a call for an Inspector General investigation of Wespac.

Now we're going to Item 4: Public hearing. I'll turn this over to Vice Char Sean to conduct this hearing from there.

Sean Martin, Wespac member, Hawai`i (Honolulu): Just for clarification purposes. If members of the public are in attendance at one of the sites around the region, we'd ask them to see the area coordinator and get a public comment card and fill that out. If you're wishing to make public comment and are on the phone we 'll accommodate that as well. I have no idea how many people we'll have in the remote areas or on the phone. We'll ask that you limit your comments to 3 minutes. At the end of 3 minutes, I'm going to ask Council staff, with a bell or something her to notify us that the time is up (bell rings). If I hear the bell. My intent is to go around to the regions in the following order. Am Samoa, CNMI, Guam and Hawai`i. … 34:58.

American Samoa? Frank, do you have anybody in attendance there?

Chair: No comment from Am. Samoa.

Sean Martin: CNMI?
Sablan, CNMI (by phone): yes. Mr. (unintelligible) would like to comment.

Mr. …: I jus t want to extend my support for the whole idea. I'm intrigued. I'm hoping this thing is coming through. I'm in full support of it. I just want to extend that. Thank you.

Guam: Frank Tibits (?) Can you hear me? Thank you. My comment concerns boundaries of FEPs. Marianas plan appears, from memory 0 – 200, same for Guam; ours is 3 – 200. Seems that local regulatory agencies might be giving up some control from 0 – 3. We do not want to be losing regulatory authority from 0 to 3. The FEP should just be from 3 – 200 for Guam.

Jarad Makaiau: I can respond to that. The Marianas language is EEZ. That's defined in MSA. There are some jurisdictional issues. By using MSA language it falls into the definition of what the EEZ is, recognized as 3 – 200 nautical miles.

Sean Martin: Hawaii: First I'd like to call Joe Detley.

Joe Detly: Rick Gaffney are you there? Congratulations, Rick. My comments all have to deal with what definition of fish. I was just looking at this public hearing and council meting that came in the mail. I had an interesting experience in June trolling up to the NWHI and back. And on this trolling expedition which basically was strictly pelagic, we had to discard, probably in terms of poundage, maybe a third of our total catch which consisted of those things in the NWHI which were defined as bottomfish, that is kahala, rainbow runner, uku and ulua and I'm looking here that they're talking about reducing bottomfish catch in MHI and considering area closures at Penguin Bank, Middle Bank and summer seasonal closures throughout MHI. It's important I think to also take , if this comes about, to take kahala, uku and rainbow runner and ulua off the bottomfishing plan and put it over in pelagics. Otherwise you're going to run into a lot of discarded bycatch. I'm sure Rick know we catch a lot of kahala off the grounds of Kona,live baiting for ahi and marlin, not that that's avery valuable fish. But it just kinda violates the basic rules of fishery management to have the rules in place that would force me for no reason at all to throw away maybe two to three thousand pounds of fish caught pelagic trolling just because of an erroneous definition. And, that's it for me.

Cha Smith, Kahea: [Summary, not transcript] 26:59 Testifying on behalf of 2,000 people part of Kahea network throughout Hawai`i. We will be submitting written testimony. Violation of NEPA, public is being locked out of this process in numerous ways, some of which has been pointed out to you by swtate and federal officials, members of the Council. Serious errors and flaws. Procedural flaws made it virtually impossible for public to have any kind of meaningful contribution to this process. Honolulu hearing – during a work day (unlike neighbor island hearings), in holiday season. Are you trying to make it impossible for people to come? It's very difficult for people to come during the work day? I'd certainly like ot hear your rationale for that. Inspector General request for investigation. People feel like enough is enough. We support call for full public investigation. State refuge. Need to treat NWHI as an ecosystem. Current DPEIS will not provide level of protection needed throughout the NWHI. US F&W boundaries must be respected, not weakened or eroded. Wespac's a bit out of step (three minute bell rings on the phone) No reason for this "fast forward" – errors, need to start the hearings over, allow adequate time for public input, appropriate hearings.

Marti Townsend: [Summary, partial transcript] 20:00. Looking over the document. Listen to suggestion of State of HI and council members and allow enough time for public comment. NEPA violation. Need to stop what you're doing. Freeze. Correct the mistakes. Republish the document and re-start the clock on public comment. 90 day instead of 60 day public comment period (this is ecosystem plan, different from FMPs). This council should not be voting on this document at this time. Thank you.

Stephanie Fried: (partial transcript/partial summary – missing parts) Environmental Defense. Thank you for this opportunity to spend three minutes of time expressing an opinion on 1200 pages of documents that were presented, one draft of which was presented to the public on Wespac's website last Wednesday at close of business. Public hearings began in Hawai`I on Monday, that's two working days afterwards. There is no conceivable way that there could be informed public input on this set of documents through this process. I would also like to state that we heard Governor Lingle's representative strongly object to a vote in this meeting and heard the federal agency representative say that those concerns were legitimate. We second those concerns17:34 and have strong concerns about the NEPA process being followed. NEPA does require public input and again there is no way that the hearings that were held last week could provide public input on a 1200 page document htat we had not seen. I was very interested to hear from the State's representative that other documents came out on December 14. Of course, we haven't seen those. This morning I saw an errata document but of course I haven't been able to read that. I have looked at some of these plans and they are loaded with errors. There are so many errors. I'd like to go through some of this information. I hope you will bear with me and we will be trying to submit written comments.

Although I would like to call upon the NMFS representative to consider extending the December 26 deadline for comments on the DEIS because frankly the heart of the DEIS is these FEPs and there is absolutely no way to have a good detailed analysis of these plans done and there's been no public hearing process on these. I echo the state's call for a March vote on these, proceeded by a full and open period of public comment. One of the disadvantages of holding an emergency meeting such as this by telephone is that those of you on the phone are unable to see in the audience that there are a number of people standing around holding signs saying "Investigate Wespac", "Save the monk seals/ Stop Overfishing", "Protect our Oceans", "Stop the deception, investigate Wespac". If you were here in person, you would see this.

The process leading to this meeting is a textbook example of why a federal investigation of Wespac is fully warranted. I'd like to submit as part of my testimony, for the record, the request by the Oahu Game Fish Club and the Waianae Boat Fishing Club for an IG investigation. [Bell rings.] I hope you don't mind if I continue…….[not enough time to transcribe this material]; ….we don't even know what documents are being voted on because we haven't even seen any of the corrected versions. We don't know what is actually, what we're supposed to be commenting on. …. Concerned re FEP boundary "expansion"; lack of need for "emergency" meeting;

0:13:52 We call for a complete redoing of this process. We want to see an actual corrected document, not something that is so riddled with errors on the science, on the policy. We want to see a fully corrected document presented to the public, for public comment with enough time in advance to be able to read the document. Two working days is certainly not enough time to process all of this material. We want to see the NEPA process followed. And we're very very concerned that final action will be taken today. We're also concerned, and this is just looking through the DEIS document. This DEIS document appears to be promoting coral harvesting in the NWHI. There is a list of banks for which there are harvest quotas – Brooks Bank, etc. It appears to be promoting lobster fishing in the NWHI. We're not sure how, in the light of NOAA's recent rejection of these sorts of plans for the proposed sanctuary how this works. It seems to us that these FEP plans that we've seen so far are almost fake ecosystem plans. I can't think of a nicer word. They appear to be all of the same old single species plans just cobbled together, gift wrapped with a new name and presto, that's an Ecosystem Plan. We don't see any of the complexities that you'd need to deal with in an ecosystem. This whole process has been fraught with confusion. We're under the impression, and maybe I can ask the NMFS representatives to clarify, we're under the impression that Wespac is not an agency. We're under the impression that Wespac is a federal advisory council but not an agency. Is that correct?

Bill Robinson: Thank you, Mr. Chairman. That's right Magnuson Stevens Act establishes the Councils as federal entities which are advisory bodies.

Stephanie Fried: Right, to an agency, such as the National Marine Fisheries Service. So that's why we were very confused to see Wespac's announcement of the hearings stating that it is the policy making agency for offshore waters of the US Pacific.

Sean Martin: Any comments from American Samoa, Guam CNMI; Any telephone commenters from state of Hawaii. In that case, East Coast of US? West Coast of US? Any international guests that would like to make comments? Any telephone commentors from anywhere?

Chair: We'll open the meeting to Council discussion.

Ed Ebisui: Mr. Chairman, this is Ed Ebisui. Mr. Chairman, Ed Ebisui. Mr. Chairman, I have a motion. Please. One moment, I'm going to ask Jarad to get it up on the screen here. Ok, Mr Chairman, my motion is that the Council adopt the FEP Objectives, Boundaries, Management Unit Species, Structure of Council advisory bodies and regional coordination and community participatoin. Prior t o transmitting to NMFS for review and approval , task council staff with working with NMFS to correct typos, errors, clarify any confusing language, allow DLNR to review Hawaii FEP and work to respond to any further concerns, respond to public comments, as appropriate, and coordinate with NMFS implementation schedule regarding other regulatory issues that are in process. That is my motion, Mr. Chairman.

Ben,CNMI: Mr. Chairman, CNMI, second the motion.

Chair: we have a second. For discussion. Ed can you please read it out so corrections can be made.

Ed Ebisui: [reads the motion again] [busy signal comes on loudly, apparently disconnecting council members from phone conference.]

Chair: Calls for break in meeting, voice drowned out by busy signal.

BREAK

Meeting resumes:

Chair: it's just what we're, what we're gonna to do.

6/ 3/13:08 **Rick Gaffney**: I have a problem with the fact that we're being asked to vote on something that's called a "Final Action." We're being asked to accept the FEP objectives 1 – 10 are precisely the way we want them. We're being asked to state that the FEP boundaries are precisely the way we want them, as Council Members. We're being asked to vote that the Management Unit Species are absolutely correct and in my reading of the documents, I can't do that. I have problems with all of those specifics and I think it's really really too early. I'm not willing to give carte blanche by voting in advance for a document that may be corrected and my concerns may or may not be incorporated. So that's my doubt at this point. I have a problem with accepting everything. I was hoping that as part of the council discussion process we could get answers to some of our questions. We could talk about the specific language of some of the objectives, talk about the list of MUS's and try to get some of this stuff straightened out before we voted on it today. I didn't expect an early motion which was asking us, as I understand it, basically to give carte blanch to council staff to proceed to finish a document that we have pre-approved. And I don't think that's an appropriate action.

Ben Sablano from Commonwealth of Northern Marianas Islands: Mister Chairman, I'd like to call for the question.

Laughter from the audience.

Chair: Ben are you still [unintelligible]. You know Rick I have no, any particular thing to say but that's the Council process. That's why council members get together and uh take on this responsibility [unintelligible] whether they agree or disagree on something. That's the priveledge given to us. Up to each individual to take it to heart and [unintelligible] use your common sense [unintelligible]that's your freedom too, as you wish. Any further comments? 6/43:43

Ed Ebisui: Mr. Chair this is Ed Ebisui. The only advice I have for Rick is that in my experience I've been on the losing end of many votes. But that's the way it is. The council has also reconsidered action too. So , it's all part of the process. Thank you.

Rick Gaffney: If I might respond. I appreciate the input from council Chair and Ed Ebisui whom I've known for many hears and I have a great deal of respect for his knowledge of council process and so forth. I'm new to this process and I apologize if I'm making it more difficult for some people. I just feel like this FEP thing that we're stepping into, which I support 100%, is so important that we get it right. We're making a major transition, as Jarad pointed out.

For 20 years, the Council has been talked to by the government about making the transition from species-based to place-based management. That's what we're doing. If you start that process with a flawed document, I really think we're making a mistake. I think we'll be a laughingstock in the public's eye and I just don't think it's appropriate. No one has explained to me why there's a rush to complete these Final Actions in today's meeting and why we can't ask the staff to go back and take some of these inputs from the state, from Council members and from the general public and fix them and come back and vote on this at the next Council meeting in March. I just feel like there's a rush to judgment here and I don't see the rush when the process has been twenty years long so far. Why are we forcing the situation in two weeks? It just doesn't make sense to me.

6 41 **32 Dan Polhemus**: Dan Polhemus, State of Hawai`i. I would like to comment and then I'll stop [unintelligible]. Essentially, our take on it is that the State of Hawai`i has a certain level of scientific integrity to uphold in this process and given that we have identified serious problems with the document as it stands, given that the NOAA representative has acknowledged those problems, given that several other Council members have also found those problems or other problems that we didn't see, it seems that there are a fair number of people on this Council who realize that this document is simply not ready for final action. And we simply do not understand why it is being rushed to final action and we do not see any real benefit to the Council by doing this. And therefore we are not going to support this motion. We are not going to support final action on this document.

Chair: Thank you for the comment. Do we have any more?

Sean Martin: Just a question for Council member Gaffney. Are there specific items in the document, I know you've articulated that you haven't really had time to read it, are their some specifics that stand out for you? It's just a question. You know to kind of get a flavor of what some of the things are that you may be referring to?

Rick Gaffney: Yeah, if I may, Mr. Chair may I respond.

[Silence]

Rick Gaffney: Mr. Chair, Rick Gaffney, may I respond?

Frank Mc Coy: Yeah go ahead.

Rick Gaffney: (partial transcript of Gaffney's detailed list of concerns). Yes, Sean I appreciate your opening that up. And I'm not even sure if it's appropriate under the current motion. I was going to take each of these items. I have language changes I'd like considered for the objectives 39:45… The MUS section in every one of the plans that I've read has errors in it. … Based on commercial harvest, not on the ecosystem. We're adopting a subset of the ecosystem and that doesn't make any sense to me. I found Chapter 7 in every one of the FMPs to be very non-definitive. Those are the kinds of things I'd like to spend time going through. I've already submitted one list to Kitty and asked for those to be considered.

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37 35**Dan Polheums**: State of Hawai`i. I just wanted to point out one more example of the problems. This is in terms of just Wespac not keeping its own actions straight. In our draft of the Hawaii FEP the discussion of the black coral fishery, the size and height exemption language that fishermen previously harvested in state waters is still retained even though the Council took Final Action and removed this exemption at its 129th meeting in Guam. So at the very least, the FEP should at least reflect the current Wespac policies which it clearly doesn't. And once again, this simply indicates that this document is being rushed to completion and Wespac can't even keep its own policies straight inside its own document.

Chair. Any more comments? We're gonna have a couple more comments and then we're gonna put this thing to a vote. We're gonna call.

Ray American Samoa; Mr Chairman, I'd like make a motion [unclear] territorial jurisdiction participates in making corrections.

Fred Duerr: I've got a problem. If we vote for this, it's approved. What we're doing is we're saying is that we agree with whatever our staff comes up with. And even though we get to review it, we've already voted that we've accepted it. And it's like writing a blank check. I have a hard time writing a blank check and letting somebody fill in the amount. I would like to withhold my vote and see the document and have an opportunity to vote on what's really there rather than vote that I'm accepting whatever we come up with.

Chair: Uh, Fred, uh, I don't, uh I think this a misunderstanding here, uh when we saying this, we will be working with NMFS and NOAA and State of Hawaii and other entities, American Samoa Department of Fisheries, you know, I think we're not saying they're going to do whatever they want to tell us. I mean this is exactly what the council is for, to look after the interests of all of our constituency, including you know the indigenous people.That's what we're gonna do.

Fred Duerr: Yes, I guess, I, I guess I

Chair: We're not signing away a blank check, you know. We're already allowing participation to clarify any confusing language that may exist. I mean, there's nothin' wrong with it. We can't keep uh discussing it, we're discussing it here.

Fred Duerr: I understand that but maybe I just can't get it into my thick head that when we're taking Final Action, we're voting Final Action, and then we're saying that we're going to have staff make changes and yes, you can have some input but does that input, does it come back to the Council again? Do we get to review it? And vote on it again? What if we don't like it? What if we still don't feel that it satisfies… 33 35

Chair: Well, that's the process. That's the process. Thank you. Did I hear someone else there?
Manny: It's Manny from Guam.

Chair: Haven't heard from you, Manny.

Manny: I've been absorbing all the information from everyone and its disheartening that this document is being discussed over and over again. The thing that bothers me the most is that it's only a plan. And this plan provides for amendments to previous plans, to plans that we have on our shelves. This plan is gonna go through many changes in the future and the only thing I appreciate most about this plan is the tie-in of everything, everybody, all the stakeholders worked together on this plan. That's what really bothers me, coming from the islands, is that we have the federal side on one side, we have local government on one side and we have other people in between. And now we're going to put everybody together and vote as one big stakeholders meeting. It seems to me that people don't like that idea. They have a different agenda. They want to keep their own little kingdom and that really bothers me. Because the people that suffer the most are people that use the water, the families, the fishermen, the subsistence fishermen of this island are gonna suffer continuously because of other impacts that we're not addressing because we say that the line of demarcation that goes from 0 to 3 belongs to you and 3 to 200 belongs to me. And we can't have dialogue. And that's all this plan is doing is providing for dialogue. And I think that all the people that have concerns, or problems, they have those problems. But I think we need to move forward. And to have this fishery ecosystem. And when we go to a council meeting and we discuss one proposal by someone, it sometimes takes half an hour to finish one sentence. You can imagine how long, the fish would be gone, the users would be gone before this document ever gets approved if we're gonna follow that type of discussion, line by line. And with that in closing, Mr. Chairman, I call for the question because this discussion has gone too far. And I'm sorry that people wanna wait til March. But I can't wait til march because there'll be another meeting in June and then another meeting in October and that's too much, way to much to finish waiting for this thing to go. Like I said it's not set in stone and I don't know if it's considered a blank check because I have not seen anything that funds anything or a blank check in the sense that people can do what they want because there are limits to every document that we produce. We have to deal with all the people involved. We do not circumvent federal law. We do not circumvent local law. We work together with all the stakeholders. And as a stakeholder, highly involved in this issue on this island, I really am appalled by the fact that we're gonna keep postponing this issue. Because the land-based issue is not being addressed and it's gonna affect the arcipelagic inshore { }. But as long as we continue to argue this point over and over and time again, it's gonna be a total waste of time. I'm tired of talking through the telephone. Thank you.

Chair: Thank you, Manny. Gentleman and Ladies of the council.

Bill Robinson: Mr. Chairman, Bill Robinson.

Chair: We can talk all day. We're still gonna all feel different about it though.

Bill Robinson: Mr Chairman

Chair: The Chair feels strongly that this is the way to go. We need to take a broader look and this opportunity is a way that allows us to do that. And it's up to you gentlemen, you vote your conscience, you vote what you concluded. But I'm gonna call for the question.

Bill Robinson: Mr. Chairman, this is Bill Robinson, may I make a couple of comments. I've stayed out of it so far.

Chair: Yeah, Bill.

Bill Robinson: I think the, although I don't have any substantive structural issues with the adoption of the objectives, boundaries and management species, I would point out that the structure of the council advisory bodies and regional coordination are really Council policy issues, they're not federal actions that are subject to NEPA. So I think really the issue here is whether council members believe there are substantive issues with the objectives, boundaries or management unit species or whether the motion can be adopted and all of the non-substantive issues can be cleaned up by a staff-to-staff review by the state of Hawai`i, and other council members and to go forward. If you think that the concept, and let me back up a little bit: what these FEPs are not new FMPs and the old FMPs are not going away. They are amendments to the existing FMPs that simply re-organize and re-title the existing plans in such a way as they transition from single species based plans to place-based plans. They set the ground work for further elaboration through further Council action, for example, changes in the MUS might be the next thing that the Council might contemplate, changes in boundaries might be the next thing that the Council might contemplate or methods for encorporating ecosystem processes might be the next thing that the Council might contemplate.

This simply lays the groundwork for doing some of this so that's something to keep in mind. The comment was made that these are not fully mature evolved ecosystem plans and that's true. They are not. And it is true that there are still remaining issues and concerns that a number of us have. One concern that we have is jurisdictional issues. We want to make it very clear that the language in these FEPs does not cede any federal authority to communities, to states, to indigenous groups on a basis that would violate any principal federal laws or policies. By the same token we would want to make sure that the language is clear that the federal government is not usurping any authority that the territories or the states have the right to exercise and we, too, have some concerns about that and feel that those types of things have to be clarified, need to be clarified.

The only issue at this point, as is so often the case, is whether the Council is comfortable going forward with basic substance of the FEPs: the boundaries, management species, objectives and allowing the basic clarifications and error corrections to be done by staff prior to transmitting it to the NMFS. Or whether the Council feels it needs to see each and every correction. I would only point out that I can't think of a single instance when an action was submitted by the Council to NOAA fisheries and we haven't gone back to the Council and said, "Well, there's a mistake here. This detail is wrong. Change this." Even, in every case, after the council takes final action there's always a need for some modification. I think, you know, at this point I won't say any more. I think that's really the issue before you. The way that it's structured, we have some confidence that we can work with Council staff to clear up any errors 24 21 and any of the concerns that NOAA Fisheries has with it. And I would think that by working with the state of Hawaii and giving them the opportunity to provide input on their concerns, that concern could be met too. Those are my thoughts.

Chair: Well we have a motion and we've had a discussion and I'm gonna call for the question.

3;13 **Bill Robinson**: Mr. Chair. This is Bill Robinson again. I just wanted to add one thing and that's that, uh, from NOAA Fisheries standpoint, we would not accept the document to start Secretarial review unless we were comfortable that the concerns that we have were fully addressed.

Chair: [unintelligible] Wouldn't the modification come into consideration?

Bill Robinson: Mr. Chairman, what I was saying was that the outcome of this motion, the staff's working together and the various reviews that produce the final documents that come to NOAA Fisheries, we still would have an opportunity to review those final documents and if we don't feel that they, uh, match up with what we think is an appropriately, a document that is of appropriate quality, we'd probably send it back to the Council for further work.

Chair: Your concerns have been noted.

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December 20, 2005

VIA e-mail to WPEAMPEIS@noaa.gov

William L. Robinson
Pacific Islands Regional Administrator
National Marine Fisheries Service
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Subject: Draft Programmatic EIS

Dear Mr. Robinson:

Thank you for the opportunity to comment on the Draft Programmatic Environmental Impact Statement Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans, dated October 27, 2005 (DPEIS). Although the overall goal of the document appears positive, the document is insufficient in that it does so little to improve the current management in the Western Pacific Region. As set forth below, this DPEIS suffers from serious flaws.

The DPEIS itself states repeatedly that that the "measures being considered would reorganize the current fishery regulations by geographic area, but would not result in substantive changes to the existing regulations." (DPEIS at i). Further, the alternatives considered "are strictly institutional." (DPEIS at 219).

NEPA requires that major Federal actions "significantly affecting the quality of the human environment" contain a detailed statement of, among other things, "the environmental impact of the proposed action." 42 U.S.C. § 4332(C)(i). Here, by defining the action too narrowly, the agency has failed to consider the full effects on the human environment as required under NEPA. A switch to environmental planning must include full discussions and analyses of the interconnectedness of habitat and species as a unified whole. It must consider the food chain and possible disruptions to that chain. Only then will the quality of the effects on the human environment be fully discussed.

The analysis, as is, ignores the essence of ecosystem planning, which is designed to force consideration of the interactions among various species. The agency and the fishery council simply omit the interactions among various species, putting this important analysis off for another day. This is, in fact, not ecosystem planning at all.

Here, the ongoing reliance on the existing regulations indicates that continued single species management will continue. This ongoing use of the single species management model will guarantee the continuation of overfishing, collapses in stocks, and habitat destruction. That is most evident when it comes to the subject of bottomfishing in the Northwestern Hawaiian Islands. The DPEIS is internally inconsistent and continues to discuss falsely the current state of fishing in the NWHI. The DPEIS states: "The 'pristine' condition of this resource is likely to continue, because they are distant from land based sources of pollution as well as protected from any large-scale human activities in the region." (DPEIS at 137). However, the DPEIS also acknowledges that it was determined that the Hawaii Archipelago multi-species bottomfish complex was subject to overfishing as defined in the Magnuson-Stevens Act, "with the Main Hawaiian Islands the area where the overfishing problem primarily occurs." (DPEIS at 139). The truth is that there is overfishing in the NWHI, as set out in the very documents issued by NOAA[1], and this ecosystem plan is an appropriate place to address this problem. Ignoring the problem and allowing the overfishing to continue is simply an attempt to bury the ongoing problem and violate the tenets of NEPA.

In other areas, the DPEIS demonstrates the other problems of this area. The turtle populations are either listed as threatened or endangered. (DPEIS at 82-90). The Hawaiian monk seals, with their entire population occurring on the NWHI, is well below its "optimum sustainable populations." Since 1985, "the overall population has declined approximately three percent per year." (DPEIS at 92). Yet, the document refuses to analyze substantive measures to address these important environmental concerns. Instead, the DPEIS maintains that only procedural changes need be considered at this stage. Again, this is unacceptable under NEPA and flies in the face of common sense. What is

[1] By Federal Register Notice dated June 14, 2005, the National Marine Fisheries Service (NMFS) gave notice that it had made a determination that overfishing is occurring on the bottomfish multi-species stock complex around the Hawaiian Archipelago. See also May 27, 2005 letter from William Robinson, Regional Administrator of NMFS to Roy Morioka, Chairman of the Council, attached to the Federal Register Notice, and Appendix 5 of the Council's 2003 Annual Report on the Bottomfish and Seamount Groundfish Fisheries of the Western Pacific Region.

needed is full application of the ecosystem approach and not simply a procedural move in that direction.

Thank you for consideration of our comments.

Sincerely,

Ellen Athas
Director of Ecosystems Protection

cc: Susan A. Kennedy
Acting NEPA Coordinator
nepa.comments@noaa.gov

MCBI
MARINE
CONSERVATION
BIOLOGY
Institute

December 26, 2005

William L. Robinson
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Mr. Robinson,

This letter constitutes Marine Conservation Biology Institute's (MCBI) comments on Wespac's *Draft Programmatic Environmental Impact Statement: Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans*. As detailed below, MCBI has serious concerns about the legality and sufficiency of this document and Wespac's overall plan to replace FMPs with FEPs.

<u>Background</u>

Wespac has taken the first steps to move from fishery management plans (FMPs) to fishery ecosystem plans (FEPs), in an attempt to implement ecosystem-based management. As part of this transition, Wespac has released and approved five FEPs: one for each of the four different regions under its jurisdiction, and one for the pelagics fishery, which Wespac describes as cutting across all of the different regions. At somewhat the same time, Wespac has been writing a programmatic environmental impact statement (PEIS) on whether to transition to FEPs, and if so, what the geographic boundaries and species covered in the FEPs should be. These comments are intended to address the glaring faults with the draft programmatic environmental impact statement, entitled "Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans."

MCBI applauds moves away from the flawed species-managed plans currently in place in the Western Pacific and towards ecosystem-based management, as recommended by the U.S. Commission on Ocean Policy and others. However, it is our view that Wespac's recent steps in the direction of ecosystem-based fisheries management are deeply flawed. We feel that the draft PEIS violates both NEPA and the Magnuson-Stevens Fishery Management and Conservation Act so extensively that it, and the FEPs that have already been approved by Wespac, should be withdrawn until a PEIS that does not violate existing law has been produced.

<u>NEPA Violations</u>

The draft programmatic environmental impact statement substantively violates NEPA. NEPA requires analysis of a potential action's environmental impacts *prior to final decisionmaking*. (42 U.S.C. § 4332(C).) In executing this analysis, NEPA's implementing regulations require

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that: "The [environmental impact] statement shall be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made." (CEQ NEPA Regulations at 40 C.F.R. § 1502.5.)

In the case of the draft PEIS and the FEPs, Wespac acted on the following dates:

9/30/05	Release of Draft FEPs (as of 12/7/05, the Hawaii Archipelago FEP was still missing chapter 7, "Integration of Ecosystem Approaches to Fisheries Management in the Mariana Archipelago FEP" and chapter 10, "Draft Regulations for Hawaii Archipelago FEP")
10/27/05	Release of draft Programmatic EIS on the move from FMPs to FEPs
12/20/05	Public hearing held by Wespac in Honolulu on the draft FEPs (held simultaneously with the Wespac Council Meeting) Wespac took "final action" on the FEPs during its council meeting, approving the draft FEPs
12/26/05	End of public comment period on the draft Programmatic EIS on whether and how to have FEPs in the Western Pacific region

As can be seen, Wespac took "Final Action" on the fishery ecosystem plans (FEPs) *prior even to closure of the public comment period for the draft PEIS*. Wespac therefore finalized its decisionmaking *substantially prior* to finishing the PEIS process, a clear violation of NEPA. The timeline followed by Wespac in releasing the draft PEIS and taking final action on the FEPs indicates that the PEIS could not be informing Wespac's decisionmaking, because their decisionmaking has been completed before the PEIS analysis. This is completely contrary to the intent and requirements of NEPA. It is our understanding that the usual process for amending FMPs requires that the draft amendment not be issued prior to a draft EIS on alternatives for the amendment, and similarly, that the final amendment not be issued prior to the final EIS. Only by following such a timeline is the agency able to incorporate NEPA analysis into its decision-making. In this case, however, Wespac issued the draft FEPs prior to the draft PEIS, and has taken final action on the FEPs prior even to the close of the draft PEIS comment period. There has also been no comment period on the draft or final FEPs, only on the current draft PEIS. In confusion about how NEPA was being followed in this process, MCBI spoke with staff in both the NMFS PIRO office and Wespac; both staffers told MCBI that the usual NEPA process followed for FMP amendments was not being followed in this case, and both expressed confusion at what exactly was being done in this case. The NEPA process has been so abused in this case that it seems no one is clear on what the timeline is, or when public comment is being accepted for the FEPs as opposed to the draft PEIS.

The entire process used by Wespac to decide how to implement ecosystem-based fisheries management is therefore flawed. We feel the only solution to this egregious violation is to withdraw the final FEPs until the final PEIS is completed.

Violations of the Magnuson-Stevens Act

Under Section 302 of the Magnuson-Stevens Act, the fishery management councils are required to establish fishery management plans (FMPs).

> Each Council shall, in accordance with the provisions of this Act – (1) for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan, and (B) amendments to such plan that are necessary from time to time... 16 U.S.C. 1852(h).

In 1999, Congress mandated that NMFS write a report to set the stage for subsequent federal efforts to implement ecosystem-based fisheries management (EBFM). NMFS convened a panel of experts to assess the extent to which ecosystem principles are currently applied in fisheries research and management, and recommend how best to integrate these principles into future activities. This Ecosystem Principles Advisory Panel (EPAP) recommended that:

> Councils **should continue to use existing Fishery Management Plans** (FMP) for single species or species complexes, **but these should be amended to incorporate ecosystem approaches consistent with an overall Fisheries Ecosystem Plan** (FEP). The FEP, to be developed for each major ecosystem under Council jurisdiction, is a mechanism for incorporating the Principles, Goals and Policies into the present regulatory structure. The objectives of FEPs are to:
>
> • Provide Council members with a clear description and understanding of the fundamental physical, biological, and human/institutional context of ecosystems within which fisheries are managed;
>
> • **Direct how that information should be used in the context of FMPs**; and
>
> • Set policies by which management options would be developed and implemented. (EPAP Report at 2 (emphasis added).)

Congress has funded the Atlantic and Gulf of Mexico Councils to conduct a pilot program on implementing ecosystem-based fisheries management. However, nowhere is the Magnuson Act's provision requiring FMPs for managed fisheries excused. In fact, all guidance on development of fishery ecosystem plans is echoed in the approach that the South Atlantic Council is taking: keeping FMPs, creating a new over-arching FEP, and amending FMPs as needed to implement the FEP. Only by both implementing an FEP and amending existing FMPs to incorporate ecosystem principles and information laid out in the FEP, can ecosystem-based fisheries management be achieved while still complying with existing law under the Magnuson-Stevens Act.

Wespac, however, seems to be forging ahead on its own and disregarding the advice of the EPAP report, which recommended development and implementation of FEPs *in addition to* FMPs. Under the EPAP approach, FMPs should still be used to manage single and multi-species fisheries. In the opening of its draft PEIS on whether and how to switch to FEPs, Wespac is very clear that it is "developing five place-based Fishery Ecosystem Plans (FEPs) to **replace** the existing species-based Fishery Management Plans for fisheries in the Western Pacific region." (Draft PEIS at i (emphasis added).) There is nowhere in the draft PEIS an analysis of whether the Magnuson-Stevens Act authorizes such a switch in management structure, or what the structure of the FEPs will be. Finally, there is no mention of how the Magnuson-Stevens Act requirements for FMPs of managed species will be met if FMPs have been replaced by FEPs. While we have serious concerns about many aspects of existing FMPs, and applaud a move towards ecosystem-based management in the Western Pacific, such a shift in management must not be done at the expense of existing law.

Wespac's Hindrance of Public Involvement

In the draft PEIS, Wespac states that:

> A major function of NEPA is to ensure that Federal agencies undergo a public disclosure process when making decisions that may affect the environment. The NEPA process fosters public participation by requiring that Federal agencies conduct public scoping meetings prior to the development of a Draft EIS as well as make all Draft and Final EISs available for public review and comment. (Draft PEIS at 11.)

Despite their assertion that public involvement is an important part of the NEPA process, Wespac has hindered public involvement on several occasions. Wespac held an Ecosystem Science and Management Planning Workshop in April 2005, "which was attended by world renowned ecosystem scientists as well as high-level government agency officials." (Draft PEIS at 19.) Wespac supports its move to FEPs by citing the results of this workshop: "The compiled proceedings of that workshop are currently under development, however, there was a general consensus amongst workshop attendees that the Council's plan to initiate an incremental shift towards ecosystem approaches to fisheries management by implementing place-based FEPs related to archipelagic boundaries was appropriate." (Draft PEIS at 19.) Despite Wespac's claim of the importance of public input, this workshop was not open to the public. After several requests, MCBI was able to have our Chief Scientist, Dr. Lance Morgan, attend the workshop, but he was informed in advance that there would be no opportunity for him to speak or contribute. The workshop, which Wespac appears to use to legitimize their switch to FEPs, could have offered an important opportunity to educate the public about ecosystem-based fisheries management, and to receive involvement of cross-disciplinary scientists – which is after all one of the main tenants of ecosystem-based management. Instead, Wespac chose to exclude the public from this important meeting.

We have found that the draft PEIS is so vague as to make commenting on it difficult; there is nowhere a discussion (other than the discussion of what geographic area they would cover) of how the FEPs would be structured, what they would contain, or how they would comply with the requirements of the Magnuson-Stevens Act. Without knowing more about how the FEPs would be carried out, it is difficult to comment on the draft PEIS. In looking at the FEPs for insight into how Wespac would implement the preferred alternatives of the draft PEIS, we are not imbued with confidence that Wespac will manage the fisheries of the Western Pacific in accordance with existing law or true involvement of the public.

The draft FEPs that were issued a month prior to the draft PEIS (we reiterate that the FEPs are in violation of NEPA) were missing key chapters until only a couple days prior to the vote on whether to approve them. The draft FEP for the Hawaii Archipelago, for example, was missing "Chapter 7 – Integration of Ecosystem Approaches to Fisheries Management in the Mariana

Archipelago FEP" (Draft FEP for the Hawaii Archipelago at 174), the section on how the document complies with Executive Orders 13178 and 13196 (Draft FEP for the Hawaii Archipelago at 194), and "Chapter 10 – Draft Regulations for Hawaii Archipelago FEP" (Draft FEP for the Hawaii Archipelago at 211). In addition to our own frustration and confusion as to when public comment on the FEPs is going to occur or on which version of the FEPs, we hear from the Northwestern Hawaiian Islands hui and others that the public feels shut out of the process.

Public review and involvement in the NEPA process requires the public to be allowed to be involved, and release of an EIS that is clear and comprehensive. The public was explicitly prohibited from involvement in the workshop that helped shape the draft PEIS preferred alternatives, and the draft PEIS is too vague to permit informed public comment.

Guidance on Fishery Ecosystem Plans

We feel that Wespac has also fallen short on its interpretation of ecosystem-based fisheries management (EBFM). There are on-going pilot projects to implement ecosystem-based fisheries management in the East Coast and Gulf of Mexico Councils. NMFS has refrained from issuing guidelines on how to implement EBFM until there is a legislative authority that applies to all councils, and until the results of the pilot project are determined.

The South Atlantic Council, part of this pilot project, has been engaged in a several year process to determine how to proceed with implementing ecosystem-based fisheries management and the eight principles established by the NMFS Ecosystem Principles Advisory Panel. The South Atlantic Council process has involved numerous meetings and workshops (15 workshops in 2003 alone), all open to the public, on the general and specific requirements of EBFM. The approach the South Atlantic Council has decided to take, and which it is in the process of implementing, is to release an FEP which will include comprehensive amendments to all of the FMPs. Deriving their authority from the Essential Fish Habitat Final Regulations, the South Atlantic Council is developing a comprehensive FEP derived from their comprehensive Habitat Plan. The FEP will result in an amendment to each of the FMPs to take into account the ecosystem-based foundation and principles expressed in the FEP.

> The transition from single species management to ecosystem management will involve incremental steps to better characterize the system and understand the complex relationships among humans, harvested fish and prey, all marine life and essential habitat and environmental characteristics of the South Atlantic Ecosystem. This effort will provide the Council with a foundation from which to attain a more comprehensive understanding of habitat and biology of species, fishery information, social and economic impacts of management and ecological consequences of conservation and management. The Fishery Ecosystem Plan will specify research and monitoring needed to fully address ecosystem management. (SAFMC Action Plan for Ecosystem-Based Management.)

This approach is consistent with the Magnuson-Stevens Act, which refers only to FMPs and makes no reference to FEPs, and with guidance from the Ecosystem Principles Advisory Panel and other groups.

On the other hand, Wespac's approach is based on one workshop which was closed to the public, makes no attempt to abide by the requirements of NEPA or the Magnuson-Stevens Act, and does little to achieve the Ecosystem Principles Advisory Panel principles. While Wespac considers alternatives for four aspects of FEP implementation, there is no discussion of how FEPs will fit into the overall fisheries management process, or what the structure of the FEPs will be. The failure of the draft PEIS to address the eight Ecosystem Principles Advisory Panel principles is due in large part to the vagueness of the proposed action. Wespac several times raises the inadequacy of existing data, yet promotes gathering even more types of information. The inevitable conclusion is that Wespac will be swamped in data that is presented on different scales and which neither NMFS nor Wespac will be able to analyze due to lack of resources.

By barging ahead like a bull in a china shop, Wespac will almost certainly find that its approach at EBFM is not identical to the one finally authorized by law and regulations. It is duplicative and wasteful for Wespac to proceed on its own at this time, rather than waiting to conform to future national standards.

Conclusion

In summary, Wespac's draft PEIS on the move from FMPs to FEPs violates NEPA, the Magnuson-Stevens Act, and guidance on what ecosystem-based fisheries management should be. The only way to address these deficiencies is to withdraw both the draft PEIS and the already finalized FEPs, and rework the draft PEIS so that it is a legal and useful document. As part of this rewrite, the draft PEIS should consider not just what the geographic boundaries of FEPs should be, but whether the proposed action of creating FEPs to replace FMPs is authorized under current law or would require a change in law.

Sincerely,

Hannah Gillelan, Esq.
Director of Policy Research

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
PN-06-331

DEC 27 2005

Mr. William L. Robinson
Pacific Islands Regional Administrator
National Marine Fisheries Service
1601 Kapiolani Blvd.
Honolulu, Hawaii 96814

Re: Draft Programmatic Environmental Impact Statement Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans

Dear Mr. Robinson:

The U.S Fish and Wildlife Service (Service) has reviewed the Draft Programmatic Environmental Impact Statement Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans (DPEIS). The DPEIS was prepared by staff of the Western Pacific Regional Fishery Management Council (Council). Based on the preferred alternatives analyzed in this DPEIS, the Federal action that would be implemented is the realignment of the existing fishery regulations contained in the Council's five current species-based Fishery Management Plan regulations into geographically-based Fishery Ecosystem Plan regulations. The measures being considered include identification of appropriate boundaries, management unit species, and advisory bodies that would result in the reorganization of current species-based fishery regulations into geographically-based fishery management areas in the Western Pacific Region.

This letter has been prepared under the authority of and in accordance with provisions of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852], as amended (NEPA), the National Wildlife Refuge System Administration Act, as amended (NWRSAA), and other authorities mandating Service concern for environmental values. Based on these authorities, we offer the following comments for your consideration.

GENERAL COMMENTS

In general, we recognize that a great amount of work has gone into producing this DPEIS. Yet, despite the lengthy comments previously expressed by the Service and Department of the Interior and formal agreements between the National Marine Fisheries Service (NMFS) and the

Service regarding jurisdictional authorities that were incorporated into the Coral Reef Ecosystem Fishery Management Plan, many of our substantive concerns regarding the Service's exclusive authority to manage fisheries within the boundaries of 10 National Wildlife Refuges (NWRs) in the Central Pacific Ocean remain inadequately addressed and not clearly described in the analyses contained in this DPEIS.

Management Responsibility for National Wildlife Refuge Resources

The DPEIS includes a discussion of NMFS as the primary Federal agency responsible for stewardship of the nation's living marine resources and their habitats. We appreciate NMFS' stewardship efforts, but given that the focus of this DPEIS is to establish a geographic-based ecosystem approach, the DPEIS should more fully disclose that the Service also has a legally mandated public stewardship responsibility to manage submerged lands and waters within 10 NWRs in the Central Pacific Ocean. U.S. coral reefs, submerged lands, and territorial seas associated with these NWRs are administered by the Service under the general regulations for the National Wildlife Refuge System published under Title 50, Code of Federal Regulations. We believe that Congress intends the Service to have primary responsibility for managing fish and wildlife resources within NWRs that are located in Federal waters. The Department of Justice Office of Legal Counsel's 2000 legal opinion regarding jurisdiction in the Northwestern Hawaiian Islands substantiates the Service's legal authority to be the primary federal agency for managing fish and wildlife resources and their habitats within a NWR. We recommend that the Final PEIS include a section on how the Service's existing geographic-based natural resource approach and legal authorities will be incorporated into the NMFS Fishery Ecosystem Plans. Section 304 of the Magnuson Stevens Fishery Conservation and Management Act (MSFCMA) supports this recommendation by mandating that Fishery Management Plans be consistent with any applicable law, such as the NWRSAA.

<u>SPECIFIC COMMENTS</u>

Section 1.2.3; Roles and Responsibilities of the Federal Government...; pg 4; first paragraph; first sentence: We recommend that this sentence be changed to read as follows: "The U.S. Fish and Wildlife Service manages waters and submerged lands within Baker Island NWR, Howland Island NWR, Jarvis Island NWR, Kingman Reef NWR, Palmyra Atoll NWR, Johnston Island NWR, Rose Atoll NWR, Guam NWR, Midway Atoll NWR and Hawaiian Islands NWR and provides a comprehensive conservation approach to protect and conserve fish, wildlife and plants and their habitats for the continuing benefit of present and future generations of Americans."

Section 1.2.3; Roles and Responsibilities of the Federal Government...; pg. 4 first paragraph: We recommend that the following sentence be inserted after the first sentence of this paragraph: "Fishing is not allowed in any waters withdrawn as a NWR by the President or Secretary of the Interior unless specifically authorized by regulations issued by the Service." It is essential to include this sentence in the Final PEIS because NMFS agreed to include this clarifying language in the Record of Decision for the Coral Reef Ecosystem Fishery Management Plan (CREFMP) and in subsequent rules and regulations implementing the CREFMP. In addition, this exclusive regulatory authority of the Service to manage fisheries in NWRs applies to all current Fishery Management Plans and is particularly important to include in this PEIS because the establishment of boundaries for Fishery Ecosystem Plans in the Western Pacific Region is the proposed Federal action and categorized as regulatory in this document.

Section 2.1 Issue 1: Fishery Ecosystem Plan Boundaries (Regulatory); pg 22; first paragraph; last sentence: Because of the significance of the role that the 10 NWRs play as existing Marine Protected Areas and NMFS' desire to establish place-based regulations, we recommend that the last sentence specifically identify the NWRSAA as a law that will be complied with in implementing the proposed action. Thus, the last sentence will read: "These actions will be taken in accordance with the MSA, NEPA, ESA, MMPA, NWRSAA, and other applicable laws and statutes."

Section 3.5.1.2 Protected Species; pg 103; Table 20 Title: Please modify the second sentence to read as follows: "Twelve species of migratory seabirds reside at Rose Atoll NWR...

Section 3.5.5.1 Baker Island; pg. 153; Social Environment; Baker Island NWR was established in 1974, not 1936. Also, please correct the fifth sentence to read as follows: "The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take marine protected area (MPA)." In addition, please delete the last sentence because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the extent of the no-take MPA at Baker Island NWR.

Section 3.5.5.2 Howland Island; pg. 155; Social Environment; Howland Island NWR was established in 1974, not 1976. Also, please correct the seventh sentence to read as follows: "The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take MPA." In addition, please delete the last sentence because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the true extent of the no-take MPA at Howland Island NWR.

Section 3.5.5.3 Jarvis Island; pg. 156-157; Social Environment; Jarvis Island NWR was established in 1974, not 1976. Also, please correct the fourth sentence to read as follows: "The Refuge boundary, established by the President of the United States, lies 3 nm seaward of the shoreline and this area is managed by USFWS as a no-take MPA." In addition, please delete the last sentence because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the true extent of the no-take MPA at Jarvis Island NWR.

Section 3.5.5.4 Palmyra Atoll; pg. 158; Social Environment; Please correct the eighth sentence to read as follows: "The Refuge boundary, established by the Secretary of the Interior in 2001, coincides with the 12-nm territorial seas boundary and this area is managed by USFWS as a no-commercial-take MPA." Also, please delete the last sentence because the Council's 50-fathom low-use MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the extent of the no-take MPA at Palmyra Atoll NWR.

Section 3.5.5.5 Kingman Reef; pg. 159: This section does not include a "Social Environment" sub-section and fails to identify the existence of Kingman Reef NWR to the public. To correct this omission, please add the following sentences: "Since 2001, Kingman Reef has been a National Wildlife Refuge managed by USFWS. The Refuge boundary, established by the Secretary of the Interior, coincides with the 12-nm territorial seas boundary and this area is managed by USFWS as a no-take MPA." Also, please delete the last sentence because the Council's 50-fathom no-take MPA is within the Refuge and does not provide any additional protection. Inclusion of the sentence confuses the public as to the true extent of the no-take MPA at Kingman Reef NWR.

Section 3.5.5.6 Johnston Atoll; pg 161; Social Environment; pg 161: Please correct the sixth sentence to read as follows: "Today, the U.S. Air Force continues to maintain administrative jurisdiction and control over the 3-nm Naval Defensive Sea around Johnston Atoll and access to this area is prohibited. Also, the USFWS continues to manage Johnston Atoll as a National Wildlife Refuge. Note: The USFWS rescinded its recreational fishing regulations at Johnston Island NWR because there are no longer any military personnel stationed on Johnston Island."

Chapter 5 Environmental Management Issues; Section 5.7 Possible Conflicts Between the Alternatives and Other Plans; pg 219: The DPEIS fails to provide a full and objective discussion of significant impacts of the proposed action on the Service's ability to manage NWRs. Commercial fishing within the Pacific NWRs is an activity that is not allowed by the Service. If the DPEIS is implemented as currently written, the Service's ability to manage marine resources within NWR ecosystems will be seriously compromised because activities that would be permitted under the Final PEIS would violate the Service's current management regimes at these NWRs. We are very concerned that the proposed type of overlapping management regime alluded to in the DPEIS appears to have a strong potential to result in unnecessary duplication of effort, bureaucracy, and expenditures, and be a source of confusion both to the Service and NMFS, as well as to the public. In our view, Council and NMFS pursuit of applying the proposed DPEIS place-based management regime within NWRs has been a misdirection of effort since the NWRSAA requires that the Service maintain sole and exclusive management authority over NWRs. To avoid unnecessary conflicts, we recommend that NMFS produce a Final PEIS that includes MPAs that are compatible with and reflective of the management regime currently being implemented by the Service within these Pacific NWRs.

SUMMARY COMMENTS

Deficiencies in the DPEIS preclude its use as a basis for a meaningful analysis of anticipated impacts to fish and wildlife resources and NWR management under the newly proposed fishery regulatory regime. The DPEIS does not fully analyze the proposed alternatives for their compatibility with the primary purposes for which the relevant NWRs were established. Finally, the DPEIS proposes activities that are incompatible with the National Wildlife Refuge System requirements found at 50 CFR 29. Because of this, it appears that the proposed Fishery Ecosystem Plans would also violate the intent of Section 304 of the MSFCMA that fishery plans and their amendments be developed and implemented in compliance with all applicable law. Therefore, we recommend that the Final PEIS include a thorough and complete analysis of the affects of the proposed Federal action on existing NWRs. If these deficiencies are not corrected in the Final PEIS, the Service will refer the matter to the Council of Environmental Quality, pursuant to 40 CFR 1504.

Although we agree with the general concept of using an ecosystem approach to managing the nation's ocean resources, we, nevertheless, desire to continue to pursue resolution of these significant marine conservation issues with your agency. We hope that these comments will enable NMFS to more fully address our basic concerns. We look forward to continuing to work with NMFS and Council toward development of a Final PEIS that is consistent with all applicable laws and that represents an adequate basis for decision-makers.

If you have questions regarding these comments, please contact either myself at (808) 792-9400 or Hawaii and Pacific Islands National Wildlife Refuge Complex Project Leader, Barry Stieglitz, at (808) 792-9540.

Sincerely,

Patrick Leonard

Patrick Leonard
Field Supervisor

cc: CEQ, Washington DC
FWS, Washington DC
FWS, Region 1, Portland Oregon
FWS, Refuges, Honolulu, Hawaii
USEPA - Region IX, San Francisco, California
USEPA - Region IX, Honolulu, Hawaii
NMFS, Strategic Planning Office, Silver Springs, Maryland
NOS-NWHICRER, Honolulu, Hawaii
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 22 2005

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

National Marine Fisheries Service
Attention: William L. Robinson
Pacific Islands Region
1601 Kapiolani Blvd., Ste. 1101
Honolulu, HI 96814

Dear Mr. Robinson:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act (NEPA), the Environmental Protection Agency (EPA) has reviewed the Draft Programmatic Environmental Impact Statement (DPEIS) "Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans."

The EPA fully supports taking an ecosystem approach to fisheries management and commends NMFS for preparation of this initial analysis. EPA understands that this Programmatic EIS is the first step towards developing and implementing the appropriate institutional framework and foundation for future fisheries management under an ecosystem approach (i.e., Fishery Ecosystem Plans (FEPs)). We support the ecosystem approach presented in the DPEIS. The preferred FEP Boundary alternative (Issue 1: Fishery Ecosystem Boundaries: Alternative 1C) that encloses each of the region's four archipelagic areas and a single pelagic FEP appears to be an appropriate approach for delineating FEP boundaries. Clearly, such an approach will provide significant positive long term impacts to the fisheries.

EPA's overall rating of the DPEIS is LO-Lack of Objection to the proposed action. Although we rated the document LO, EPA requests that the following issues be clarified and addressed in the DPEIS. Specifically, the general issues are as follows:

1.) Issue 2: List Of Management Unit Species (MUS) discusses the various options for MUS 1 lists that will be managed under an ecosystem approach. The preferred option for Issue 2, Alternative 2B, chosen by NMFS/Council is to define and manage only the current MUS 1 listed fisheries believed to be present within each developed Fishery Ecosystem Plan boundary. The DPEIS states that "while principles of ecosystem approach to fisheries management direct managers to consider predator/prey relationships for each target species, it does not require managers to manage every species under an ecosystem approach." While EPA understands it would be difficult to monitor and manage all species under an ecosystem approach, an option that takes into account other species occupying the same niche as fisheries and that interact with fisheries may be more appropriate from an ecosystem management standpoint. EPA believes that Alternative 2C, which defines MUS as those current fisheries plus incidentally caught and associated species that are known to occur within each FEP boundary is more in line with a ecosystem approach. Accordingly, EPA suggests that the FPEIS provide a more in depth comparison of Alternatives 2C to Alternative 2B for Issue 2.

2.) We support the provisions that Alternative 2B for Issue 2 provides for protection of target and non-target stocks as well as protected species. While the DPEIS discusses how the removal of species from the MUS list not physically present in the FEP would be part of an adaptive management approach, it does not discuss how species could be added to the MUS list if evidence becomes available that they are present in the FEP boundary. With this in mind, EPA suggests that the FPEIS discuss the adaptive management measures that will be taken to ensure that all ecosystem important species will be included in the FEP's MUS list and the measures that will be taken to include species that prove important to managing species within each FEP.

3.) There is no discussion under Issue 2, List of MUS, about how the species managed under the restructured MUS lists will be monitored. Under the existing Fishery Management Plans, stock assessments of managed fisheries are to be conducted on an annual basis. Alternative 2 does not specify how the species to be managed will be assessed and how the frequency of the assessments may or may not impact the approach to ecosystem management. In addition to the question on monitoring, the FPEIS should address how the NMFS/Council will provide for funds to ensure that species managed under the proposed FEPs will be adequately monitored and that the adaptive management approach is working to a sufficient degree to protect managed species.

We appreciate the opportunity to review this DPEIS. We also look forward to reviewing future documents related to this project. The staff contact for this review is Matthew Harrington and he can be reached at (202) 564-7148.

Sincerely,

Anne N. Miller

Anne Norton Miller
Director
Office of Federal Activities

cc: Steve Kokkinakis; NOAA Office of Strategic Planning
John Hansel; NMFS Office of Sustainable Fisheries