CHAPTER 1 INTRODUCTION

1.0 Introduction

This draft programmatic environmental impact statement (DPEIS) analyzes the impacts on the human environment resulting from phase one of the implementation of an ecosystem approach to fisheries management in the Western Pacific Region (American Samoa, Guam, Hawaii, the Commonwealth of the Northern Mariana Islands, and the U.S. Pacific Remote Island Areas[1]). The analysis presented here is based on the terms established by the National Environmental Policy Act (42 U.S.C. 4321 et seq.) and its corresponding regulations (40 CFR §§1500-1508). Chapter 1 provides the purpose and need for initiating an incremental approach to managing fisheries under an ecosystem context. Chapter 1 also provides background information on fishery management in the Western Pacific Region, as well as an overview of important topics related to managing fisheries within an ecosystem approach.

1.1 Statement of Purpose and Need

The Western Pacific Region includes a series of archipelagos 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, their families, and their island communities. This remains true in the today's modern era where 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 tasked with managing marine resources are moving towards an ecosystem approach to fisheries management. One reason for this shift is a growing awareness that many of the Earth's marine resources are stressed and the ecosystems that support them are degraded. In addition, increased concern regarding the potential impacts of fishing and non-fishing activities on the marine environment, as well as a greater understanding of the relationships between ecosystem changes and population dynamics have all fostered support for a holistic approach to fisheries management that is science-based and forward thinking (Pikitch et al. 2004).

The National Oceanic and Atmospheric Administration (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 provides that 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

[1]The remote island areas include Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Wake Island, Palmyra Atoll, and Midway Islands. Although physically located in Hawaii, Midway is considered part of the PRIAs because it is not a part of the State of Hawaii.

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 the National Marine Fisheries Service (NMFS) to establish the Ecosystem Principles Advisory Panel (Panel) which was responsible for assessing the extent to which ecosystem principles were being used in fisheries management and research and recommending how to further their 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.

The Panel reached consensus that Fishery Ecosystem Plans (FEPs) should be developed and implemented to manage U.S. fisheries and marine resources (EPAP 1999). According to the Panel, an FEP should contain and implement a management framework to control harvests of marine resources based on available information regarding the structure and function of the ecosystem in which such harvests occur. The Panel also constructed seven ecosystem principles that they believe to be important to the successful management of marine ecosystems (see Section 1.5).

In recognition of the Panel's findings, the Western Pacific Regional Fishery Management Council (Council) has recommended to initiate an incremental shift towards an ecosystem approach by the establishment and implementation of FEPs for fisheries of the Western Pacific Region. The first phase of this incremental shift will establish the appropriate institutional framework and foundation (place-based FEPs) for future fisheries management under an ecosystem approach. Subsequent phases of fishery management actions will expand on the FEP foundation using the best available information and adaptive management.

Based on the preferred alternatives in this DPEIS, the Federal action to be implemented would be 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. Although some alternatives considered here would create various Fishery Ecosystem Plan boundaries and modify existing lists of management unit species, no alternatives would result in substantive changes to existing fishing regulations. Instead, the preferred action would establish an institutional structure for the development of future management and regulatory measures under an ecosystem approach. From a greater understanding of ecosystem dynamics derived from enhanced ecosystem science and research, new information and adaptive management will lead to the consideration of FEP amendments. As is the current practice with FMP amendments, future FEP amendments will be developed and implemented in compliance with all applicable law.

1.2 Fisheries Management in the Western Pacific Region

1.2.1 The Magnuson-Stevens Fishery Conservation and Management Act and the Fishery Management Councils

The 1976 Magnuson Fishery Conservation and Management Act (later amended to the Magnuson-Stevens Fishery Conservation and Management Act or MSA) established U.S.

jurisdiction from the seaward boundary of the territorial sea out to 200 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 domestic marine fisheries. The purposes of the MSA include: the conservation and management of the fishery resources of the United States; the protection of essential fish habitat; 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 which are underutilized or not utilized.

The MSA created eight regional fishery management councils to provide advice and recommendations to the Secretary of Commerce through the U.S. Department of Commerce, NOAA and NMFS. As described in the MSA, the Western Pacific Regional Fishery Management Council is responsible for the preparation and transmittal to the Secretary of Commerce of appropriate, science-based Fishery Management Plans (and amendments to those plans) for each fishery in the Western Pacific Region under its jurisdiction. The Secretary of Commerce shall then approve, disapprove, or partially approve each FMP or amendment and implements them through regulations and enforcement. Federal fisheries in the Western Pacific Region are currently managed under five species-based FMPs: Pelagics, Coral Reef Ecosystems, Bottomfish and Seamount Groundfish, Crustaceans, and Precious Corals.

1.2.2 NOAA's National Marine Fisheries Service

The National Marine Fisheries Service is an agency within the U.S. Commerce Department's National Oceanic and Atmospheric Administration, 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.

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

In the Western Pacific Region, responsibility for the management of marine resources is shared by a number of Federal and local government agencies. At the Federal level the Council, NMFS, NOAA and the U.S. Department of Commerce develop and implement fishery management measures as described above. Additionally, NOAA's Ocean Service co-manages (with the State of Hawaii) the Hawaiian Islands Humpback Whale National Marine Sanctuary, manages the

Fagatele Bay National Marine Sanctuary in American Samoa, and administers the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

The U.S. Department of the Interior, through the U.S. Fish and Wildlife Service manages waters surrounding ten National Wildlife Refuges throughout the Western Pacific Region. The U.S. Department of Defense, through the Air Force, Army, Navy and Marine Corp also controls access and use of various marine waters throughout the region.

The Territory of American Samoa, the Territory of Guam, and the State of Hawaii manage all marine resources within waters 0-3 miles from their shorelines. In the Commonwealth of the Northern Mariana Islands (CNMI), the submerged lands and marine resources from the shoreline to 200 miles has been found (by the U.S. District Court 9th Circuit) to be owned by the Federal government, although CNMI is currently seeking to acquire jurisdiction of the territorial sea around CNMI through various legal avenues.

1.2.4 Fishery Management Plans of the Western Pacific Region

1.2.4.1 Coral Reef Ecosystems FMP

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

1. Establish a network of marine protected areas (MPA) in the Pacific Remote Island Areas (PRIA). Howland, Baker, Jarvis Islands, Rose Atoll and Kingman Reef have been designated as no-take MPAs. Palmyra, Johnston Atolls and Wake Islands are designated as low-use MPAs where fishing is allowed under special fishing permits.
2. Establish a special permit and Federal reporting system for controlling and monitoring the harvest of certain coral reef ecosystem MUS for which there is little or no information. Special permits are also required to fish in all areas designated as low-use MPAs. The FMP also uses data collected under existing local reporting systems to monitor the harvest of currently fished coral reef ecosystem management unit species (MUS);
3. Prohibit the use of destructive and non-selective fishing gears;
4. Prohibit harvesting of coral and live rock, but allow limited take under the special permit system for collection of seed stock by aquaculture operations, and religious/cultural use by indigenous peoples;
5. Incorporate an 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. Consider and take into account in management, the historical and cultural dependence of coral reef resources by indigenous people and;
7. Identify and prioritize coral reef related research needs for each island area, including socio-economic and cultural research for future potential allocation of resources.

1.2.4.2 Bottomfish and Seamount Groundfish FMP

The Bottomfish and Seamount Groundfish FMP was implemented in 1986. It prohibits certain destructive fishing techniques, including explosives, poisons, trawl nets and bottom-set gillnets; establishes a moratorium on the commercial harvest of seamount groundfish stocks at the Hancock Seamounts; and implements a permit system for fishing for bottomfish in the EEZ around the Northwestern Hawaiian Islands (NWHI). The moratorium on the commercial harvest of seamount groundfish stocks at the Hancock Seamounts, the only exploitable seamount habitat in the management area, remains in effect. At its 123rd meeting, June 21-24, 2004, the Council recommended an extension of the moratorium until August 31, 2010, which was approved and implemented by NMFS (69 FR 51400). Consequently, there is no seamount groundfish fishery in the region. The plan also establishes 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.

The FMP has been amended seven times since 1986. Implemented in 1987, Amendment 1 includes the establishment of potential limited access systems for bottomfish fisheries in the EEZ surrounding American Samoa and Guam within the framework measures of the FMP. Amendment 2 (1988) divides the EEZ around the NWHI into two zones: the Ho`omalu Zone to the northwest and the Mau Zone to the southeast. The amendment also establishes a limited access system for the Ho`omalu Zone. Amendment 3 (1991), which has been supplanted by Amendment 6, defined 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. Amendment 3 also delineated the process by which overfishing is monitored and evaluated. Amendment 4 (1990) requires vessel owners or operators to notify NMFS at least 72 hours before leaving port if they intend to fish in a 50 nm “protected species study zone” around the NWHI. This notification allows Federal observers to be placed on board bottomfish vessels to record interactions with protected species if this action is deemed necessary.

Amendment 5 (1999) establishes a limited access system for the Mau Zone and a framework for a Community Development Program. Amendment 6 (1999) identifies and describes essential fish habitat for managed species of bottomfish, discusses measures to minimize bycatch and bycatch mortality in the bottomfish fishery, provides criteria for identifying when overfishing has occurred in the fishery and describes fishing communities in the Region. Amendment 6 initially was only partially approved, with the provisions for bycatch, overfishing and fishing communities in Hawaii disapproved. The disapproved provisions were rewritten and the revised provisions have been implemented. Amendment 7 (2004) brings the Bottomfish FMP into conformity with the Coral Reef Ecosystem (CRE) FMP by prohibiting fishing for BMUS in the CRE FMP’s no-take areas and amending the BMUS list to exclude species now managed under the CRE FMP.

1.2.4.3 Precious Corals FMP

The Precious Corals FMP was implemented in 1983. The plan established harvest quotas for separate beds, a minimum size limit for pink coral, gear restrictions, area restrictions and fishing seasons. The FMP has been amended five times. Amendment 1, implemented in 1988, applied 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; expanded the managed species to include any coral of the genus *Corallium*; and outlined provisions for experimental fishing permits. Amendment 2, implemented in 1991, defined 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. Amendment 3, implemented in 1998, established a framework procedure for adjustment of management measures. Amendment 4, implemented in 1998, identified and described essential fish habitat for managed species of precious corals, discussed measures to minimize bycatch and bycatch mortality in the precious corals fishery and provided criteria for identifying when overfishing has occurred in the fishery. Amendment 5, implemented in 2004, prohibits the harvest of precious corals management unit species in the no-take marine protected areas as designated under the Coral Reef Ecosystem FMP (waters shallower than 50 fathoms around Jarvis Island, Howland Island, Baker Island, Kingman Reef, and Rose Atoll).

1.2.4.4 Crustaceans FMP

The FMP was implemented in 1983. Initial provisions in the FMP include: a prohibition on fishing for spiny lobster within 20 nm of Laysan Island and within the EEZ landward of the 10 fm curve as depicted on National Ocean Survey Charts Numbers 19022, 19019, and 19016; a minimum size limit; requirements for gear design; prohibitions on retention of ovigerous females; and a mandatory logbook program. Since its implementation in 1983, the FMP has been amended ten times. Amendment 1, implemented in 1983, adopted State of Hawaii regulations in the EEZ around the main Hawaiian Islands (MHI). Amendment 2, implemented in 1983, specified trap opening dimensions. Amendment 3, implemented in 1985, clarified definitions for minimum size and tail length. Amendment 4, implemented in 1986, prohibited all lobster fishing in the FMP closed areas in the NWHI.

Amendment 5, implemented in 1987, established a minimum size for retained slipper lobsters and required escape panels in traps. Amendment 6, implemented in 1990, defined recruitment overfishing. Amendment 7, implemented in 1991, established a closed season, limited access system and adjustable annual harvest quota. Amendment 8, implemented in 1994, eliminated the "use-it-or-lose-it" landing requirement for permittees. Amendment 9, implemented in 1995, revised the annual harvest guideline and removed minimum size and condition restrictions in the NWHI fishery, thus establishing a "retain-all" fishery in which every lobster brought aboard is counted against the annual harvest guideline. Amendment 10, implemented in 1998, identified and described essential fish habitat for crustacean management unit species, discussed measures to minimize bycatch and bycatch mortality, and provided criteria for identifying when overfishing has occurred.

In 1998, bank-specific harvest guidelines were established through a framework regulatory measure. The annual harvest guideline represents 13 percent of the exploitable population, which

results in a 10 percent chance of overfishing the lobster stock at a particular permit area. In 1999, a process was established by which NMFS is authorized, in consultation with the Council, to allocate the annual harvest guideline among permit subareas (i.e. Necker Island, Gardner Pinnacles and all other NWHI lobster fishing grounds).

1.2.4.5 Pelagics FMP

The Pelagics FMP was implemented by NMFS on March 23, 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 encourage more domestic harvesting and utilization of fishery resources. The Pelagics FMP replaced a previous management regime, the Preliminary Management Plan (PMP), that 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. Establish a triggering mechanism to institute new area closures for foreign longline vessels in the EEZ.
2. Eliminate existing quotas on foreign longline catch in the EEZ.
3. Require catch data and reporting of fishery interactions with protected species in the EEZ.
4. Prohibit the use of drift gill nets in the EEZ (except by domestic vessels fishing under an experimental permit).
5. In cooperation with the State Department, establish 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) required that catch and effort data for species managed under the FMP (pelagic management unit species or PMUS) 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]
The objectives of the plan were revised in 1991, and are summarized as follows:

- Manage fisheries for PMUS to achieve optimum yield (OY).
- Promote domestic harvest of and domestic fishery values associated with PMUS (e.g., by enhancing the opportunities for satisfying recreational fishing experiences, continuation of traditional fishing practices, and domestic commercial fishers to engage in profitable operations).

[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 management unit species 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 managed under the South Pacific Tuna Treaty (SPTT), although provisions of the Pelagics FMP do 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.

- Diminish gear conflicts in the EEZ, particularly in areas of concentrated domestic fishing.
- Improve the statistical base for conducting better stock assessments and fishery evaluations.
- Promote the formation of regional/international arrangements for assessing and conserving PMUS throughout their range.
- Preclude waste of PMUS associated with longline, purse seine, pole-and-line or other fishing operations.
- Promote domestic marketing of PMUS in American Samoa, Guam, Hawaii and the Northern Mariana Islands.

Over the ensuing years, the FMP has been amended a number of times. Table 2 summarizes amendments of and other changes to the Pelagics FMP.

Table 2: Amendments to the Pelagics FMP

AMENDMENTS		
No.	**Effective Date**	**Action**
1	March 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 with the above definitions and National Standards 1 and 2 of the MSA.
2	May 26, 1991 (except "Protected Species Zone" - July 16, 1991)	(Preceded 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 log book data on their fishing and transhipping activities. Extends the jurisdiction of the FMP to include the CNMI. Adds tuna to managed species after 1991. Establishes a "Protected Species Zone" in the NWHI. 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	October 14, 1991	(Preceded by an emergency rule.) Prohibits longline fishing within 50 nm of certain NWHI as well as within corridors between those islands. Abrogated the requirement for observers established in Amendment 2. Required notification of NMFS when transiting the zone.
4	October 10, 1991	(Preceded 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 for PMUS. Provides a framework under which VMS may be required.
5	March 2, 1992	(Preceded 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 nm also is implemented around Guam and its offshore banks. Framework procedures are established to adjust the size of the closed areas and modify criteria for exemptions.

6	November 27, 1992	Brings FMP into consistency with the 1990 amendments to the MFCMA. 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	June 24, 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	February 3, 1999	Implements provisions of the SFA for EFH and the definitions of fishing community for Western Pacific island areas except Hawaii.
8	July 3, 2003	Implements provisions of the SFA for bycatch, overfishing definitions and control rules, and definitions of fishing communities for Hawaii.
9	In Revision	(Draft Amendment establishing limits on shark landings was rendered moot by the Shark Finning Prohibition Act.)
10	March 25, 2004	Implements parts of the Coral Reef Ecosystems FMP. Prohibits fishing for PMUS in CREFMP no-take MPAs. Amends the list of PMUS.
11	May 24, 2005	Establishes a limited entry program for the American Samoa longline fishery.
FRAMEWORK AMENDMENTS		
No.	**Effective Date**	**Action**
1	March 1, 2002	Prohibits vessels greater than 50 feet in overall length from fishing for PMUS between 3 and 50 nm around the islands of American Samoa.
2	June 13, 2002	(Preceded 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. (Codifies terms and conditions of FWS BiOp of November 28, 2000.)
REGULATORY AMENDMENTS		
1	June 12, 2002	Implements the RPA of NMFS' March 29, 2001 BiOp intended to reduce interactions between endangered and threatened sea turtles and pelagic fishing gear and to mitigate harmful effects of interactions that occur. Prohibits targeting of swordfish north of the equator by 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°), 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 ft must carry line clippers, dip nets, wire or bolt cutters. Float lines must be longer than 20 m. 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 m. Vessel operators must attend and be certified for a protected species workshop.
2	October 4, 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	April 2, 2004	Reopens the swordfish-directed component of the Hawaii-based longline fishery and eliminates a seasonal closure for longline fishing in an area south of the Hawaiian Islands. For swordfish fishing, establishes required types of hooks and bait; annual fleet-wide limits on interactions with leatherback and loggerhead sea turtles, annual fleet-wide limit on fishing effort, and other mitigation measures including the necessity for setting at night when fishing above 23°N.

1.3 The National Environmental Policy Act

This document was prepared to meet the requirements of NEPA, the Nation's primary environmental disclosure law. Passed by Congress in 1969 and signed into law in 1970 by then President Nixon, NEPA requires, amongst other things, that Federal agencies prepare Environmental Impact Statements (EIS) for all major actions which may significantly affect the quality of the human environment. Through the preparation of an EIS, Federal agencies make available for public review and comment the environmental information and analysis that inform their decisions.

1.3.1 Programmatic EIS

In addition to major Federal actions, NEPA also requires the development of an EIS for cumulative or connected actions, as well as for regional planning or new Federal programs (40 CFR 1502.4(b)). NEPA encourages the use of program, policy, or plan EAs and EISs (i.e. programmatic EAs and EISs) to eliminate repetitive discussion of similar issues (40 CFR 1500.4(i)). Generally, a programmatic EIS (PEIS) is a broad-based evaluation that examines a program to be implemented on a large-scale. Based on a review of NEPA, NMFS and the Council have determined that a PEIS is an appropriate vehicle for the analysis of issues involved with the establishment of institutional structures that allow the Council to move towards an ecosystem approach to fisheries management in the Western Pacific Region. NEPA regulations further suggest, and NMFS and the Council intend, that the broad, program-oriented issue analyses found in a PEIS may then be incorporated by reference where appropriate in future Environmental Assessments or EISs that focus on specific subsequent Federal actions. This concept is defined as 'tiering' in 40 CFR 1508.28.

Subsequent phases to further ecosystem approaches to fisheries management in the Western Pacific Region will build off the institutional structure established from this first step—the shift from species-based FMPs to place-based FEPs. The NEPA documentation for subsequent steps will, as appropriate, utilize the tiering concept and incorporate related information and analyses contained in this DPEIS. Although the scope of subsequent phases to further implement ecosystem approaches to fisheries management in the Western Pacific Region are currently unknown, future management measures and FEP amendments will be developed and implemented to comply with all applicable law.

1.3.2 Public Participation

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. NOAA's administrative procedures to implement NEPA (NAO 216-6) further suggest that public hearings also be conducted after the DEIS is made available to the public, thus affording the public another opportunity to comment and participate in the decision making process.

1.3.3 Notice of Intent and Public Scoping

NEPA regulations (40 CFR 1501.7) state "[t]here shall be an early and open process for determining the scope of issues to be addressed in an EIS. This process is termed scoping." Once a decision has been made to develop an EIS for a proposed action, the scoping process is initiated with a publication of a Notice of Intent in the *Federal Register.* This notice describes the objectives of the action being considered and inviting the public to attend public scoping meetings so as to provide their comments and perspectives regarding the proposed action and related issues.

The Notice of Intent to prepare this DPEIS was published in the *Federal Register* on October 18, 2004 (69 FR 61351). Between October-November 2004, eight public scoping meetings were held across the Western Pacific Region, as described in the Notice of Intent and advertised in local newspapers. The dates and locations of the meetings are listed in Table 3.

Table 3: PEIS Public Scoping Meeting Schedule

Date	Location	Number of Attendees
October 27, 2004	Hilo, Hawaii, HI	24
October 28, 2004	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, step-wise 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 Councils 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, inter-jurisdictional issues, indigenous rights, community-based management, education, and enforcement. The public scoping meetings did not reveal any issues which required new categories of alternatives.

1.4 Coordination With Other Agencies

This document was drafted by staff of the Western Pacific Regional Fishery Management Council. Its analysis and conclusions were reviewed by NMFS as well as other NOAA agencies (e.g. the National Ocean Service's National Marine Sanctuary Program) prior to its release.

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, Pitkitch et al. 2004, Laffoley 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 amongst scientists and policy makers on how to best apply these often theoretical objectives and principles in a real-world regulatory environment (Hilborn 2004, Garcia 2003). In many cases it is a lack of scientific information that hinders their 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 due to various dynamic processes (Kay and Schneider 1994, Christensen et al. 1996, NMFS 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 1994). 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 (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 which is to be studied or influenced by management. Thus, the identification of ecosystem boundaries for management purposes may differ from those resulting from purely scientific assessments, but in all cases ecosystems are geographically defined, or in other words, place-based.

According to the Ecosystem Advisory Panel (1999), the following principles are important when considering and identifying marine ecosystems:

- The ability to predict ecosystem behavior is limited.
- Ecosystems have real thresholds and limits which, 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.
- Ecosytem boundaries are open.
- Ecosystems change with time.

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 (NMFS 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 which 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 becomes 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 Non-fishing 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, 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 non-target or incidental catches, minimizing fishing impacts to habitat, and eliminating interactions with protected species. While fisheries management has significantly improved in these areas in recent years, 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. 2004).

For example, fishing for a particular species at a level 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 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 non-fishing 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 in include:

- 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 arise from events such as weather cycles, hurricanes and environmental regime changes. While managers cannot regulate or otherwise control such events, their occurrence can often be predicted and appropriate management responses can lessen their adverse impacts.

Understanding the complex inter-relationships 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 inter-relationships 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 due to differences in collection methodologies coupled with a lack of meta-data or documentation of how the data was 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.

1.5.5 Use of Indicators and Models

Clearly 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) related to the structure, composition or function of an ecological system (MAFAC 2003, EPAP 1999, de Young et al. 2004).

<u>Indicators</u>

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); why it is important, and what should be done (response variables, e.g. management measures). This pressure-state-response framework provides an intuitive 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 pers. comm.).

While much has been written on potential marine ecosystem indicators (FAO 1999, ICES 2000, ICES 2005) to date there are no established reference points for optimal ecosystem structures, composition, or functions. Due to 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 2004). 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 (Polovina 1984, Polovina et al. 1994 and 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) cautions 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. Multi-species Management

A major theme in ecosystem approaches to fisheries management is the movement from conventional, single-species management to multi-species management (Sherman 1986, Mace 2004). Multi-species 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 over exploited (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 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 and multi-species models are valuable tools in this analysis. In addition, fishery science and management must remain open and transparent and must not be subjected to distorting political perspectives, whether public or private.

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 (Murawski 2004, ICES 2000, and Witherell et al. 2000). 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 (Sissenwine and Murawski 2004, Browman and Stergiou 2004).

1.5.7 Ocean Zoning

The use of ocean zoning to regulate fishing and non-fishing activities has been a second major theme in the development of marine ecosystem management theory (Browman and Stergiou 2004). 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 Marine Protected Areas (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 marine protected areas. 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 2005). Today MPAs can be found throughout the Western Pacific Region and are considered an essential part of marine management. Ongoing research and outreach is 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 Intra-agency and Inter-agency Cooperation

To be successful, ecosystem approaches to management must be designed to foster intra and inter-agency cooperation and communication (Schrope 2002 in NOAA 2003). 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. International management bodies include the Western and Central Pacific Fisheries Commission, the Inter-American Tropical Tuna Commission, and the Forum Fisheries Agency. 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. Coordination with state and local governments will be especially important to the improved management of near-shore resources as these are not under Federal authority. The recently released 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 amongst Federal and local government agencies. One scenario would be to centralize virtually all domestic marine management authority within one agency, however this would fail to utilize the local expertise and experience contained in existing agencies and offices and would likely lead to poor decision making and increased social and political conflict.

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 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, Sissenwine and Murawski 2004, NOAA 2004). This viewpoint was highly stressed at the Council convened Ecosystem Science and Management Planning Workshop held April 18-22, 2005 in Honolulu, HI, which was attended by world renowned ecosystem scientists as well as high-level government agency officials. 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. The Council is currently planning a second workshop to be held in January 2006, which is titled Ecosystem Social and Policy Science Workshop. The objective this second workshop is to identify the social and policy science requirements to support ecosystem approaches to marine resource management and the development of such approaches in the Western Pacific Region. A third workshop is being planned to build off of the recommendations generated from the April 2005 and January 2006 ecosystem workshops.

The goal of the Federal action contemplated in this PEIS is to begin the incremental process by establishing western Pacific FEPs with appropriate boundaries and management unit species. Other issues (non-regulatory) such as the Council's advisory structure, regional coordination, and international coordination are also considered in this DPEIS as a means for the Council to round-out the first step of implementing an ecosystem approach by determine the best approach to gather information on fishing and non-fishing activities impacting ecosystems on various scales. The proposed action will establish the appropriate institutional framework and foundation for future fisheries management under an ecosystem approach.

As described in Section 1.5, successful ecosystem management will require an increased understanding of a range of social and scientific issues including appropriate management objectives, biological and trophic relationships, ecosystem indicators and models, and the ecological effects of fishing and non-fishing activities on the marine environment. While work on some of these issues has been conducted, there is clear need for increased efforts in ecosystem research as well as clear need for how information derived from such research should be incorporated into fishery management decisions. For example, the use of indicators as they relate to ecosystem variability coupled with predictive models will likely be a powerful tool for fisheries managers. However, as discussed at length during the Ecosystem Science and Management Planning Workshop (April 2005, Honolulu), in order to select appropriate indicators as well as to develop appropriate models, management objectives and ecosystem science priorities need to be melded. The outcome of the upcoming series of ecosystem science and management workshops will hopefully fulfill such coordination to prioritize ecosystem management objectives and science.

The Ecosystem Principals Advisory Panel (1999) recommended 8 management and policy measures to further develop Fishery Ecosystem Plans in which the Council may consider. The Panel's recommendations are to:

- Delineate the geographic extend of the ecosystem(s) that occur(s) within Council authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, an "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 plant 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 kind of buffers against uncertainty are included in conservation and management actions.
- Develop indices of ecosystem health as targets as management.
- Describe available long-term monitoring data and how they are used.
- Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/Department of Commerce authority. Included should be a strategy to address those influences to achieved both FMP and FEP objectives.

Under the incremental approach proposed in this document, future fishery management actions will utilize 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. At this point in time, the administrative costs to advance the implementation of ecosystem science and management in the Western Pacific Region are unknown, however, what is known is that it will take increased coordination amongst the Council, NMFS Pacific Islands Fisheries Science Center, NMFS' Pacific Islands Regional Office, state and local government agencies, and resource user and community groups. As new information becomes available and adaptive management through the Council process occurs, the future proposed actions and the impact analysis of such actions will be in compliance with all applicable laws and statutes (e.g. ESA, MMPA, NEPA).